HAND BOOK

स्नातकोत्तर शिक्षक (भौतिक) के लिए सेवकालीन प्रशिक्षण कार्यक्रम का आयोजन

17.05.2018 से 28.05.2018 तक

IN-SERVICE TRAINIG COURSE FOR PGT (PHYSICS)

FROM 17.05.2018 TO 28.05.2018

प्रतिभागीसंभाग / PARTICIPATING REGION

के.वि.सं. आगराचंडीगढ़, दिल्ली,देहारादून, गुड़गाँव, पटनाएवंतिनसुकियासंभाग

KVS AGRA, CHANDIGARH, DELHI, DEHRADUN, GURUGAON AND JAMMU REGION

कार्यस्थल:

शिक्षाएवंप्रशिक्षणआंचलिकसंस्थान, चंडीगढ़

Zonal Institute of Education & Training, Chandigarh

OUR PATRON

श्री रणवीर सिंह
निदेशक सेवा कालीन प्रशिक्षणएबं
शिक्षाएवंप्रशिक्षणआंचलिकसंस्थान, चंडीगढ़
(उपायुक्त, चंडीगढ़ संभाग)

श्रीमती अलका गुप्ता
सह निदेशक सेवा कालीन प्रशिक्षण
(सह आयुक्त देहरादून संभाग)

अरुण कुमार
(ज्ञानसाधक)

अनुपम एस प्रकाश
(ज्ञानसाधक)

FROM THE DESK OF THE COURSE DIRECTOR……

Planning and executing different In-service Course is a regular phenomenon while working in the Kendriya Vidyalaya Sangathan. Many such courses have been successfully organized in ZIET Chandigarh in the past, but this In-service Course for PGT (Physics) was different in many ways since the day the responsibility was entrusted with us.

It was necessary to organize this course for a vital subject like Physics because many changes are being introduced in this subject during recent past, taking from the coverage of topics, marks distribution, methodology, new techniques of teaching and meeting the expectations of students, parents and society in general.

The topics covered during the first spell are all related to these areas and address the need of the hour. I believe that the participants who have come to the venue with lot many expectations would not return unquenched. Their own knowledge combined with the newly acquired experience and exposure will bring about that difference in manner as well as attitude towards teaching and help them in attaining new heights in their professional life.

The I spell of this In-service Course was to emphasise especially on the knowledge segment, whereas the II spell would be laying more stress on practice and demonstrations of teaching methodology. But one thing that remains common in these two spells is the sessions on life skills, Computer Aided Teaching Skills and Digital Classrooms etc. These are some of the areas where our teachers have lay stress and adopt such methodology that suits time as well as demand of the society.

I am thankful to the team of participants who have spared no effort to make this spell if In service Course successful and also the organizing team of the resource

persons and other faculty of ZIET Chandigarh whose contribution in different forms has made this course a learning experience for usall.

Message from Associate Director

The Inservice Course is national level programme of KVS. The first spell of the course is planned on the basis of needs of the participants and expectations of Kendriya Vidyalaya Sangathan. Lectures, discussions, visits, excursion have been organised to keep the participants engaged mentally and physically. Time spent on group discussions, group work & individual work, not only stimulates the mind but is also a reflection on how these methods can be effectively used in the class room to promote learning.

We live in interesting times and should be excited by the challenges that lie ahead. We have tried to equip the participants with the competence & skills to address them. Participants have been encouraged to try out new methods of Teaching - Learning and Multi-Disciplinary studies.Hands-on practice given during the course will ensure the enthusiasm of teachers in the class.

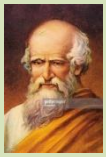
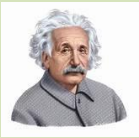
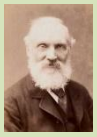
I hope that first spell of Inservice course is useful & our team is always available for any clarification on the contents developed during the course. The entire material developed during the course is shared with the participant teachers on Google drive

Let's keep the KVS flag flying high and do the work assigned to us meticulously with devotion.

Alka Gupta
Assistant Commissioner
KVS Dehradun Region

INDEX

GROUP INFORMATION

S.NO.	GROUP NAME	GROUP	NAME OF MEMBERS
1	AMPERE		Mr. Sanjay kumar Jha, Dr. Kumar Hemendra, Mr. Tilak Raj, Mr. Rajeev Kumar, Mrs Mamta Sharma
2	ARCHIMEDES		Ms. Poonam, Ms Indu Goswami, Ms Anjli Jain, Mr. Satish Kumar Verma, Mr. Pravendra Singh
3	BERNOULLIS		Mr S M Sariq, Mr Arvind Kumar, Mr Satish Kumar , MrSurendra Singh Arora
4	COULOMB		Ms. Rashmita Medak, Mr KK Jha, Mr. Ahok Kumar Gupta, Mr. Satyavir Singh Tomar, Mr. Kuldip Singh
5	EINSTEIN		Mr Ramesh Kumar, Mr Kumar Rajesh, Mr. Alok Chaturvedi, Mr. Yudhavir Singh, Mr. Amandeep SIngh
6	FARADAY		Ms. Nirmala, Ms. Shikha Bhalla, Mr. Shankar Prasad, Ms Neelam Aggrawal, MsMamta Singh
7	HUYGEN		Mr. Pradeep Kumar, Dr. Narendra Kumar Pandey, Ms Namita, Mr. SumitMehra, Mr. Sanjay Kumar
8	KELVIN		Mr. Anil Kumar, Mr Jaswinder Lal, Ms Shalini Kumari, Mr A K Chaudhary, Mr. K K Jha
9	KEPLER		Mr U S Paul, Mr Viresh Kumar, Mr Kashmir Singh, Mr Manish Tilak, Mr. O.P. Upadhyay

KENDRIYA VIDYALAYA SANGATHAN, NEW DELHI

IN-SERVICE COURSE FOR TEACHERS 2018-19

SAMPLE TIME-TABLE FOR THE I SPELL

Venue: **PGT** **Subject: PHYSICS**

Date	9.00 am to 9.30 am	90 minutes 9.30am to 11.00am	15 min	90 minutes 11.30am to 1.00pm	1 hr	60 minutes 2.00pm to 3.00pm	60 minutes 3.00pm to 4.00pm		15 min	REMAINING ONE HOUR
17.05.2018	Prayer/Yoga	Inauguration & Group Formation	Tea Break	MARWAH SIR DEMONSTRATION	Lunch Break	MARWAH SIR DEMONSTRATION	Pre test			
18.05.2018	Prayer/Yoga/ Report of Day-1	VISIT TOASHA SCHOOL		Vist to K.V. No.2 Chandimandir (Modernisation of lab.)		MARWAH SIR DEMONSTRATION	MARWAH SIR DEMONSTRATION	Tea Break	MARWAH SIR DEMONSTRATION	
19.05.2018	Prayer/Yoga/ Report of Day-2	ISHA FOUNDATION		Communication Skill Mrs. MANJU SALARIA		AEP & Gender Sensitization (Kuldip Singh)	Demo Lesson		Demo Lesson	
20.05.2018	Prayer/Yoga/ Report of Day-3	Mrs. ALKA GUPTA (Associate Course Director)		Demo Lesson/ICT		Demo Lesson/ICT	Demo Lesson/ICT		Demo Lesson	
21.05.2018	Prayer/Yoga/ Report of Day-4	Mr. CHAND SINGH (Terrestrial magnetism)		Mr. M.S. Chauhan (New Education Policy)		Mr. Ranveer Singh (	Demo Lesson/ICT		Demo Lesson	
22.05.2018	Prayer/Yoga/ Report of Day-5	Mid test		Ms. Sunita Gosain (Rajbasha)		INDOSAW	INDOSAW		INDOSAW	
23.05.2018	Prayer/Yoga/ Report of Day-6	Educational Trip								
24.05.2018	Prayer/Yoga/ Report of Day-7	CONSTRUCTIVISM Ms T. RUKMANI	Tea Break	Dr. SUNITA MISHRA (Physical Sensors)	lunch	Demo Lesson	Demo Lesson	Tea Break	GROUP WORK/ICT	
25.05.2018	Prayer/Yoga/ Report of Day-8	SERVICE MATTERS Mr. H.R.THAKUR		Demo Lesson		CSIO VISIT	CSIO VISIT		CSIO VISIT	

26.05.2018	**Prayer/Yoga/ Report of Day-9**	LEAVE RULES **Ms. RACHNA SHARMA**		Mr. ARUN SINGH **RESOURCES OF PHYSICS**		**Demo Lesson/ICT**	**GROUP WORK/ICT**		**GROUP WORK/ICT**
27.05.2018	**Prayer/Yoga/ Report of Day-10**	**Post test**		**Mr. Anupam S. Prakash (CBSE Result)**		**Demo Lesson/ICT**	**GROUP WORK/ICT**		**GROUP WORK/ICT**
28.05.2018	**Prayer/Yoga/ Report of Day-11**	**Mrs. ALKA GUPTA (Associate Course Director)**		**GROUP WORK**		**Demo Lesson/ICT**	**GROUP WORK/ICT**		**Valedictory**

IN-SERVICE COURSE FOR PGT(PHYSICS) (I SPELL) 17-05-18 to 28-05-18

S.No.	Name of the teacher Sri./Mrs./Ms.	M/F	DESIGNATION	शिक्षककानामश्री./ श्रीमती/सुश्री	KENDRIYA VIDYALAYA	केन्द्रीयविद्याल य	REGION	संभाग	EMAIL ADDRESS	ईमेल
1	SATYAVIR SINGH TOMER	M	PGT(PHY)	सत्यवीरसिंहतोमर	NTPC DADRI	एनटीपीसीदादरी	AGRA	आगरा	stomerkv@gmail.com	kvntpc.dadri@gmail.com
2	MAMTA SHARMA	F	PGT(PHY)	ममताशर्मा	OEF HAZRATPUR	ओईएफ़हजरतपुर	AGRA	आगरा	Drmamtasharma30@gmail.com	kvhazratpur01@gmail.com
3	VIRESH KUMAR	M	PGT(PHY)	विरेशकुमार	AFS,SARSAWA	एएफ़एससरसावा	AGRA	आगरा	vireshkum80@gmail.com	vireshkuma80@gmail.com
4	PRADEEP KUMAR	M	PGT(PHY)	प्रदीपकुमार	NO.2 AGRA CANTT	क्र.2 आगराछावनी	AGRA	आगरा	pra4752@gmail.com	kv2agracantt@gmail.com
5	S.M. SHARIQ	M	PGT(PHY)	एस. एम. शारिक	NO.3 JHANSI	क्र.3 झाँसी	AGRA	आगरा	syedshariq5467@gmail.com	jhansikv3@gmail.com
6	SURENDRA SINGH ARORA	M	PGT(PHY)	सुरेन्द्रसिंहअरोरा	BAAD MATHURA	बादमथुरा	AGRA	आगरा	ssarorapgt@gmail.com	kvbaadmathura@gmail.com
7	ANJLI JAIN	F	PGT(PHY)	अंजलिजैन	NO. 1 HINDAN	क्र.1 हिंडन	AGRA	आगरा	mkj.1962@gmail.com	kv1hindan@gmail.com
8	INDU GOSWAMI	F	PGT(PHY)	इन्दुगोस्वामी	NO. 1 HINDAN	क्र.1 हिंडन	AGRA	आगरा	anilkumarcpwd@gmail.com	kv1hindan@gmail.com

9	NIRMALA	F	PGT(PHY)	निर्मला	NO.4 JALANDAHR	क्र.4 जालंधर	CHANDIGARH	चंडीगढ़	neelu.kvs@gmail.com	neelu.kvs@gmail.com
10	SURESH KUMAR SHARMA	M	PGT(PHY)	सुरेशकुमारशर्मा	NO.5 BATHINDA CANTT	क्र.5 बटिंडाछावनी	CHANDIGARH	चंडीगढ़	absent	kv5bti@gmail.com
11	MAMATA SINGH	F	PGT(PHY)	ममतासिंह	NO 4, BTI CANTT	क्र.4 बटिंडाछावनी	CHANDIGARH	चंडीगढ़	mamta181973@yahoo.com	kv4bathinda@gmail.com
12	KULDIP SINGH	M	PGT(PHY)	कुलदीपसिंह	3-BRD,CHD	3बीआरडीचंडीगढ़	CHANDIGARH	चंडीगढ़	kdip78@rediffmail.com	kv3brdchd@gmail.com
13	JASWINDER LAL	M	PGT(PHY)	जसविंदरलाल	SEC.31 CHANDIGARH	से.31 चंडीगढ़	CHANDIGARH	चंडीगढ़	laljaswinder@gmail.com	kvsec31@gmail.com
14	TILAK RAJ	M	PGT(PHY)	तिलकराज	NANGALBHUR	नंगलभूर	CHANDIGARH	चंडीगढ़	rajtilk80@gmail.com	kvnangalbhur@gmail.com
15	YUDHBIR SINGH	M	PGT(PHY)	युद्धवीरसिंह	NO.2 PATHANKOT	क्र.2 पठानकोट	CHANDIGARH	चंडीगढ़	yudhbirsingh5@gmail.com	kvno2pathankot@gmail.com
16	PRAVENDRA SINGH	M	PGT(PHY)	प्रवेन्दरसिंह	SEC. 47 CHANDIGARH	से.47 चंडीगढ़	CHANDIGARH	चंडीगढ़	pravendrasingh156@gmail.com	kvsector472016@gmail.com
17	SASHI VARSHNEY	F	PGT(PHY)	शशिवाष्नेय	KAPURTHALA CANTT	कपूरथलाछावनी	CHANDIGARH	चंडीगढ़	absent	kvkapurthal@gmail.com
18	KASHMIR SINGH	M	PGT(PHY)	कश्मीरसिंह	SURANUSSI	सुरानूसी	CHANDIGARH	चंडीगढ़	kashmirsinghk@gmail.com	kvsura.jal@gmail.com
19	SHIKHA BHALLA	F	PGT(PHY)	शिखाभल्ला	NO.1 HUSAINPUR	क्र.1 हुसैनपुर	CHANDIGARH	चंडीगढ़	shikhabhalla17@gmail.com	kv1husainpur@gmail.com
20	ARVIND KUMAR	M	PGT(PHY)	अरविंदकुमार	NTPC BADARPUR	एनटीपीसीबदरपुर	DELHI	दिल्ली	akpkbegusarai@gmail.com	kvbtps@gmail.com
21	ASHOK KUMAR GUPTA	M	PGT(PHY)	अशोककुमारगुप्ता	RK PURAM SEC 8 (FS)	आरकेपुरमसे.8 (I पाली)	DELHI	दिल्ली	akguptakvs@gmail.com	kvsec8rkpdelhi@yahoo.com
22	ALOK CHATURVEDI	M	PGT(PHY)	आलोकचतुर्वेदी	NO.4 DELHI CANTT.	क्र. 4	DELHI	दिल्ली	alokchaturvedi27@gmail	kv4dc10@gmail.com

						दिल्लीछावनी			.com	
23	AJIT	M	PGT(PHY)	अजित	BAWANA AFS	एएफ़एसबवाना	DELHI	दिल्ली	absent	ajitkvsb@yahoo.co.in
24	SHANKAR PRASAD	M	PGT(PHY)	शंकरप्रसाद	RK PURAM SEC 8 (FS)	आरकेपुरमसे.8 (I पाली)	DELHI	दिल्ली	spdayal@rediffmail.com	kvsec8rkpdelhi@yahoo.com
25	ANIL KUMAR	M	PGT(PHY)	अनिलकुमार	AGCR COLONY (FS)	एजीसीआरकॉलोनी (I पाली)	DELHI	दिल्ली	aktyagi79@gmail.com	kvagcr2@gmail.com
26	B.B.PANDAY	M	PGT(PHY)	बी .बी . पाण्डेय	NO.1 DELHI CANTT (SS)	(II पाली) क्र. 1 दिल्लीछावनी	DELHI	दिल्ली	absent	kv1delhicantt10@yahoo.co.in
27	SHAMBHU KUMAR PAUL	M	PGT(PHY)	शंभूकुमारपॉल	DELHI CANTT. NO.2 (SS)	(II पाली)क्र. 2 दिल्लीछावनी	DELHI	दिल्ली	absent	kv2delhicantt@yahoo.com
28	SANJAY KUMAR	M	PGT(PHY)	संजयकुमार	DWARKA SEC.5		DELHI	दिल्ली	sanjay15chaudhary@gmail.com	kv2delhicantt@yahoo.com
29	OM PRAKASH UPADHYAY	M	PGT(PHY)	ओमप्रकाशउपाध्याय	GOLE MARKET (SS)	(II पाली) गोलमार्केट	DELHI	दिल्ली	oupadhyay41@yahoo.com	kvgolemarket@gmail.com
30	RAM KUMAR SHARMA	M	PGT(PHY)	रामकुमारशर्मा	PASCHIM VIHAR	पश्चिमविहार	DELHI	दिल्ली	absent	kvpaschimvihar@gmail.com
31	SATYA PAL SHARMA	M	PGT(PHY)	सत्यपालशर्मा	PITAMPURA (FS)	(I पाली) पीतमपुरा	DELHI	दिल्ली	absent	kvpitampura@gmail.com
32	SONIA BAWEJA	F	PGT(PHY)	सोनियाबवेजा	PITAMPURA (FS)	(I पाली) पीतमपुरा	DELHI	दिल्ली	absent	kvpitampura@gmail.com
33	L K .JHA	M	PGT(PHY)	एल . के . झा	ROHINI SEC - 8 (SS)	(II पाली) से.8 रोहिणी	DELHI	दिल्ली	absent	kvsector8rohini@gmail.com
34	SANJAY KUMAR JHA	M	PGT(PHY)	संजयकुमारझा	ROHINI SEC -25 (S S)	से.25 रोहिणी	DELHI	दिल्ली	sanjay.jha701@gmail.com	kv25rohini@gmail.com
35	POONAM	F	PGT(PHY)	पूनम	PUSHP VIHAR (SS)	(II पाली) पुष्पविहार	DELHI	दिल्ली	laplace29@gmail.com	principalkvpushpvihar@gmail.com
36	MANISH TILAK	M	PGT(PHY)	मनीषतिलक	ARJANGARH AFS	एएफ़एसअर्जन	DELHI	दिल्ली	manishhtilak@gmail.com	kvarjangarhvidyalaya@yahoo.co.in

						गढ़				
37	NEELAM AGGARWAL	F	PGT(PHY)	नीलमअग्रवाल	AFS GURGAON (FS)	एएफ़एसगुड़गाँव (I पाली)	GURUGRAM	गुरुग्राम	neelam1974hathras@gmail.com	kvgurgaon14@gmail.com
38	SHAKTI SINGH	M	PGT(PHY)	शक्तिसिंह	AFS GURGAON (FS)	एएफ़एसगुड़गाँव (I पाली)	GURUGRAM	गुरुग्राम	absent	kvgurgaon14@gmail.com
39	SATISH KUMAR	M	PGT(PHY)	सतीशकुमार	BANGANA (H.P.)	बंगाना	GURUGRAM	गुरुग्राम	satishdhiman1983@rediffmail.com	kvbanganahp@gmail.com
40	SHALINI KUMARI	F	PGT(PHY)	शालिनीकुमारी	HAMIRPUR	हमीरपुर	GURUGRAM	गुरुग्राम	shalinidhiman09@gmail.com	pplkvhamirpur@gmail.com
41	SUMIT MEHRA	M	PGT(PHY)	सुमितमेहरा	YOL CANTT	केलोंग	GURUGRAM	गुरुग्राम	sumitsawrup@gmail.com	kvkeylong@gmail.com
42	RAJEEV KUMAR	M	PGT(PHY)	राजीवकुमार	NHPC SAINJ, KULLU	सैज, कुल्लू	GURUGRAM	गुरुग्राम	kumarrajeev1983@gmail.com	kumarrajeev1983@gmail.com
43	K.K. JHA	M	PGT(PHY)	के. के. झा	NO.2 AMBALA	क्र.2 अंबाला	GURUGRAM	गुरुग्राम	kkjha4162@gmail.com	kv2amb@gmail.com
44	RASHMITA MEDAK	F	PGT(PHY)	रश्मितामेडक	NO.1, AMBALA CANTT.	क्र.1 अंबालाछावनी	GURUGRAM	गुरुग्राम	rashmita.medak148@gmail.com	kv1ambala @gmail.com
45	RAMESH KUMAR	M	PGT(PHY)	रमेशकुमार	HISAR CANTT	हिसारछावनी	GURUGRAM	गुरुग्राम	rksphy81@gmail.com	principal@kvhisarcantt.org
46	NAMITA	F	PGT(PHY)	नमिता	NO.2 BAILEY ROAD (SS)	क्र.2 बेलीरोड(एसएस)	PATNA	पटना	namita0111@yahoo.com	kvbaileyroad@rediffmail.com
47	NARENDRA KUMAR PANDEY	M	PGT(PHY)	नरेंद्रकुमारपाण्डेय	KANKARBAGH PATNA (SS)	कंकडबाग (एसएस)	PATNA	पटना	narendrakpandey2008@gmail.com	kvk1dotpatna@yahoo.co.in
48	KUMAR HEMENDRA	M	PGT(PHY)	कुमारहेमेन्द्र	DANAPUR CANTT (SS)	दानापुरछावनी (एसएस)	PATNA	पटना	kmr.hemendra@gmail.com	Kv_dr@rediffmail.com
49	SATISH KUMAR VERMA	M	PGT(PHY)	सतीशकुमारवर्मा	KANKARBAGH PATNA (FS)	कंकडबाग(एफ़एस)	PATNA	पटना	skvermakvkphysics@gmail.com	kvk1dotpatna@yahoo.co.in

50	KUMAR RAJESH	M	PGT(PHY)	कुमारराजेश	NTPC KAHALGAON	एनटीपीसीकहलगाँव	PATNA	पटना	rajesh.gdjha@gmail.com	kvdntpc@yahoo.co.in
51	K K OJHA	M	PGT(PHY)	के .के. ओझा	SONPUR	सोनपुर	PATNA	पटना	ushakamal1993@gmail.com	kvsonp@yahoo.co.in
52	UDAY SHANKAR PAUL	M	PGT(PHY)	उदयशंकरपॉल	NERIST (NIRJULI)	नेरिस्ट (निरजुली)	TINSUKIA	तिनसुखिया	udayelectronicsau06@gmail.com	nerist1483@gmail.com
53	ANIL KUMAR CHAUDHARY	M	PGT(PHY)	अनिलकुमारचौधरी	NFC VIGYAN VIHAR	एनएफ़सीविज्ञानविहार	DELHI	दिल्ली	chaudharyanilkumar64@gmail.com	
54	AMAN DEEP SINGH	M	PGT(PHY)		No.1 AMRITSAR		CHANDIGARH		amanddhillon@yahoo.co.in	kv1asr@rediffmail.com

DAY-1 (17.05.2018) REPORT BY AMPERE GROUP (GROUP-1)

The First day of In-Service course for PGT (Physics) was inaugurated by Hon'ble Deputy Commissioner , KVS RO Chandigarh , Mr Ranvir Singh and Assistant Commissioner KVS RO Dehradoon and Associate Course Director, Mrs Alka Gupta by lightning the lamp and Saraswati Vandana in front of Maa Sarrasvati. After that morning prayer was performed by all the participants (Itni Shakti Hamen dena data…….)

After prayer introduction was given by all the participants and an motivational speech was delivered by Hon'ble Deputy Commissioner. In his speech D.C. Sir suggested that today there is a necessity of innovation in teaching profession.Then an eminent Professor M.S. Marwaha was introduced by Resource Person Sh. Arun Kumar PGT (Physics) ZIET Chandigarh. Professor Marwaha given the concept of Inertial and Non –Inertial Frame of reference ,Centripetal force , Centrifugal force, pseudo force with the help of number of Activities. Some experiments/Activities were wonderful.

Address by Mr Ranveer Singh , DC ,RO Chandigarh Demonstration on Physics by Prof M.S. Marwaha

DAY-2 (18.05.2018) REPORT BY AMPERE GROUP (GROUP-1)

The Second day In-Service Course is started with SAHAJ yog by Mrs Sheetal and Yoga classes by Mrs Walia.
After the Breakfast a visit was organised to ASHA SCHOOL And K.V. No 2 Chandimandir.
In the ASHA School we met with the number of Students with differently abled where they were beautifully tought to be self dependent and self sufficient. The visit to the ASHA school had touched the heart of each of the participants.
Next visit was to the K.V. No. 2 Chandimandir . A warm welcome of participants by Mrs Bharti Koul PGT (Physics), K.V. No 2 Chandimandir. Some live experiments were demonstrated by the students Master Abhishek and Master Ritesh of the K.V. under the Guidance of Mrs Bharti Koul like Sound waves needs medium to travel, defects and correction of eye defects , Classification of dia, para and ferromagnetic substance etc.
Second session of day -2 ,was started by Prof. M.S. Marwaha. He demonstrated experiments of light, sound, Centrifugal force, TIR very effectively through number of activities.

A visit to ASHA School Chandimandir Cantt

A VISIT TO KV NO -2 CHANDIMANDIR CANTT ON DAY -2

DAY-3 (19.05.2018) REPORT BY ARCHIMEDES GROUP (GROUP -2)

*****The day started with the prayer conducted by group 2 members (Mrs.Poonam,Mrs. Indu Goswami,Mrs. Anjali Jain,Mr.S.K. Verma and Mr.Pravendra Singh)
*After the assembly ,resource person Mr.Arun Kumar briefed about the activities to be taken up for the day .
*At 9:30 am,Mr. Sanjib Mishra and their team from ISHA FOUNDATION founded by a great Yogi Sadguru,gave idea of different yoga activities like yoga for health ,yoga for success, yoga for inner exploration ,yoga for peace,yoga for joy,yoga for well-being and yoga for love.Really this session was very much benificial for our life system in which all participants take active participation with whole heartedly.
*After the tea break at 11:30 am Ms. Manjula Salaria delivered a very much interactive programme related to "Communication skill".She shared her all views to develop communication skill among we people by active participation of almost participants.
*After the lunch break ,afternoon session was started with a programme AEP and gender sensitisation by active participation of participants under leadership of Mr. Kuldeep Singh.He had conducted so many activities related problem faced by students in their adolesence age and how we remove their problems in their teen age.A video is also displayed on this programme by Mr. Satish kumar.
*Finally, the day concluded with the extremly useful programme based on demo lesson-
1. Mr. S.Tomar ,KV N.T.P.C. Dadri, Agra region delivered a lesson on topic 'Interference of light.'
2. Miss Mamta sharma ,KV Hazaratpur, Agra region delivered a lesson on topic 'Unit and measurement' .
3. Mr.Virish kumar ,KV AFS ,Sarsava ,Agra region followed the lesson 'Equation of motion in kinematics'.
4. Mr. Pradeep sharma KV 2 Agra cantt. Followed the lesson 'vectors'.
5. Last lesson was followed by Md. S.M. Shariqof KV No. 3 Jhansi on topic 'Laws of motion .'
ALL THE TEACHERS DELIVERED THEIR LESSON VERY EFFECTIVELY USING ICT.

DAY- 4 (20.05.2018) REPORT BY BERNOULLI GROUP- 3

The day started with sahaj yoga by Mr.Rachit Gupta.He gave training to the participants for kundli Jagran.After that at 9:00am assembly programme conducted by the group members. Sh.S.M.shariq recited a very nice poem on patriotism and Mr Arvind Kumar explained the Life history and contribution of Great Mathematician and Physicist Daniel Bernoulli and about bernoullis theorem.

After the assembly programme Mrs Alka Gupta Associate Course Director explained rules of administration , rules of RTE and role of local purchase committee and purchasing rule.In this session Mrs Alka Gupta very nicely exaplained how we have to asdmit chils under RTE and how much fee reimbursement given to the children comes under RTE.After that in post lunch seesion Demo lesson was given by participants i.e Sh.Surender Singh Arora of KV Baad mathura of on friction, Mrs Namita KV Bailey Road on Capacitor and their applications ,Mrs Nirmala KV No.4 jalandhar Cantt on Cyclotron ,Mrs Mamta Singh KV no. 4 Bathinda on Transformer ,Mrs Shikha Bhalla KV No.1 RCF Hussainpur on Electric Field,Mrs Poonam KV Pushp Vihar on Huygens Principle,Mrs Anjali Jain KV no.1 Hinden on Transistor and Mrs Indu Goswami KV no.1 on Work Done by Electric Dipole.The Demo Classes over by 5:30pm

DAY- 5 (21.05.2018) REPORT BY COULOMBS GROUP (GROUP 4)

The group members of coulomb group marked the beginning of the day with the morning assembly. In the morning assembly the group members presented the thought of the day and special item. The achievement and contribution of great scientist was also discussed followed by an activity on Coulomb's law.

The first session of the day was taken up by guest speaker Mr. Chand Singh on Terrestrial magnetism. Explain the earth magnetism in detail and emphasized that Physics teacher should visualize the things to their students which enhance the understanding of the students and their field in better position while solving the Physics problems.

Mr. MS Chauhan Ex-DC KVS RO Chandigarh region was the second guest speaker of the day. He dealt with the very vast topic “the new education policy” He made the day of participants by giving an enlightening talk on the unique role and responsibility of teachers towards nurturing the future of the nation. He emphasized the role of physical education in the in the school education system and proposed his education model. In his model he kept the physical education and sports in the core of our education system. He gave a wonderful and new idea to make India a happy and healthy Nation.

In the post lunch session the Course Director Mr.Ranveer Singh DC KVS RO Chandigarh enlighten the participants by explaining the seven habits to be a successful person.

He explained how these 7 habits can help the teachers in classroom situations. Apply these habits a teacher can improve his performance in his profession and at domestic front .In his

interactive session he ignited all the teachers and motivated them to bring excellence in there every walk of life In the last session 7 demo lessons were given by participants.

Mr Yudhvir Singh- Biot Savart law , Mr. Tilak Raj -Magnetic dipole moment
Mr Ashok Kumar Gupta -Standing wave Mr Arvind -Ampere's circuital law
Mr Kashmir Singh – Interference Mr Jaswinder Lal -Alterrnating Current
Mr Alok Chaturvedi -Doppler Effect

All the lessons were well planned and effective. All the demo classes were enjoyable and learning experience for all the participants.

A Session on New Education Policy By Mr M.S, Chauhan ,Ex-DC ,KVS (RO) Chandigarh

Address by Mr Ranveer Singh , DC ,RO (Chd) on 7-hbbits of a successful person

DAY- 6 (22.05.2018) REPORT BY EINSTEIN GROUP (GROUP 5)

The day started with a very pleasant morning with yoga session where all the participants enjoyed yoga with great enthusiasm. After yoga session all the participants assembled for group photo. After group photograph the morning assembly was conducted by the members of group 5(Einstein's group).

Mr. Ramesh kumar presented the thought of the dayand special item is presented by Mr. Alok Chaturvedi. Mr. Amandeep Singh briefly explained about the life and achievements of Albert Einstein. Mr Kuldeep presented report of day five. After morning assembly mid test was conducted in the morning session. All the participants appeared in the test with great enthusiasm in the mid test.

After the tea break Mrs. Sunita Gussain associate trainer Hindi ZIET Chandigarh explained the importance of Raj Bhasha and provisions for Raj Bhasha in the Indian constitution. She answered all the queries raised by the participants.

There was short session of Mr. Amit Kumar executive Manager HDFC bank and Assistant sales Manager Ms. Pooja from HDFC bank about the advantages of online transaction and enlightened the participants about the financial literacy. They explained the utilities of different modes of online transactions using debit and credit cards.

After the lunch break Mr. Rajat rishi from INDOSAW nicely demonstrated the activities on apparatus provided by Indosaw in various Kendriya Vidyalayas for modernization of physics laboratories. After evening tea the participants completed their group task in computer lab.

A Session on Importance of Rajbhasha By Mrs Sunita Gussain ZIET Chd

A Session by Mr Rajat Rishi (INDOSAW)

DAY- 7 (23.05.2018) REPORT BY FARADAY GROUP (GROUP 6)

An excursion trip was organised on 23rd may,2018 .Our bus started for Naina Devi temple at 5:30 am in the morning. After the journey of two hours, our bus reached at Naina Devi bus

stand at 8:30 a.m from where we have to go by foot for the temple which is nearly 3 km from the bus stand .The participants reached the temple in small-small groups.We all reached there by 10 am.After performing the rituals of pooja , all the members again assembled at bus stand at about 11:45 am and took their breakfast at the bus stand.Next we started for Shri Anandpur Sahib first.We went to Virasat-e-Khalsa museum where all the members were introduced with the rich and appreciable history of Khalsa panth,its origin,growth, contribution and sacrifices given by all the Gurus of Sikh religion through the films(audio & video),ppts running and the paintings & sculptures kept in the museum.After visiting the museum, we went to gurudwara Shri Kesgarh sahib at Anandpur sahib .We prayed there for the welfare of the humanity & to guide us for the right path in our lives. After that we enjoyed guru ka langar and then started our journey for back to ZIET,Chandigarh . We reached here back at about 6 o'clock .The excursion was very well organized, informative and enjoyed by all.

An Educational Trip to Mata Naina Devi Temple and Virasat-e-Khalsa , Anandpur Sahib

DAY- 8 (24.05.2018) REPORT BY HUYGEN'S GROUP (GROUP -7)

The day 24th May 2018 Thursday was started with yoga class following by morning payer by 6th Group i.e. Faraday's Group. In the morning session we had an interaction with Hon'ble Assistant Commissioner Chandigarh Region which was delivered in a very effective and efficient manner using PPT on constructivism. This was very fruitful to all the participants.

After the tea break we had an energetic and fruitful interaction with Dr. Sunita Mishra Principal Scientist and HOD UAT CSIR _ CISO about different type of sensors all the participants enjoy the session by enriching their knowledge. It was ended after a curious enquiry by participants.

After the lunch at 2 P.M all the participants gathered in computer lab and lecture theater to complete the assignment work and all participants achieved their targets. The day was ended with energy and sprit for next day programme

Address By Ms.T Rukmani , Assistant Commissionerv KVS (RO) Chandigarh

A lecture on Physical Principle Of Sensing by Dr Sunita Mishra, Scientist –CSIO Chandigarh

DAY- 9 (25.05.2018) REPORT BY KELVIN GROUP (GROUP -8)

The day started with a very pleasant morning with yoga session where all the participants enjoyed yoga with great enthusiasm and the queries about the diet were also quenched by the yoga teacher very decently.

After breakfast, the morning assembly was organized by group seven, that is Huygens's group very effectively in which activity based on particle nature and wave nature of light was presented by Mr. Sumit Mehra in very interesting & impressing way.

After morning assembly, Shri Arun Kumar, the resource person narrated a very short story on "kind heartedness".

After this, all the participants were shifted to another lecture hall where demo lessons were presented by six participants that is on TIR by Mr. Anil Kumar, Mechanical properties of matter by Rajeev Kumar, on free, forced and damped oscillation by Uday shankar Pal, waves by Mrs.Neelam Agarwal, EMI by Amandeep Singh and potentiometer by Mr. K K Jha.

After this, there was a very very interactive talk by Mr. Thakur,ASO, RO Chandigarh on various topics such as NPS,TA/DA and LTC rules. This session was very informative. Lots of queries of participants were discussed thoroughly.

In the post lunch session, all the participants visited CSIR, CSIO, Chandigarh where participants enriched their scientific knowledge by visiting various labs and equipments such as monochromatic analyser, spectrum analyser, fibre optic sensor and many others. At about 6 p.m all the participants returned to ZIET with utmost satisfaction.

Morning Prayer By Huygen's Group

A Visit to CSIO Chandigarh

DAY- 10 (26.05.2018) REPORT BY KELVIN GROUP (GROUP -9)

The day started with a very pleasant morning with yoga session where all the participants enjoyed yoga with great enthusiasm. After breakfast, the morning assembly was organized by

group 8 that is KELVIN'S group very effectively. After morning assembly, in the series of guest lecture Mr. Chand Singh delivered a lecture on wave motion.
He explained the complex concepts of wave equation, progressive wave and stationary waves in a very easy and lucid way by relating his lecture from daily life examples and using board and chalk very nicely. His lecture enlightend all participants and highly appreciable.
After this, Dr. Kumar Hamendra delivered a demo lesson on viscosity using PPT.
After, small tea break Mrs. Rachna Sharma ASO KVS (RO) Chandigarh discussed and explained discipline, conducts and leave rules and satisfies all the quarries raised by all the participants.
After post lunch session our worthy Associate course director Mrs. Alka Gupta, resource person Mr. Arun Kumar and Mr. Anupam S Prakash appreciated and congratulated all teachers to produce a wonderful and flying color CBSE board result in class XII.
After this our resource person Mr. Arun Kumar acquainted all participants about effective use of technology. In his presentation he motivated participants for the adequate use of ICT to make their teaching interesting, child centered and effective. After this participants enjoyed tea-break and remain engaged in their group work. Finally the day was ended with smile and full satisfaction in fruitful manner.



Members Of KELVIN Group **Session By Mr Chand Singh & Mr Arun Kumar (RP)**

DAY-11 (27.05.2018) REPORT BY AMPERE GROUP (GROUP-1)

The day was started with yoga class followed by SAHAJ Yoga. After breakfast morning session was started with morning assembly organised by Ninth Group (KEPLER Group) .After Morning assembly a discussion between the participants done for the requirement and planning of second spell of the Programme of In service Course. Meanwhile experiments of classes XI and XII were alloted to different groups. A video on ejection of electron was displayed and demonstrated by Mr Pradeep Kumar K.V. NO-2 Agra. A talk on Indian technology given by Mr Alok Chaturvedi, K.V. No 4 , Delhi Cantt.After tea break the Post Test was conducted .

After the lunch in afternoon session the demo lessons were given by following participants:

(1) Mr Sanjay Kumar Jha , K.V. Rohini Sec-5 Delhi
(2) Mr O.P. Upadhyay , K.V. Gol Market Delhi
(3) Mr Sanjay Kumar K.V. Dwarika ,Sec-5
(4) Mr Sumit Mehra , K.V. Yol Cantt
(5) Mr N.K. Pandey , K.V. Kankarbagh Patna
(6) Mr Shankar Prasad , K.V. R.K. Puram Sec-8
(7) Mr Manish Tilak ,K.V. Arjangarh
(8) Mr Ramesh Kumar ,K.V. Hisar

The left out group work was completed by all the participants. The day was ends in very useful manner.

Morning Prayer by Kelvin Group Demo lessons

DAY-12 (27.05.2018) REPORT BY ARCHIMEDES GROUP (GROUP-2)

*The day was started with yoga session. After yoga session, morning assembly was conducted by group 1 members(AMPERE GROUP).
*After assembly, our resource person Mr. Arun kumar briefed about the schedule of the day.
*At 9:30 am our honourable associate course director Mrs.Alka Gupta delivered a lecture on ----------.Really this lecture was very much beneficial for us.
*After tea break , assigned group work was completed by the participants.
*After lunch break ,afternoon session was started with demo lessons given by participants.....,.....,.....,.
*Finally the day and the in-service course of first spell was concluded with a valedictory function convened by honourable DC(Chandigarh region). Mr. RANVEER SINGH .

Lesson plan

Date & Day: 17/05/2018 (THURSDAY)
Name of Teacher: SHALINI KUMARI
Class: XI
Designation: PGT PHYSICS
Subject: PHYSICS
No. of students: 33
Topic: ERROR ANALYSIS

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
*Error and its type *Propagation of error *Significant Figure *Rules for Finding Significant Figures *Significant Figures in Algebric Operations *Rules of Rounding Off Significant Figures *Accuracy in measurement *Precisian	*Basic Concept behind error * Correct calculation of generalize error in daily life *Solution of Numericals*Questions By the learners.	Learners will be able 1.To define error and its type 2.To define absotute error, mean absolute error, percentage error 3.To define Significant Figure and Rulesfor Finding Significant Figures and Significant Figures in algebric Operations 4.To differentiate between accuracy and precisian	Use of verniercaliiper ,screw gauge, spherometer to understand least -count error	. PPT on error analysis	Q.1 The mass of a body is measured by two persons is 10.2kg and 10.23kg. Which one is more accurate and why? Q.2 Precisions describe the limitation of the measuring instrument. Is the statement false? Q.3 If $F = x^2$,relative error in f, then how many times the relative error would be in x? Q.4 Round off to four significant figures (i) 36.879 (ii) 1.0084 Q.5 What is the percentage error in volume of a sphere, when error in	1.The resistance R is the ratio of potential difference V and current I. What is the percentage error in R if V is (100 ± 5)V and I is (10±2)A? 2. If displacement of a body is S = (200±0.5)m and time taken by it is t =(20 ± 0.2) s, then find the percentage error in the calculation of velocity. 33.State the number of significant figure in the following

					measuring its radius is 2%? Q.6 Find the relative error in Z if $Z=\frac{A^4B^{1/3}}{CD^{3/2}}$	-- (i) 0.007 m^2 (ii) 2.64 x 10^{24}kg 4. What is the need to take large number of readings in the experiment ?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Period No.	Day & Date	Portion	Target competency &ELO	Activities planned	Audio visual aid including CAL/TAL	Evaluation Questions /activities (class Work)	(HW, assign. Projects)
		Physical Quantities- Fundamental and Derived quantities Physical Unit- Fundamental unit and derived units System of units	To enable them to participate actively, observation critical thinking leadership qualities and communication. To enable them to apply relevant knowledge and tabulate results as well develop innovative and			• State some characteristics of a standard unit • Verify whether the equation Fs = 1/2mv^2	NCERT exercises Dimensions formula

		Some important practical units Dimensions of Physical quantity Dimensional formula and dimensional equations Dimensions analysis and its application	scientific temperament. Students will be able to develop skills of conceptualization application, calculation, inquisitiveness, mental alertness etc To enable them to know understand recall recollect spatial thinking. Students will be able to Describe how physical quantities are measured and there are different system of units to measure the physical quantities.	Activity based on measurement Activity based on different system of units	Black board ,chalk ,measuring tap ,slotted weight, clock etc.	-1/2 $mu^2$is dimensionally correct •Why length, mass and time are chosen as base quantities in mechanics Activity based on different system of unit	of all physical quantities given in NCERT Text Book The rotational kinetic energy of a body is given by $E = ½ Iw^2$, where w is the angular velocity of the body. Use the equation to obtain dimensional formula for the moment of Inertia I. Also write its unit

Lesson plan Date & Day: 24/05/2018 (THURSDAY)

Name of Teacher: MAMTA SHARMA

Class: XI

Designation: PGT PHYSICS

Subject: PHYSICS

No. of students: 33

Topic: UNITS AND MEASUREMENT

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
*Units and its Measurement	*Basic Concept	Learners will be able 1. To know need of	Measurement of	.	1. What do you mean by order of magnitude of a	1. Which is the most accurate clock?

*The International System of Units *Measurement of Length * Measurement of Mass * Measurement of Time	of * Physical Quantity *Units *Need of Measurement *System of Units * Seven Fundamental Units * Two Supplementary Units *Measurement of Length and its method * Direct Method *Indirect Method *Parallex Method * Measurement of Mass * Measurement of Time	Measurement 2. To know about the Fundamental Unit 3. To know about the measurement of Length 4. To know about the measurement of Mass 5. To know about the Parallex method measuring the distance of stars	Length by VernierCallipers, Screw Gauge and Scale. Measurement of Time by quartz	PPT on Units and Measurement	quantity? 2. How do you find the order of magnitude of a quantity? 3. What does RADAR mean? 4. Which type of waves are used in SONAR? 5.Which method is used to find the height of a tower or that of a mountain?	2. What is the difference between mass and weight? 3. Are inertial and gravitational mass of an object different from one another? 4. State the underlying principle of the reflection methods of measuring distances. How is this idea used in the RADAR and the SONAR? 5. Explain, how the distance of nearby stars? Why cannot the method be used for very distant stars? Which is the most accurate clock? 6. What id difference between mass and weight? 7. Are inertial and gravitational mass

						of an object different from one another? 8. State the underlying principle of the reflection methods of measuring distances. How is this idea used in the RADAR and the SONAR? 9. Explain, how the distance of nearby stars? Why cannot the method be used for very distant stars?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date& Day: 20/05/2018 (SUNDAY)

Name of Teacher:ShikhaBhalla ,K.V. NO1 RCF HUSSAINPUR

Class: XI Designation: PGT PHYSICS

Subject:PHYSICS No. of students:

Topic: RELATIVE VELOCITY

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
UNIT 2 KINEMATICS **Topic-Relative velocity** **Subtopics-Velocity, uniform velocity, variable velocity,averagevelocity,relative velocity & various graphs related to relative velocity.**	*Basic Concept of **Velocity, uniform velocity, variable velocity,averagevelocity,relative velocity & various graphs related to relative velocity**. Numerical Questions By thelearners.	Learners will be able 1.To explain the concept of **Velocity, uniform velocity, variable velocity,averagevelocity,relative velocity** 2.To derive the formula for relative velocity & then discuss the various cases with the help of that expression 3.To draw x-t graph for the two bodies moving in(a)same direction (b) opposite direction. . 4.To solve the Numerical Questions based on the topics	PPT on the topic Video clip will be shown to explain the concept of relative velocity.	1. Define term relative velocity. 2.A man moving in rain hold his umbrella inclined to the vertical even though the rain drops are falling vertically downwards. Why ? 3. A boy walks to his school at a distance of 6 km with constant speed 2.5 km/hr and walks back with a constant speed of 4km/hr. What is average speed for the round trip in km/hr? (	1. On a certain day, rain was falling vertically with a speed of 35m/s. A wind started blowing after sometime with a speed of 12m/s in east to west direction. In which direction should a boy waiting at the bus stop hold his umbrella? (

				Ans:-40/13 km/hr) 4.When two bodies move uniformly towards each other, the distance between them decreases by 6 metres /second. If Both the bodies move in the same direction with their same speeds, the distance between them increases by 4 meter/second. What are the speeds of the two bodies? (Ans:- u=5 m/s , v=1 m/s)	Ans:- 19 degree towards east, with the vertical) 2. To a driver going east in a car with a velocity of 40km/, a bus appear to move towards north with a velocity of $40(3)^{1/2}$ km/h. What is the actual velocity and direction of motion of the bus? (Ans:- 80 km/h ,30 degree east of north) 3. To a person moving eastwards with a velocity of 48km/h, rain appears to fall vertically downwards

					with a speed of 6.4km/h. Find the actual sped and the direction of the rain? (Ans:- 8 km/h 53 degree 7’ 33”) 1. What do you understand by relative velocity of an object w.r.t another? Obtain an Expression for the relative position of the two objects at time t in terms of their velocities and positions , when motion take place along a straight line.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: K.K.JHA** **Class: XI** **Designation: PGT PHYSICS**

Subject: PHYSICS

Topic: VECTORS

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
* Cross product of two vectors and scalar product of vectors *vector addition * triangular law of vector addition *	*Basic Concept Of Vector * Concept of vector addition and product of vectors *derivations *Solution of Numericals	Learners will be able 1.To define scalar and vector product 2. To define vector addition 3.To define triangular law of vector addition 4.to derive resultant of two vector inclined to an angle $R^2 = A^2 + B^2 + 2AB \cos Ø$	Use of examples from daily life And correlation of vectors with mathematics	. PPT on vector addition triangular law of vector addition	1.What is a vector? 2Define thetriangular law of vector addition ? 3.define cross product of two vectors. 4.explain scalar product of vectors. 5.Give two examples of scalar product and vector product	1.indentify which one is vector quantity (i)mass (ii) force (iii) linear momentum (iv) time (v) torque 2. Derive the . resultant of two vector inclined to an angle 3. Derive the expression for the scalar and cross vectors.

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
	*Questions By the learners.					

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 21/05/2018 (MONDAY) **Name of Teacher: SURENDRA SINGH ARORA**

Class: XI **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students: 35**

Topic: Friction. **Period No. : 02 nd**

CHAPTER: 4 FRICTION i)static friction ii)laws of friction iii)kinetic friction iv) rolling friction v) angle of friction vi) angle of repose	*Basic Concept of friction *friction formula * diagram for total reaction *Solution of Numerical Questions By the learners.	Learners will be able 1. To understand the concept of static, kinetic and rolling friction. 2. To draw the diagram showing directions of normal reaction, friction. 3. To derive the relation μ= tanθ 4. To solve the Numerical Questions based on the topics.	*Demonstrate activity on kinetic friction, and rolling friction. *To study the relationship between force of limiting friction and normal reaction and to find the coefficient of friction between a block and a horizontal surface.	Video of Friction. PPT on Friction. Using objects like boxes, pens, inclined plane for showing friction.	(a)what do you understand by friction. (b) What is limiting friction? (c) Does the force of friction change with the applied force? (d) What is the cause of friction? (e) What is meant by coefficient of friction? On what factors does the value of μdepend? Does μdepend upon area of the two surfaces in contact. Does μdepend on the magnitude of the normal reaction. Will the value of μ increase or decrease when the surfaces in contact are made smoother? (f) How does a body start moving over the surface of another body when the force of friction is always there to oppose it? (g) Is there any relation between angle of friction and coefficient of friction? (h) Why do you slip on a muddy road?	a) Is a large brake on a bicycle wheel more effective than smaller one? (b) For a body placed on an inclined plane, what is the component of force along the inclined plane if the angle of inclination with horizontal is θ. (c)Why friction is considered a necessary evil? Give two reasons in support. (d) What are some of the methods of reducing friction?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 21/05/2018 (THURSDAY) **Name of Teacher: S.m.shariq**
Class: XII **Designation: PGT PHYSICS,**
Subject: PHYSICS **No. of students:35**
Topic- Laws of motion **Period No. :**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
Laws of motion Introduction Inertia Types of inertia First law of motion momentum Impulse Second law of motion Third law of motion Second law is real law	Student should know about newton's laws of motion Use of these laws in real life situations	Students are able to explain Newton's laws of motion. They can apply these laws in real life situations.	About first ,second and third Laws of motion.	Activities are in videos. Power point presentation.Spring balance etc	Showing the activities , ask the students which law is used.	1.What is inertia? 2.What is impulse? 3.Explain laws of motion. 4.Explain second law of motion is real law.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

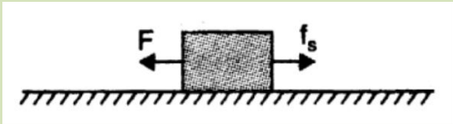
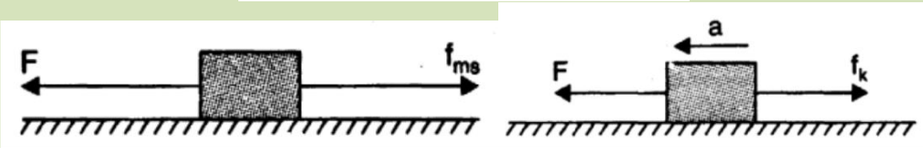
LESSON PLAN

Teacher Name &Desig.Ramesh Kumar, PGT Physics **Class: XI**

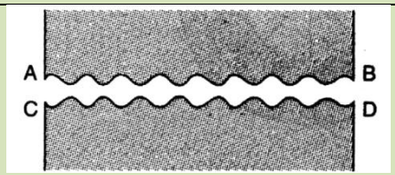
Subject : Physics **Time:**

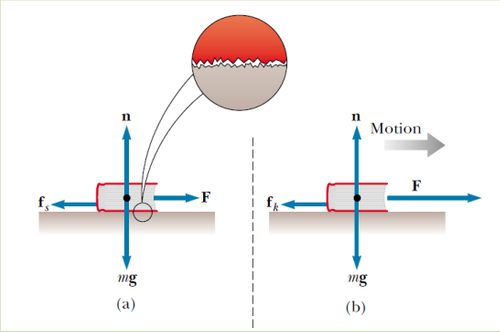
Topic: Friction **Date:**

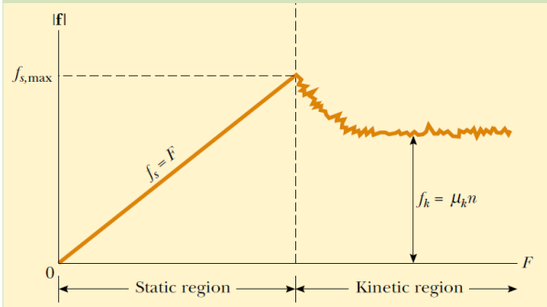
General Aids	Chalk, Duster, Black Board
Specific Aids	PPT
General Aims	• To Consolidate the knowledge and skill acquired in lower classes • To acquire the knowledge and understanding of term ,symbols, concept and principle etc. • To apply this knowledge and skill to solve numerical ,scientific problems
Previous Knowledge	• Forces • Equation of motion • Balanced and unbalanced forces
Concepts to be developed	• Concept of friction • Use of friction • Advantage of friction • Disadvantage of friction
Previous Knowledge Testing	Q1. What is force ? Q2. What are the types of force? Q3. What balanced and unbalanced force ?
Announcement of the Topic	Friction
Presentation	Demonstrative cum discussion method used to develop Cognitive thinking

Subject Matter	Teaching Aid	Board Work
Friction - The property by virtue of which the relative motion between two surfaces in contact is opposed is known as friction. **Frictional Forces** - Tangential forces developed between the two surfaces in contact, so as to oppose their relative motion are known as frictional forces or commonly friction.   **Types of Frictional Forces** - Frictional forces are of three types :- 1. Static frictional force 2. Kinetic frictional force 3. Rolling frictional force **Static Frictional Force** - Frictional force acting between the two surfaces in contact which are relatively at rest, so as to oppose their relative motion, when they tend to move relatively under the effect of any external force is known as static frictional force. Static frictional force is a self adjusting force and its value lies between its minimum value up to its maximum value. **Minimum value of static frictional force** - Minimum value of static frictional force is zero in the condition when the bodies are relatively at rest and no external force is acting to move them relatively. **fs(min) = 0** **Maximum value of static frictional force** - Maximum value of static frictional force is μsN (where μs is the coefficient of static friction for the given pair of surface and N is the normal reaction acting between the two surfaces in contact) in the condition when the bodies are just about to move relatively under the effect of external applied force. **fs(max) = μsN** Therefore, $fs(min) \leq fs \leq fs(max)$ or, $0 \leq fs \leq \mu sN$	Friction demostration	Summary of subject matter

Kinetic Frictional Force - Frictional force acting between the two surfaces in contact which are moving relatively, so as to oppose their relative motion, is known as kinetic frictional force. It'smagnitude is almost constant and is equal to $\mu_k N$ where μ_k is the coefficient of kinetic friction for the given pair of surface and N is the normal reaction acting between the two surfaces in contact. It is always less than maximum value of static frictional force. $\mathbf{f_k = \mu_k N}$ Since, $f_k < fs(max) = \mu sN$ Therefore, $\mu_k N < \mu_s N$ or, $\mu_k < \mu_s$ **Limiting Frictional Force** – The maximum value of static frictional force is the maximum frictional force which can act between the two surfaces in contact and hence it is also known as limiting frictional force. **Laws of Limiting Frictional Force –** 1. Static friction depends upon the nature of the surfaces in contact. 2. It comes into action only when any external force is applied to move the two bodies relatively, with their surfaces in contact. 3. Static friction opposes the impending motion. 4. It is a self adjusting force. 5. The limiting frictional force is independent of the area of contact between the two surfaces. **Cause of Friction** Old View - The surfaces which appear to be smooth as seen through our naked eyes are actually rough at the microscopic level. During contact, the projections of one surface penetrate into the depressions of other and vice versa. Due to which the two surfaces in contact form a saw tooth joint opposing their relative motion. When external force is applied so as to move them relatively this joint opposes their relative motion. As we go on increasing the external applied force the opposition of saw tooth joint also goes on increasing up to the maximum value known as limiting frictional force ($\mu_s N$) after which the joint suddenly breaks and the surfaces start moving relatively. After this the opposition offered by the saw tooth joint slightly decreases and comes to rest at almost constant value ($\mu_k N$)		







Modern View – According to modern theory the cause of friction is the atomic and molecular forces of attraction between the two surfaces at their actual point of contact. When any body comes in contact with any other body then due to their roughness at the microscopic level they come in actual contact at several points. At these points the atoms and molecules come very close to each other and intermolecular force of attraction start acting between them which opposes their relative motion.

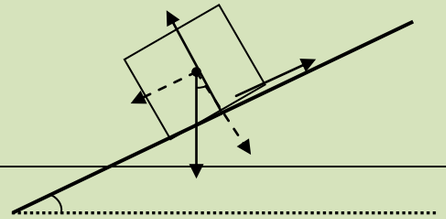
Angle of Repose – The angle of the inclined plane at which a body placed on it just begins to slide is known as angle of repose.

N

fs

mgSinθ θ

mgCosθ



Perpendicular to the plane

$N = mgCos\theta$ (since body is at rest)

Parallel to the plane when body is at rest

$mgSin\theta = f_s$

When body is just about to slide $mgSin\theta = fs(max) = \mu sN = \mu smgCos\theta$

or, $Tan\theta = \mu s$

or, $\theta = Tan^{-1}(\mu s)$

Note - Angle of repose is equal to the maximum value of angle of friction

Rolling Frictional Force - Frictional force which opposes the rolling of bodies (like cylinder, sphere, ring etc.) over any surface is called rolling frictional force. Rolling frictional force acting between any rolling body and the surface is almost constant and is given by $\mu_r N$. Where μr is coefficient of rolling friction and N is the normal reaction between the rolling body and the surface.

$\mathbf{f_r = \mu_r N}$

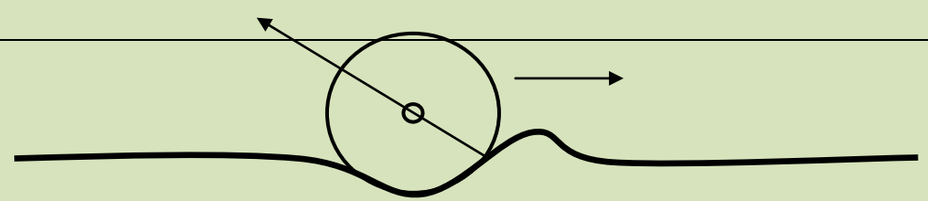
Note – Rolling frictional force is much smaller than maximum value of static and kinetic frictional force.

$\mathbf{f_r << f_k < f_s(max)}$

or, $\mu_r N << \mu_k N < \mu_s N$ or, $\mu_r << \mu_k < \mu_s$

Cause of Rolling Friction – When any body rolls over any surface it causes a little depression and a small hump is created just ahead of it. The hump offers resistance to the motion of the rolling body, this resistance is rolling frictional force. Due to this reason only, hard surfaces like cemented floor offers less resistance as compared to soft sandy floor because hump created on a hard floor is much smaller as compared to the soft floor.

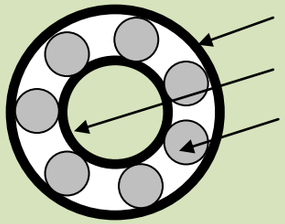
fr



v(direction of rolling)

Need to Convert Kinetic Friction into Rolling Friction – Of all the frictional forces rolling frictional force is minimum. Hence in order to avoid the wear and tear of machinery it is required to convert kinetic frictional force into rolling frictional force and for this reason we make the use of ball-bearings.

Rings having groove on its inner side



Rings having groove on its outer side
Steel ball trapped between the groves

Friction: A Necessary Evil – Although frictional force is a non-conservative force and causes lots of wastage of energy in the form of heat yet it is very useful to us in many ways. That is why it is considered as a necessary evil.

Advantages of Friction –

i) Friction is necessary in walking. Without friction it would have been impossible for us to walk.
ii) Friction is necessary for the movement of vehicles on the road. It is the static frictional force which makes the acceleration and retardation of vehicles possible on the road.
iii) Friction is helpful in tying knots in the ropes and strings.
iv) We are able to hold anything with our hands by the help of friction only.

Disadvantages of Friction – i) Friction causes wear and tear in the machinery parts. ii) Kinetic friction wastes energy in the form of heat, light and sound. iii) A part of fuel energy is consumed in overcoming the friction operating within the various parts of machinery. **Methods to Reduce Friction** – i) By polishing – Polishing makes the surface smooth by filling the space between the depressions and projections present in the surface of the bodies at microscopic level and there by reduces friction. ii) By proper selection of material – Since friction depends upon the nature of material used hence it can be largely reduced by proper selection of materials. iii) By lubricating – When oil or grease is placed between the two surfaces in contact, it prevents the surface from coming in actual contact with each other. This converts solid friction into liquid friction which is very small.		

Recapitulation	• What is Friction? • What are the types of friction? • What is angle of repose • Give any three laws of limiting friction
Home Work	Q1. Prove that the angle of repose is equal to angle of friction Q2. Determine the maximum acceleration of the train in which a box lying on its floor will remain stationary, given that the co-efficient of static friction between the box and the train's floor is 0.15 Q 3 Two bodies of masses 10 kg and 20 kg respectively kept on a smooth, horizontal surface are tied to the ends of a light string. a horizontal force F = 600 N is applied to (i) A, (ii) B along the direction of string. What is the tension in the string in each case?

Signature of teacher

Lesson plan

Date & Day: 17/05/2018 (THURSDAY)
Class: XI
Subject: PHYSICS
Topic: LAWS OF MOTION

Name of Teacher: RASHMITA MEDAK
Designation: PGT PHYSICS
No. of students: 33

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER: 9 1.Laws of Motion 2. Inertia 3.Newton's First Law of Motion 4. Momentum 5. Newton's 2nd Law of Motion 6.Impulse 7.Impulse Momentum Theorem 8. Newton's 3rd Law of Motion 9.Newton's 2nd law is the real law of motion 10.Conservation of Linear momentum 11. Recoil Velocity 12. Application of Newton's Law of motion	*Basic Concept of motion and Inertia * Impulse, *Momentum *Newton's Law of Motion *Practical application related to daily life *Solution of Numerical *Questions By the learners.	Learners will be able 1.To define Newton's laws of motion 2.To define Impulse and derive the relation between impulse and momentum 3.To explain why Newton's 2nd law is called the real law of motion 4.To prove conservation of momentum 5.To solve the Numerical & Questions based on the topics	* Use of ball, table, to explain theNewton's laws of motion. * Use of plastic cup, index card, coin to explain Inertia. *Use of spring balance to explain action and Reaction force.	Demonstration to explain Newton's law of motion, momentum. PPT on the Laws of Motion.	1. What is Inertia? 2. state Newton's laws of Motion 3. Why a cricket player lowers his hands while catching a cricket ball? 4. Why Newton's 2nd law is called the real law of motion? 5. What is Recoil Velocity? 6. What happens if you are standing on a skateboard or a slippery floor and push against a wall? 7. Action and reaction are equal and opposite. Why cannot they cancel each other?	1. A bullet of mass 200 g fired from a gun moving with a velocity of $20ms^{-1}$ hits a wooden log. The bullet stops after travelling a distance of 40 cm in the wooden log. Calculate the retarding force exerted by the log on the bullet. 2. A boy of mass 30 kg climbs on a rope which can withstand a maximum tension of 400 N. The rope will break if the child (i) climbs up with an acceleration of $4\ ms^{-2}$. (ii) slips down with an acceleration of $6\ ms^{-2}$. (iii) climbs up with a uniform speed of $2\ ms^{-2}$. Given g = 10 ms^{-1}.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: ANJLI JAIN**

Class: XI **Designation: PGT PHYSICS**

Subject: PHYSICS

Topic: WORK, ENERGY AND POWER

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
*Work and its types * Energy * Kinetic energy and	*Basic Concept Behind work * Correct	Learners will be able 1.To define work and its type 2.To define energy and its type	Use of examples from daily life	. PPT on work , energy and power	1. Define the conservative and non-conservative forces? Give example of each? 2. A light body and a heavy body have same linear momentum.	1. Define spring constant of a spring? 2. What happens when a sphere collides head on elastically with a sphere of same mass initially at

potential energy * Power	calculation of dot product *Solution of Numericals *Questions By the learners.	3.To define power 4.To define elastic collision and its derivation			Which one has greater K. E. 3. If the momentum of the body is doubled by what percentage does its K.E changes? 4. A truck and a car are moving with the same K.E on a straight road. Their engines are simultaneously switched off which one will stop at a lesser distance? 5. What happens to the P.E of a bubble when it rises up in water?	rest? 3 Derive an expression for K.E of a body of mass m moving with a velocity v by calculus method 4.State and explain work – energy theorem ?

Lesson plan

Date & Day: 21/05/2018 (SUNDAY)
Name of Teacher: Ms. NAMITA
Class: XI
Subject: PHYSICS

Designation: PGT PHYSICS
No. of students: 40

Topic: Work ,energy and power

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER:5 1. Definition of work ,energy and power 2. Formula for kinetic energy, potential energy and power 3. Conservative and non- conservative forces 4. Positive and negative work done	*Basic Concept of work energy and power and their use in our day to day life *Problem solving attitudes * difference between conservative and non conservative forces * features of constant and variable forces	Learners will be able 1.To define and differentiate conservative forces, work ,energy and power 2.To differentiate conservative ,non conservative and variable forces 3.To derive the formula for work energy theorem 4.To solve the Numerical & Questions based on the topics	* Use of spherical objects to show the change in energy by applying variable forces * Use of objects in the class room to show the difference between friction and applied forces and how to calculate work done by them * Use of an object to derive the formula for kinetic and potential energy * Use of simple pendulum	Video to explain work- energy theorem Video to explain conservative and non – conservative forces PPT on work – energy and power	Q.1.Write the conditions of positive , negative and zero work done. Q.2. How can we calculate the work done by variable forces? Give examples. Q.3. Explain work done by a spring. What is the potential energy stored in a spring? Q.4. Define conservative and non- conservative forces. Give examples.	Q.1. What is the difference between work , energy and power? Q.2. Write the SI unit of power . Give an example of non-conservative forces. Q.3. State and explain work –energy theorem. Q.4. Write the values of 1watt , 1hp and 1 kWh in joule.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson Plan

DATE:
NAME OF CLASS: XI
SUBJECT: Physics

TOPIC: Systems of Particles and Rotational Motion.
Teacher's Name: Sh. S K Varma.
GIST:
Centre of mass of a two-particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of a uniform rod.Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications.Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions. Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.
ACTIVITY:

(x) In symmetrical bodies having homogeneous distribution mass the centre of mass coincides with the geometrical centre the body. (xi) The position of centre of mass of an object changes translatory motion but remains unchanged in rotatory motion
Moment of Inertia
The inertia of rotational motion is called moment of inertia. It is denoted by L.
Moment of inertia is the property of an object by virtue of which it opposes any change in its state of rotation about an axis.
The moment of inertia of a body about a given axis is equal to the sum of the products of the masses of its constituent particles and the square of their respective distances from the axis of rotation

Re-capitulation:
1. Define Centre of mass.
2. What is Moment of Inertia?
3. Give the statement of Parallel &Perpendular Axes Theorems
4. Define Radius of Gyration.
5. Give the location of center of mass of following:
i. A Straight Rod
ii.Circular Ring
iii.A two rod of L shaped.

HOME ASSIGNMENT:

1.Find the centre of mass of three particles at the vertices of an equilateral triangle. The masses of the particles are 100g, 150g, and 200g respectively. Each side of the equilateral triangle is 0.5m long.

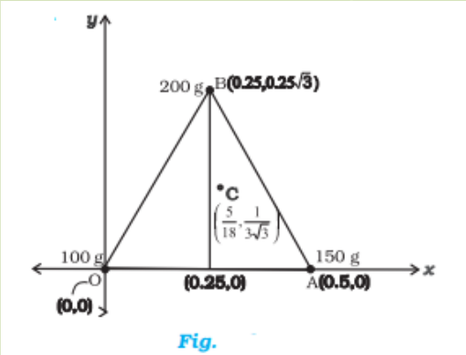


Fig.

2. Find the centre of mass of a uniform L-shaped lamina (a thin flat plate) with dimensions as shown. The mass of the lamina is 3 kg
3.Find the scalar and vector products of two vectors. a = (3i ˆ – 4j ˆ + 5ˆk) and
b = (– 2i ˆ + j ˆ – 3ˆ k)
4.Find the torque of a force 7i ˆ + 3j ˆ – 5ˆk about the origin. The force acts on a particle whose position vector is i ˆ – j ˆ + ˆk.
4. Show that the angular momentum about any point of a single particle moving with constant velocity remains constant throughout the motion.

5.A cord of negligible mass is wound round the rim of a fly wheel of mass 20 kg and radius 20 cm. A steady pull of 25 N is applied on the cord as shown in Fig. 7.35. The flywheel is mounted on a horizontal axle with frictionless bearings. (a) Compute the angular acceleration of the wheel. (b) Find the work done by the pull, when 2m of the cord is unwound. (c) Find also the kinetic energy of the wheel at this point. Assume that the wheel starts from rest.

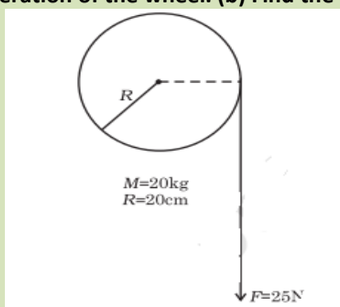


Fig.

(d) Compare answers to parts (b) and (c)

6.Three bodies, a ring, a solid cylinder and a solid sphere roll down the same inclined plane without slipping. They start from rest. The radii of the bodies are identical. Which of the bodies reaches the ground with maximum velocity?

(Sh. S K Varma.)
Teacher's Name &signature
Designation:PGT Physics KV No.1 Kankarbagh Patna.

Lesson plan

Date& Day: 20/05/2018 (SUNDAY)
Name of Teacher:NIRMALA ,K. V. NO 4 JALANDHAR CANTT
Class: XI Designation: PGT PHYSICS
Subject:PHYSICS No. of students: 32
Topic: SATELLITE

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
UNIT 6 GRAVITATION SATELLITE 1 Satellite 2 types of satellite 3 Principle of launching the satellite 4 Orbital velocity of satellite 5 Time period of satellite 6 height of satellite 7 Geostationary	*Basic Concept of Satellite , type satellite, orbital velocity time period geostationary satellite polar satellite Solution of Numerical Questions By the learners.	Learners will be able 1. To derive the orbital velocity, time period, height and energy of the satellite. 2. To draw the ray diagram for orbits of polar and geostationary satellite 3. To explain the principle of launching the satellite and uses of satellite. 4. To solve the Numerical Questions based on the topics	PPT on satellite	Q1 An artificial satellite revolves in its orbit around the earth without using any fuel. But an aero plane requires fuel to fly at a certain height. Why? Q2 An artificial satellite is revolving around the earth at a height 200 km from the earth's surface. If a packet is released from the satellite ,what will happen to it? Will it reach the earth? Q3 A satellite revolving around earth loses height. How will its time period be changed? Q4 Two artificial satellite, one close to the surface and	Q1. What is the sense of rotation of polar satellite of earth and geostationary satellite? Q2. A satellite of mass m is in a circular orbit of radius r round the earth. Calculate its angular momentum with respect to Centre of the orbit in terms of the mass M of the earth and G

satellite 8 Polar satellite				the other away are revolving around the earth. Which has larger speed? Q5 Should the speed of two artificial satellites of the earth having different masses but the same orbital radius, be the same? Q6. Which has longer period of revolution, a satellite revolving close or away from surface of earth?	Q3 Two satellite A and B go around a planet P in circular orbits having radius 4R and R respectively. If the speed of the satellite A is 3v , find the speed of the satellite B. Q4. What is a satellite ? Explain the principle of launching a satellite. Q5. What do you understand bygeostationary and polar satellites? Discuss their important uses? Q6 What do you understand by orbital velocity ? Derive an expression for the orbital velocity of satellite? Q13 Derive an expression for

					time period of satellite and height of satellite?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: INDU GOSWAMI**

Class: XI **Designation: PGT PHYSICS**

Subject: PHYSICS

Topic: TORQUE AND ANGULAR MOMENTUM

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
* Cross product of two vectors *Torque * Angular momentum	*Basic Concept Of torque *	Learners will be able 1.To define centre of	Use of examples from daily	. PPT on torque and angular momen	1.Define torque . 2.What is the SI unit of torque ? 3. What is the value of	1.Write the analogue of (i)mass (ii) force

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evalua Questi (class						
						Concept of angular momentum and different relations *Solution of Numericals *Questions By the learners.	mass 2. To define torque 3.To define angular momentum and its relation with different physical quantity	life	tum	A× B ? 4.Handles are provided far away from hinge near the edge of the door . Explain why ? 5.What is angular momentum ?	(iii) linear momentum 2.Prove that dL/dt=Ʈ . 3. Derive relation between torque, moment of inertia and angular acceleration. 4. If the earth contracts to half of its radius .

Chapter- 9 MECHANICAL PROPERTIES OF SOLIDS ***elastic behavior** ***Strain- strain relationship** ***Hook's Law** ***Young's modulus, Bulk modulus, shear modulus of rigidity,** *** Poisson'Ratio** ***elastic ratio**	To *Define elasticity, Plasticity, strain and Stress *Explain the different types of Modulus of Elasticity. *Draw the stress –strain curve *Derive the elastic potential energy. * Solution of Numerical Questions By the learners.	***Learners will be able to** **i) Define the stress and strain** **ii)Differentiate the Young's Modulus, Bulk Modulus and Modulus of Elasticity.** **iii) plot the stress- strain curve and explain the different points on the graph.** **iv) Can solve the numerical problems**	**i)To determine the Young's modulus of elasticity of the material of a given wire.** **ii)To determine spring constant by load extension method.** **iii) Explanation of the topic.**	**PPT related to different elastic constants will be shown in suitable time.** **Video of will be shown on related topics and explained**	**i)** **ii)** **iii)** **iv)** **v)**						What would be the length of the day. 5.Why wrench are provided with long arm ?

Lesson plan

Date & Day: 17/05/2018 (THURSDAY)
Class- XI
Subject: PHYSICS
Topic:Mechanical Properties of Solids

Name of Teacher: Mamata Singh
Designation: PGT PHYSICS

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: DR.KUMAR HEMENDRA**
Class: XI **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students: 33**
Topic: VISCOSITY

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

Viscosity	*Basic Concept of viscosity * Stoke's formula *****Terminal velocity	Learners will be able 1.To know about viscosity 2.coefficient of viscosity and their unit,dimension 3. The factors affecting Viscosity 4.Statement and derivation of Stoke's formula.	Use of viscous liquid and iron ball to measure terminal velocioty	PPT on viscosity	1.what isviscosity 2. what is newtons formula for viscosity 3 define terminal velocity	1.All exercise questions 2.What is coefficient ofviscosity. State its unit and dimension. 3.State and derive Stoke's formula.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Model Lesson plan

Class : XI Science
Subject :Physics

Unit VII: MECHANICAL PROPERTIES OF SOLIDS
Topic :Elastic Behaviour , Stress-Strain , Hook's Law
Date of commencement :18.05.2018
Date of completion :18.05.2018
No of periods required :1

A.Gist of the Lesson

Elastic Behaviour , Stress-Strain relationship, Hook's law ,

B. Objectives and expected learning outcomes.

1. Students will be able to know about difference between elasticity and plasticity
2. Students will be able to know about stress , strain and their types.
3. Students will be able to know about Hook's law

C. Teaching Aids

PPT, Black Board , Video Lessons , Rubber band , Spring etc

D. Content of the lesson :

- **Deforming force**:- A force acting on a body which produces change in its shape of body instead of its state of rest or uniform motion of the body.
- **Elasticity**:-The property of matter by virtue which it regains its original shape and size, when the deforming forces are removed is called elasticity.
- **Plasticity**:- The inability of a body to return to its original shape and size, when the deforming forces are removed is called plasticity.
- **Elastic Behaviour Of Solids :-**We know that in a solid, each atom or molecule is surrounded by neighbouring atoms or molecules. These are bonded together by interatomic or intermolecular forces and stay in a stable equilibrium position. When a solid is deformed, the atoms or molecules are displaced from their equilibrium positions causing a change in the interatomic (or intermolecular) distances. When the deforming force is removed, the interatomic forces tend to bring them back to their original positions. Thus the body regains its original shape and size.
- **STRESS :**-When a body is subjected to a deforming force, a restoring force is developed in the body. This restoring force is equal in magnitude but opposite in direction to the applied force**. The restoring force per unit area is known as stress.**

  If *F* is the force applied and *A* is the area of cross section of the body,

  Magnitude of the **stress =** $\frac{F}{A}$

  The ***SI unit of stress is*** Nm^{-2} ***or pascal (Pa)***and its **dimensional formula is [** $ML^{-1}T^{-2}$ **].**

- **TYPES Of SRESS :-**
  - **(i) Normal Stress Or Longitudinal Stress :-**It is defined as the restoring force per unit area perpendicular to the surface of body. It is further of two types :-
    - **(a) Tensile Stress :** When there is an increase in length or extension of the body along the direction of force (fig A)
    - (b) **Compressive stress**: when there is decrease in dimension or compression of the body along the direction of force (fig B)
  - **(ii) Tangential stress Or Shearing Stress** : When deforming force acts tangential to the surface of body then stress is called Tangential stress (Fig C)
  - **(iii) Hydraulic Stress Or Bulk Stress :-**When a solid body undergoes change in volume on applying the deforming force perpendicular to every point on the surface of body ,then the restoring force per unit area is called **Bulk stress of Hydraulic stress. (Fig D)**

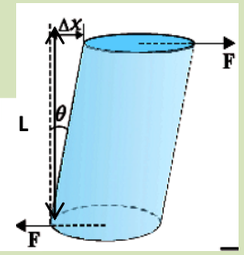
STRAIN :-The ratio of change in dimension to the original dimension is called **strain.**

It has no units and no dimension

- **TYPES OF STRAIN :-**

Types of strain:-

- Longitudinal strain= $\frac{\text{Change in Length}}{\text{Original Length}} = \frac{\Delta L}{L}$
- Volumetric strain = $\frac{\text{Change in Volume}}{\text{Original Volume}}$
- Sharin Shearing Strain = $\frac{\textit{relative displacement } (\Delta x)}{\textit{Original Length } (L) \textit{ of body}} = \theta$

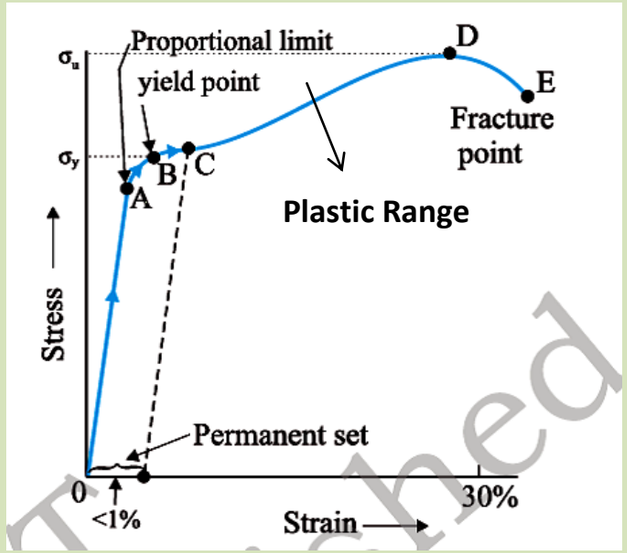


- **Hooke's Law:-** Within elastic limit, **stress α strain**
  - ⇨ $\frac{Stress}{Strain}$= a Constant called Modulus of Elasticity.

- **STRESS –STRAIN CURVE :-**These curves help us to understand how a given material deforms with increasing loads. From the graph, we can see that in the region between O to A, the curve is linear. In this region, Hook's law is obeyed. The body regains its original dimensions when the applied force is removed. In this region, the solid behaves as an elastic body.

  Proportionality limit(A) – *The stress at the limit of proportionality point A is known as proportionality limit*

  In the region from A to B, stress and strain are not proportional. Nevertheless, *the body still returns to its original dimension when the load is removed. This point B in the curve is known as* ***yieldpoint*** *or* ***elasticlimit*** *and the corresponding stress is known as* ***yield***



strength(σ_y) *of the material.*

Elastic limit - *the maximum stress which can be applied to a wire so that on unloading it return to its original length is called the elastic limit*

If the load is increased further, the stressdeveloped exceeds the yield strength and strain increases rapidly even for a small change in the stress. The portion of the curve between B and D shows this. When the load is removed, say at some point C between B and D, the body does not regain its original dimension. In this case, even when the stress is zero, the strain is not zero. The material is said to have a **permanentset**. The deformation is said to be **plasticdeformation**. The point D on the graph is the ultimate **tensile strength** (σ_u) of the material. Beyond this point, additional strain is produced even by a reduced applied force and fracture occurs at point E.

Fracture point or Breaking point(E*)-* *the value of stress corresponding to which the wire breaks is called breaking point*

(E) RECAPTULATION :

Q1. What do you Elasticity

Q2. Define normal stress

Q3. What is Hook's Law

Q4. What is permanent set and proportional limit in stress-strain curve

(F) HOME ASSIGNMENT :-

1. Write the factors on which modulus of elasticity depends. 1
2. Which is more elastic rubber or steel? Explain.
3. Why do we prefer steel to copper in the manufacture of spring? 1
4. State Hooke's law? Give its one limitation
5. Discuss stress strain curve for a loaded steel wire and hence explain the term elastic limit, yield point, permanent set, tensile strength. 3

Rajeev Kumar

PGT (Physics)

KV Sainj

KENDRIYA VIDYALAYA

LESSON PLAN

DATE – PERIOD –

DAY –

DURATION- 40 MIN

CH. – 5. FORCE AND LAWS OF MOTION

TOPIC – <u>Equilibrium of rigid body</u>

Previous Knowledge – Students are already aware with force.

General Objectives –

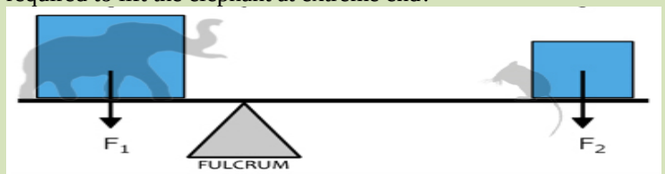
1. To make the students able to understand the concepts of physics.
2. To make the students able to apply the concepts of physics in day today life.

Specific Objectives –

1. To make the students able to understand the concept of equilibrium of rigid body.
2. To make the students able to apply the knowledge of equilibrium in day to day life.
3. Students will be able to solve the numerical based on them.

Introductory question :

1. If a duster is placed on table. But it is not moving, does it mean that no force is acting on body?
2. What do you mean by equilibrium of body?
3. On what principal does the lever based?

STPECNOC	GOLODOHTEMY	SSECORP GNINRAEL GNIHCAET	SDIA GNICAET	GNINRAEL DETCEPXE EMOCTUO	NOITALUTIPACER
noitcudortnI	noitartsnomeD dohtem	lliw rehcaeTkeep roolf no ydob a and ask, whether any force is acting on body or not? Why do not body move instead of no of forces acting on it?	cte retsud ,llab	yam dna kniht lliw stnedutS .rewsna	
Translational equilibrium, Rotational equilibrium And numerical based on rotational equilibrium of rigid body	muc erutceL noitartsnomed dohtem	rehcaeTwill make them to refresh their knowledge about translational motion? Teacher will show a lever of scale in equilibrium and discuss the type of equilibrium. He will explain rotational equilibrium with proper sign convention of torque Teacher will discuss, solve and explain a numerical based on rotation equilibrium. A plank of length 4 m is balance at centre on a fulcrum. A baby elephant of mass 500 kg is to be lifted which is at a distance of 1 m from centre. What is the force required to lift the elephant at extreme end?  Teacher will give one numerical to solve in class by moving the fulcrum and explain the use of mass of plank itself.	,rotcejorp ,sdia lausiv oidua noitatneserp tniop rewop	tpecnoc eht dnatsrednu lliw tnedutS fotranslational equilibrium. Students will discuss and understand the concepts of rotational equilibrium and how does it act? Students will understand and take part in teaching learning process Students will solve the numericals	si tahWtranslational equilibrium? What do you Mean by rotational equilibrium? What is torque? How can you calculate torque? A plank of mass 5 kg and length 1 m is supported at its mid-point. An object of mass 2 kg is hanged at distance of 30 cm from mid-point. At what distance a mass of 1.5 kg is to bar hanged so that it will remain in

					equilibrium?

Home Assignment:

1. What do you mean by stable, unstable and neutral equilibrium of a rigid body?

2. A ladder of length 5 m and mass 2 kg is supported at wall at an angle of 30^0 with ground. Calculate the reaction force applied by wall and the ground.

Subject Teacher **Principal**

Lesson plan

Date & Day: 21/05/2018 (THURSDAY) **Name of Teacher: JASWINDER LAL ,K V SEC-31,CHD**

Class: XI **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students:**

Topic: Thermal properties of matter **Period No. :**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
Thermal properties of matter: heat, temperature, measurement of temperature, thermal expansion, methods of heat transfer, heat calorimetry,	Concept of heat & temperature, how to measure temperature on different scales, Relation between scales of temperature, types of thermal expansion; linear, superficial & volume expansion, methods of heat transfer; conduction, convection & radiation	The learners will be able to explain about definition of heat and temperature, to measure temperature with different types of thermometers, to find coefficient of linear, superficial & volume expansion, thermal conductivity, heat transfer by convection & radiation	To show how the temperature is measured with Different thermometers, boiling of water to show convection of heat.	Ppt on conduction, convection and radiation, video to show land breeze and sea breeze.	What is temperature? What are the different scales of temperatures? Write relation between Fahrenheit & Celsius scale. Write relation between coeff. of linear, superficial & volume expansion . What is the reading of temperature of a healthy person?	What do you mean by temperature? Write relation between different scales of temperature. Why mercury ifs used in the thermometer? Derive expression for thermal conductivity. Explain how heat is transferred by conduction convection and radiation with examples.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 21/05/2018 (MONDAY) **Name of Teacher: TILAK RAJ**
Class: XII **Designation: PGT PHYSICS, KV. NANGALBHUR.**
Subject: PHYSICS
Topic: THERMODYNAMIC PROCESS

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
TOPIC: Thermodynamics Thermodynamic system Thermodynamic variables Types of thermodynamic processes	Basic concept of System and variable Thermodynamic variables Types of thermodynamic processes. Differentiate between different types of processes. conditions for different types of process	After the completion of topic The students will be able to 1.Explain thermodynamics and thermodynamic system 2. Explain Thermodynamic variable and thermodynamic processes. 3.Differentiate between different types of thermodynamic processes	**PPT will be shown .** **Video lesson on given topics**	Thermodynamics and Thermodynamic system will be explained with the help of daily life examples. Thermodynamic variables and Types of thermodynamic processes will be explained with the help of diagram and from daily life example. Evaluation by- By daily PK testing. Class test after completion of topics Retest for low achiever after remedial teaching	1.What is thermodynamics? 2.What do you mean by a 'thermodynamic variable'? 3.How is it related with temperature? 4.What is thermodynamic process? 5.Draw p-v diagram for isothermal process. 6.What are necessary conditions for isothermal process?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

Chapter 7: Introduction Vector product of two vectors Angular velocity and its relation with linear velocity Torque and angular momentum Kinematics of rotational motion about a fixed axis Dynamics of rotational motion about a fixed axis Angular momentum in case of rotation about a fixed axis	***laws of motion** * Basic Concept of circular motion * They Know the Vector Product. *Solution of Numerical *Questions By the learners.	Learners will be able 1.define Torque 2.To find expression for Torque in Cartesian co-ordinate system 3. To find expression for Torque in Polar co-ordinate system 4. To define Angular momentum 5. To find expression for Angular momentum in Cartesian & Polar co-ordinate system 5.To solve the Numerical &Questions based on the topics	1.Activity 2.Activity	Video to explain Tuoque PPT on the Torque And Angular Momentum	1.What is dimensional formula of torque? 2.If a body of mass 2 kg is moving parallel to x-axis with velocity 2m/s at y=0.2m.Find the magnitude angular momentum of the body . 3.If the angular momentum of a body becomes twice remaining the M.I of the body same .find the rotational Kinetic energy of the body Sol: It becomes four times.	1.A cord of negligible massis wound round the rim of a fly wheel ofmass 20 kg and radius 20 cm. A steadypull of 25 N is applied on the cord . The flywheel is mounted on ahorizontal axle with frictionless bearings. (a) Compute the angular acceleration ofthe wheel. (b) Find the work done by the pull, when2m of the cord is unwound. (c) Find also the kinetic energy of thewheel at this point. Assume that thewheel starts from rest. (d) Compare answers to parts (b) and (c). 2. Derive an expression for torque in Cartesian and polar co-

						ordinates

Lesson plan

Date & Day: 24/05/2018 (THURSDAY) **Name of Teacher: Dr.NarendrakumarPandey**

Class: XI **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students: 29**

Topic: Torque

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

LESSON PLAN REVERSIBLE AND IRREVERSIBLE PROCESS, HEAT ENGINE AND REFRIGERATOR

Class- XI, Date- Yudhbir Sing KV-2 Pathankot

Key words: Reversible process, Irreversible process, Heat engine, Efficiency of a heat engine, Source, Sink, Refrigerator, Coefficient of performance, heat pump

- **Method**: Lecture method with the help of **Power Point Presentation.**

Teaching point	Learning objective	Evaluation
Recapitulation of Previous Knowledge: Thermodynamical process, Isothermal process, adiabatic process, First law of thermodynamics, Second law of thermodynamics	Recapitulates the previous taught concepts	State first law of thermodynamics and Second law of thermodynamics.
Reversible and Irreversible process Examples of these processes.	Understands Reversible and Irreversible processes	Give examples of Reversible and Irreversible process.
Heat Engine Essential Parts of Heat Engine Working of a heat engine Efficiency of a heat engine	Understands the working of a heat engine.	What is a heat engine? Why efficiency of a heat engine is never 100%? Write formula of efficiency of a heat engine.
Refrigerator	Understands the working of a refrigerator. .	What is a refrigerator? Why coefficient of performance of a refrigerator. Is never infinite? Write formula of coefficient of performance of a refrigerator.

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

UNIT : 1 **TOPIC:** **1. Reversible and Irreversible process.** **2. Heat engine** **3. Construction and working of a heat engine.** **4. Efficiency of a heat engine** **5. Refrigerator** **6. Construction and working of a Refrigerator.** **Coefficient ofg performance of a Refrigerator.**	**Recapitulation of 1.Previous Knowledge:** **Thermodynamical process, Isothermal process, adiabatic process.** **2.Reversible and Irreversible process** **Examples of these processes.** **3.Heat Engine** **4.Essential Parts of Heat Engine** **5.Working of a heat engine** **6.Efficiency of a heat engine** **7.Refrigerator** **8.Essential parts of a refrigerator** **9.Working of a refrigerator and** **Coefficient of performance of a refrigerator**	***Learners will be able to** **(i)Recapitulates the previous taught concepts** **(ii) Understands Reversible and Irreversible processes** **(iii)Understands the working of a heat engine.** **(iv) Understands the working of a refrigerator.**	**PPT will be shown .** **Video lesson on given topics**	**1. State first law of thermodynamics and 2.Second law of thermodynamics.** **3.Give examples of Reversible and Irreversible process** **4.What is a heat engine?** **5.Why efficiency of a heat engine is never 100%?** **6.Write formula of efficiency of a heat engine.** **7.What is a refrigerator?** **8.Why coefficient of performance of a refrigerator is never infinite?** **9.Write formula of coefficient of performance of a refrigerator.**	**1. What are reversible and irreversible processes? Give examples.** **2.Explain working of a heat engine and a refrigerator?** **3. What is difference between heat pump and a Refrigerator?** **4. A refrigerator is working between temperatures 20°C and 80°C Find the coefficient of performance of the Refrigerator?**		
Essential parts of a refrigerator Working of a refrigerator Coefficient of performance of a refrigerator							
Difference between heat pump and a refrigerator						Understands the difference between heat pump and a refrigerator	What is difference between heat pump and a refrigerator?

Exercise for homework

1. What are reversible and irreversible processes? Give examples.

2. Explain working of a heat engine and a refrigerator?

Lesson plan

Date & Day: 2105/2018 (MONDAY) **Name of Teacher: YUDHBIR SINGH**
Class: XI **Designation: PGT PHYSICS, K.V. No.2 ARMY AREA** **PATHANKOT**
Subject: PHYSICS
Topic: Reversible and Irreversible process, Heat Engine and Refrigerator

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: SATISH KUMAR**
Class: XI **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students: 33**
Topic: BEATS AND DOPLER EFFECTS

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
1. Beats 2.Applicaton and phenomenon of beats 3.Graphical representation of beats 4.Doppler's Effect	*Basic Concept of beats * Applicaton and phenomenon of beats * Graphical	Learners will be able 1.To define beats 2.To explain the phenomenon of beats 3.To be able to represent the beat graphically 4.To define Doppler's Effect	*wax, tuning fork to explain the phenomenon of beats	Video to explain Beats and Doppler's Effect. PPT on the Beats and Doppler's	1. What is meant by beats ? Discuss graphical method of formation of beats. 2. Write the condition for Doppler's effect in sound There must be relative motion between source of sound and listener	1. When two tuning forks A and B sounded together three beats are heard. Frequency of A is 381Hz. If (i) B is loaded (ii) A is loaded the B and A are become unison. What is the

5.Aplication of Doppler's Effect	representation of beats *.Doppler's Effect and its Aplication *Solution of Numerical *Questions By the learners.	5.To know the application of Doppler's effect 5.To solve the Numerical &Questions based on the topics		Effect	3. What is the cause of Doppler's effect when souce of sound is in motion? 4. A bus is moving towards a huge wall with a velocity of 5m/s .the driver sounds the horn of frequency 200Hz .what is the frequency of beats by a passanger of bus if the speed of sound in air is 342 m/s. 5. A source is moving towards stationary observer with some velocity.The frequency of sound heard is 4/23 of its original frequency. What is the velocity of source?	frequency of B? 2. Two tuning forks of frequencies 250Hz and 252Hz are being sounded together. If a loud is produced just now, after what time would the sound be again equally loud? 3. A train standing at the outer signal of a railway station blows awhistle of frequency 400 Hz still air. The train begins to movewith a speed of 10 m s-1 towards the platform. What is thefrequency of the sound for an observer standing on the platform? (sound velocity in air = 330 m s–1)

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

LESSON PLAN

Class: XI **Subject: Physics** **Period:** **Date:**

Chapter: 15 Waves **Topic: Standing Waves**
Teacher's Name: Ashok Kumar Gupta, PGT [Physics]

Objectives: (1) Students will be able to learn **Standing Waves, Their properties,**
(2) Students will be able to apply knowledge of Standing waves in stretched string, Air Column (Closed and Open Organ Pipe)
Teaching Aids: PPT ,' activity demonstrating formation of standing waves
Previous Knowledge:

1) Knowledge of SHM
2) Knowledge of Progressive Waves
3) Superposition Principle

Recapitulation:

1) What is the difference between Travelling waves and Standing waves
2) What is the separation between two consecutive nodes/ antinodes?
3) What do you mean by wavelength
4) What is the relation between wavelength and frequency
5) Home Assignment:

1) Revise the lesson at home.
2) Solve ncert questions.

KENDRIYA VIDYALAYA
LESSON PLAN

DATE – **PERIOD –**
DAY – **DURATION- 40 MIN**
CH. – WAVE OPTICS **TOPIC –INTERFERENCE OF LIGHT**
Previous Knowledge–Students are already aware with Wave front.
General Objectives–

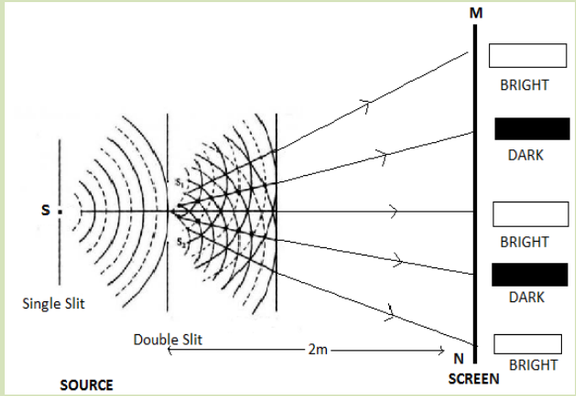
1. To make the students able to understand the concepts of physics.
2. To make the students able to apply the concepts of physics in day today life.

Specific Objectives–

1. To make the students able to understand the concept of interference.
2. To make the students able to apply the knowledge of interference in day to day life.
3. To create the interest in science.
4. Students will be able to explain the facts or common phenomenon due to interference

Introductory question :

1. What is wave front?
2. what are the types of wavefront?
3. state Huygens's Principle?

STPECNOC	YGOLODOHTEM	SSECORP GNINRAEL GNIHCAET	GNICAET SDIA	GNINRAEL DETCEPXE EMOCTUO	NOITALUTIPACER
Interference of light Young's Double Slit Experiment Conditions for constructive and destructive interference	muc erutceL noitartsnomed dohtem	**Interference of light** It is the phenomenon of modification (distribution) of light energy two coherent sources of light on the account of superposition of two waves. **Young's Double Slit Experiment** The experimental set up of Young's double slit experiment is shown below. Here 'S' is a narrow slit illuminated by a monochromatic source of light. At a suitable distance from S, there are two fine slits A & B about 0.5mm apart, placed symmetrically parallel to S. A screen is placed at a distance about 2m from the slits A & B. Teacher will explain about conditions required for constructive and destructive interference, he will also derive the conditions. Few important formulae regarding maxima and minima will be discussed.  	PPT , Chalk cte retsud	dna kniht lliw stnedutS .rewsna yam Students will discuss, understand and will apply the concepts. Students will also note down the concepts.	*About interference * Type of interference *Condition for constructive interference * Condition for distructive interference

Home Assignment

1. derive the condition for constructive and destructive interference
2. Intensity of two waves are I and 4 I find the ratio of their max intensity and minimum intensity

Subject Teacher **Principal**

Lesson plan

Date & Day: 21/5/2018 Name of Teacher: AlokChaturvedi Class- XI
Designation: PGT PHYSICS
Subject: PHYSICS
Topic:Dopplers effects and Beats

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

Chapter- 14 Oscillation and wave	To *know about beats * change in frequency of sound due to relative motion of source and observer	*Learners will be able to i) Define the beats ii)Time period of beats iii) frequency variation due to relative motion of source and observer iv) Can solve the numerical problems	i)To demonstrate Beats using tuning forks ii)To demonstrate change in frequency due to motion of source of sound (mobile)	PPT related to Doppler's effect & Beats will be shown in suitable time. Video on related topics will be played and explained	1)What do you mean by beats? 2) Under what condition beats are heard? 3)Under what condition beats are formed? 4)Two tuning forks of frequency 256 Hertz and 280 Hertz are sounded together how many Beats are heard? 5)"Doppler Effect is observed for all types of waves" comment on the statement. 6)Name two conditions in which Doppler Effect is not observed.	1)Discuss analytically how beats are formed? 2) Draw a diagram showing formation of Beats by two waves. 3)A sound source is moving towards a wall with 30 m/s.produces a note of frequency 200 Hz. Calculate frequency of the reflected sound received by the source. 4) Deduce an expression for the Apparent frequency heard by an observer moving towards a stationary source. 5)Two vehicles at driving, in the same direction, down a highway at 100 km/h. A passenger in the leading car sounds a 1000 Hz whistle. What frequency will a passenger in the following car hear?	

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Period No.	Day & Date	Portion	Target competency &ELO	Activities planned	Audio visual aid including CAL/TAL	Evaluation Questions /activities (class Work)	(HW, assign. Projects)
		HORIZONTAL OSCILLATIONS OF A	To enable them to participate actively, observation			• A spring of force constant K is cut into	NCERT exercises 1.A spring of force

Lesson plan Date& Day : 17/05/2018 (THURSDAY)

Name of Teacher:NEELAM AGARWAL
Class: XI **Designation: PGT PHYSICS**
Subject:PHYSICS **No. of students: 32**
Topic:Wave Motion **Period No. 7TH**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
MASSLESS LOADED SPRING **VERTICAL OSCILLATIONS OF A LOADED SPRING** **OSCILLATIONS OF A LOADED SPRING COMBINATIONS**	critical thinking leadership qualities and communication. To enable them to apply relevant knowledge and tabulate results as well develop innovative and scientific temperament. Students will be able to develop skills of conceptualization application, calculation, inquisitiveness, mental alertness etc To enable them to know understand recall recollect spatial thinking. Students will be able to Describe **horizontal oscillations of a massless loaded spring , vertical oscillations of a loaded spring, oscillations of a loaded spring combinations**		Experimental demonstration of vertical oscillation of a spring	Black board ,chalk ,springs weights etc.	two piece such that one piece is double the length of other. What is force constant of longer piece of the spring? • What is the restoring force acting on block attached with a spring when it is displaced by x displacement? Name this law. • At what point during the oscillation of a spring is the force on the mass greatest?	constant 1200N/m is mounted horizontal table. A mass of 3Kg is attached to the free end of the spring, pulled sideways to a distance of 2.0cm and released. (i) What is the frequency of oscillation of the mass? (ii) What is the maximum acceleration of the mass? (iii) What is the maximum speed of the mass? What is the restoring force acting on block attached with a spring when it is displaced by x displacement? Name this law.	

CHAPTER14 *Definition of wave *Displacement wave length, ,amplitude ,time period, wave vector, wave velocity etc	*The student would understand the meaning of wave, disturbance, and various variables, associated with wave motion. *They would derive the expression for frequency, time period, velocity etc.	Learners will be able * To derivethe formula for frequency, and time period, velocity etc. *The learner would solve the numerical based on these concepts.	*Take a string and tie its one end with a pole, other end is shacked by other hand and the wave is propagated in the string.	Ppts used for explaining the various concepts.	1. What are mechanical waves ? 2. What are difference between the mechanical wave and transverse wave? 3. Transverse waves are not produced in liquids and gases. Why? 4. Which is most fundamental property of a wave?	*A simple harmonic wave of amplitude 1 cm and frequency 100 Hz is travelling along positive X direction with a velocity of 15 m/s.Calculate the displacement y, particle velocity acc. At x=180cm from the origin at x=5s.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 24/05/2018 (Thursday)
Name of Teacher: Mr. SumitMehra
Class: XII **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students: 40**
Topic: Refraction By Spherical Surfaces

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER:2 1. Type of spherical refracting surfaces 2. Refraction by convex spherical refracting	*Basic Concept of refraction * Formation of real and virtual images *Identification of angles of	Learners will be able 1.To understand refraction 2.Define the laws of refraction 3.To draw the ray diagram when the object is placed in rarer or denser medium or the image formed is virtual or real 4.To derive the formula for the	* Use of convex and concave lenses * Use of laser torch and lenses of different thickness to explain the formation of	Power point presentation to explain the formation of images by convex and concave spherical refracting surfaces.	Q.1.Expalin what is the condition for the formation of the virtual image. Q.2 Write the expression for the Lens Makers formula ? Q.3 Explain why the convex	Q.1. What is meant by refractive index? Q.2. What is the effect of wavelength of light on the refractive power of the lens .

surfaces 3. Refraction by Concave spherical refracting surfaces 4. Lens Makers Formula	incidence and refraction * Combined action of spherical surfaces to form the final image in convex lens * Applications of the result for solving problems	formation of image by convex and concave spherical refracting surfaces. 5.To solve the Numerical & Questions based on the topics	images by these surfaces * Use of laser light to explain its bending in water	Videosand images to explain the formation of images by spherical refracting surfaces.	lens behaves as concave lens when it is dipped in a medium of refractive index greater than the refractive index of the medium. Q4..For the same angle of incidence the angles of refraction in three different media are 15^0, 25^0 and 35^0 respectively. Explain in which medium the velocity of light will be minimum?	Q.3. How is the focal length of the lens affected when it is place in water. Q.4. What happens if the radius of curvature of both the surfaces of the convex lens is not same?.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: **Name of Teacher: O. P. UPADHYAY**

Class: XII **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students:**

Topic: Optical Instruments. **Period No. :**

Topic And Subtopic	Target Competencies/ Learning	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

	objectives					
CHAPTER: 9 OPTICAL INSTRUMENTS (i)Principle of optical instruments (ii)simple Microscope (iii) Compound Microscope (iv)Astronomical Telescope (v) Reflecting type telescope	*Basic Concept of Simple Microscope *Magnification formula * Ray Diagram *Solution of Numerical Questions By the learners.	Learners will be able 5. To derive the magnification formula for simple & compound microscope 6. To draw the ray diagram for simple & compound microscope 7. To explain the normal adjustment mode and the operational mode when the final image is formed at least distance of distinct vision 8. To solve the Numerical Questions based on the topics	*Combination of Three convex lenses so that the final image is magnified. *Drawing of ray diagram	Video of Functioning of Microscope and telescope. PPT on the function of the Microscope and telescope.	a)Draw a ray diagram of compound microscope for the final image formed at least distance of distinct vision? (b) An angular magnification of 30X is desired using an objective of focal length 1.25 cm and an eye piece of focal length 5 cm. How will you set up the compound microscope for the final image formed at least distance of distinct vision? (a) Draw a ray diagram of an astronomical telescope for the final image formed at least distance of distinct vision? (b) An astronomical telescope has an angular magnification of magnitude for distant objects. The separation between the objective and an eye piece is 36 cm and the final image is formed at infinity. Calculate the focal length of the objective and the focal length of the eye piece?	1. The length of an astronomical telescope in normal adjustment is 110cm. The magnifying power is 10 find out focal length of objective lens and eye piece. 2. Explain why does focal length and aperture of astronomical telescope are kept large.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: **Name of Teacher: O. P. UPADHYAY**

Class: XII **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students:**

Topic: Graphs of A.C. **Period No. :**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER14: A.C. (i) graphs on resistive circuit, capacitive circuit, inductive circuit and LCR circuit. (ii) conceptual and numerical based on them	To *draw and interpret of different graphs with various device used in a.c. supply * solve the numerical problems based on these graphs.	*Learners will be able to i) Draw the graph showing the variation of impedance with frequency , V and I with t of ac source ii) understand the various factors on which impedance depends on iii) apply series LCR circuit in communication.	i)Derivation of the formula. ii) Drawing the graph. iii) Explanation of the topic.	PPT will be shown in suitable time. Drawing graphs on graph paper will be shown	1. Draw the variation in capacitive reactance and inductive reactance with frequency of 2. Does resistance depends on frequency of ac source? 3. What is the power of pure inductive circuit? 4. What is the phase angle between current and voltage in pure capacitive circuit	Q1.An AC source of voltage $V = V_m \sin \omega t$, is applied across a series LCR. Draw the phasor diagram for this circuit (i) $X_L > X_C$ (ii) $X_L < X_C$ (iii) $X_L = X_C$. An a.c. source of 200 volt ,50 Hz. Is connected across a 300 ohm Resistor and a capacitor of $25/\pi$ μF in series. Calculate (a) the reactance (b)impedance and (c)current in the circuit

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: UDAY SHANKAR PAUL**
Class: XI **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students: 35**
Topic: Oscillation **Period No. : 04 th**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER14: Oscillation *Forced Oscillation * Free oscillation *Damped Oscillation *Resonance *Natural Frequency	To *Define forced oscillations *List the equations of motion associated with forced oscillations *Explain the concept of resonance and its impact on the amplitude of an oscillator *List the characteristics of a system oscillating in	*Learners will be able to i) Draw the graph showing the variation of g with distance from the centre of the earth ii) understand the various factors on which 'g' depends on iii) Define Gravitational potential energy.	i)Derivation of the formula. ii) Drawing the graph. iii) Explanation of the topic.	PPT will be shown in suitable time. Video of free, forced and damped oscillation will be shown and explained Video of different type of resonance will be shown	i) What is the length of a pendulum that has a period of 0.500 s? ii) Find the frequency of a tuning fork that takes 2.50 x 10^{-3} s to complete one oscillation. iii) Why a troop is advised not to march on a bridge?	Q1. A famous magic trick involves a performer singing a note toward a crystal glass until the glass shatters. Explain why the trick works in terms of resonance and natural frequency? Q2.Why are completely undamped harmonic oscillators so rare?

	resonance.					

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 24/05/2018 (THURSDAY) **Name of Teacher: SANJAY KUMAR**

Class: XI **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students: 40**

Topic: PRISM **Period No. : 01**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER: 9 PRISM	*Basic Concept of refraction and reflection *To derive the prism formula * Ray Diagram *Solution of Numerical Questions By the learners.	Learners will be able 1. To derive the prism formula 2. To draw the ray diagram for prism 3. To explain the condition of minimum deviation 4. To know the basic idea of total internal reflection 5. To solve the Numerical Questions based on the topics	* determination of refractive index of glass prism in lab *Drawing of ray diagram	Video of Phenomenon of TIR PPT on the ray diagram of prism PPT on TIR.	1-Draw the suitable ray diagram and hence derive the prism formula 2-write the color pattern of emergent rays when a beam of white light incident on the prism. 3 What do you mean by refractive index . 4- write the condition of minimum deviation in refraction by a prism 5-Does the refractive index depend on wavelength and colour of incident light.	1-Practice the ray diagram of refraction by prism. 2-Draw the variation of angle of minimum deviation with angle of incidence . 3 write the color pattern of emergent rays when a beam of white light incidenton the prism. 4 For which colour there is a least deviation and for which it is maximum

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Class –X1 Subject –Physics

Topics –Total Internal Reflection

Teacher's Name: Anil Kumar

Aims and Objective	Teaching aids and its source	Assessments Questions	Home assignment

• Understand the phenomenon of total internal reflection with the help of examples from daily life and visuals mentioned in PPT. • Understand the effect of light when it passes through transparent medium. • Define refraction and its cause. • Define refractive index and established a relation between refractive index and critical angle. • Use snell's Law to solve numerical problems • Investigate the properties of light as it crosses from glass as it crosses from glass to air at various angle. • Define critical angle. • Practical applications of TIR of incidence & angle of refraction.	• Power point presentation • Laser beam being passed on water in a beaker.	• Why does a ray of light beam towards normal as it passes from air to glass • Why does a diamond shiner? • State the factors on which refractive index of a medium depend. • When does Snell's Law of refractive fail?	• The Critical angle for glass air interface is C and for glass water interface is C' how are C and C' related. • Explain why A crack in a window pane appears silvery The bubbles of air rising up in a water tank appear silvery when viewed from top • Does critical index depend on colour of light?

Lesson plan

Date & Day: 24:05:2018 (THURSDAY) Name of Teacher: MR. ARVIND KUMAR JHA

Class: XII SCIENCE Designation: PGT PHYSICS

Subject: PHYSICS No. of students: 37

Period No. : 1ST

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
Chapter: 15 *WAVE MOTION *Transverse wave *longitudinal wave	*To Derive the expression for Progressive wave *Standing wave	Learners will be able to 9. Understand the nature of Transverse wave and longitudinal 10. Find the	Derivation for the expression of expression for Progressive wave& standing waves	Video will be shown to the learners	• Which physical quantity is transferred by a wave motion • Does particle of a medium really move	Q1. What is a longitudinal wave ? Give one example. Q2. What is progressive wave ? Q3. Find mathematical expression for

		expression for Progressive wave& standing waves			from part of the medium to another part of the medium during the wave motion	Displacement of a particle when the progressive wave is moving in + X Axis?

Teacher's Signature_____ Sign of Principal_____Sign of Inspector_____

Lesson plan

Date& Day: 20/05/2018 (SUNDAY)
Name of Teacher:Ms. NAMITA
Class: XII Designation: PGT PHYSICS
Subject:PHYSICS No. of students: 40
Topic:Capacitors and its Capacitance

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

CHAPTER:2 5. Definition and symbol of capacitor 6. Formula for capacitance with and without dielectric slab 7. Series combination of capacitors 8. Parallel combination of capacitors	*Basic Concept of capacitors and its use in daily life * symbol of capacitor *Problem solving attitudes * Elementary ideas of cylindrical and spherical capacitors and calculation of their capacitance	Learners will be able 1.To define a capacitance 2.To define spherical and cylindrical capacitors also 3.To draw the circuit diagrams of series and parallel combination 4.To derive the formula for capacitance of a parallel plate capacitor and an isolated capacitor 5.To solve the Numerical &Questions based on the topics	* Use of parallel plates and a battery * Use of a thin metallic plate which act as a dielectric slab * Use of series and parallel combination of parallel plate capacitors * Use of spherical capacitors	Video to explain capacitance and its combinations in series and parallel. PPT on thecapacitors and its capacitance (with series and parallel combinations).	Q.1.Calculate the capacitance of a capacitor whose plates are 20 cm x 3 cm and are separated by a 1.0 mm air gap ? Q.2 What is the charge on each plate if the capacitor is connected to a 12 volt* battery? Q.3 Determine the capacitance of a single capacitor that will have the same effect as the combination shown. Use $C_1 = C_2 = C_3 = C$.	Q.1. What is the formula for capacitance of an isolated capacitor? Q.2.Write the value of capacitance of Earth. Q.3. What happens to the capacitance when a dielectric slab is inserted between the plates of capacitors. Q.4. Write the formulae for equivalent capaicitance of three capacitors connected in (i) Series (ii) parallel.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 20/05/2018 (SUNDAY) **Name of Teacher: ShikhaBhalla**
Class: XII **Designation: PGT PHYSICS, K.V. No.1 RCF,Hussainpur**
Subject: PHYSICS
Topic:Electric field

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
UNIT : 1 **TOPIC:** **ELECTRIC FIELD** **Subtopics-** **Electric Field Intensity or Electric Field Strength, Electric Field Intensity due to a Point Charge, Electric Field lines** **(i) Due to a Point Charge (ii) Due to a Dipole (iii) Due to a Equal and LikeCharges (iv) Due to a Uniform Field** **Properties of Electric field lines ,Electric Dipole,Electric Field Intensity due to an Electric Dipole** **Torque on an Electric Dipole**	**Basic concept of** **1. Electric Field** **2. Electric Field Intensity or Electric Field Strength** **3. Electric Field Intensity due to a Point Charge** **4. Electric Field lines** **(i) Due to a Point Charge (ii) Due to a Dipole (iii) Due to a Equal and Like Charges (iv) Due to a Uniform Field** **5.Properties of Electric field lines** **6. Electric Dipole** **7. Electric Field Intensity due to an Electric Dipole** **8. Torque on an Electric Dipole**	***Learners will be able to** **(i)Define electric field,electric dipole and torque acting on an electric dipole in uniform electric field(ii)Derive the expression forElectric Field Intensity due to a Point Charge,Electric Field Intensity due to an Electric Dipole& torque on an Electric Dipole** **(iii)Plot the electric Field lines** **(i) Due to a Point Charge (ii) Due to a Dipole (iii) Due to a Equal and Like Charges (iv) Due to a Uniform Field** **(iv) define ideal dipole**	**PPT will be shown .** **Video lesson on given topics**	**1.Why must electrostatic field be normal to the surface at every point of a charged conductor?** **2.A proton is placed in a uniform electric field directed along the position x-axis. In which direction will it tend to move?** **3.Why do the electric field lines not form closed loop?** **4.In which orientation a dipole placed in a uniform electric field is in a) Stable, b) Unstable Equilibrium?** **5.Define electric field intensity at a point and give its SI unit.**	**1.Derive expression for electric field at a point on the axial line of the dipole. Give the direction of electric field at the point.** **2.An electric dipole is held in uniform electric field** **(i) Show that no translatory force acts on it.** **(ii) Derive an expression for he torque acting on it** **3.Derive the expression for the electric field intensity at any point on the equatorial line of an electric dipole ?** **4.Define the electric dipole and dipole moment. Give its direction and hence and find an expression for electric field due to this dipole of length 2l at a point on its axial line which is at distance √5l from center of dipole .** **5. Two point charges, q =8×10^{-8} C and Q= -2×10^{-8} C are separated by a distance of 10 cm in air. What is the net electric field at the mid- point between the charges** **6. Give two properties of electric field lines.Sketch them for an isolated positive charge and an electric dipole .**

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) Name of Teacher: DR.KUMAR HEMENDRA
Class:XIi Designation: PGT PHYSICS
Subject: PHYSICS No. of students: 33
Topic: **Electric Charge and field**

Topic And Subtopic	**Target Competencies/ Learning objectives**	**Expected Learning outcome**	**Activities Planned**	**Audio Visual Aids**	**Evaluation Question/Activity (class work)**	**Home Assignment**
Electrostatics	*Basic Concept of Electric Charge and field * Electric field lines and their properties	Learners will be able 1. To know about electric Charge 2.to take concept of electric field 3. To know electric field lines and their properties	Use of glass rod ,fur, comb ,hair etc to show production of two types of electric charges	PPT on electric charge and field	1.what is electric charge. 2. what are the methods of production of electric charge. 3 What are properties of magnetic lines of force	1.All exercise questions 2.All board questions related to electric charge and field.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 24/05/2018 (THURSDAY) **Name of Teacher: SANJAY KUMAR**

Class: XII **Designation: PGT PHYSICS**

Subject: PHYSICS **No. of students: 42**

Topic: ELECTROSTAICS **Period No. : 3rd**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

CHAPTER1: ELECTROSTICS * property of electric charge * Coulombs law *electric line of forces *Gauss theorem and its applications *electric dipole and electric dipole moment * electric flux	To *to know about the basic property of charge * static charge as a source of electric field *Explain the concept of electric field in day to day life *different applications of Gauss's theorem .	*Learners will be able to i) Draw the graph showing the variation of electric field with distance for a point charge ii) understand the various factors on which 'g' depends on iii) Define electric dipole, and its example iv) explanation of various graphs in electrostatics	i)Derivation of the formula. ii) Drawing the graph. iii) Explanation of the topic. iv) demonstration of charging by friction by plastic scale and hair v) display of pattern of electric line of force on the chart paper in different situation	PPT will be shown in suitable time. Animated video has been shown to the students to show electric field in various situation using Gauss theorem Visualization of electric line of force has been shown by animation	1. Deduce the expression for the torque acting on a dipole of dipole moment $\vec{p}$ in the presence of electric field$\vec{E}$. 2- Sketch the pattern of electric field lines due to (i) A conducting sphere having negative charge on it and (ii) an electric dipole. 3- Why must electrostatic field be normal to the surface at every point of a charged conductor?	2. State Gauss' theorem in electrostatics. Apply this theorem to derive an expression for electric field intensity at a point near an infinitely long straight uniformly charged wire. 2 Why two electric lines of force never intersect each other. 3- If the distance between two charges is doubled how does the force between them change

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson Plan

Class –X11 Subject –Physics

Topics –Factors affecting internal of a primary cell . Teacher's Name: Anil Kumar KV AGCR, NEW DELHI

Aims and Objective	Teaching aids and its source	Assessments Questions	Home assignment
• Ability to tell the factors affecting the internal resistance of a cell • Define internal resistance • Devise a formula for calculating internal resistance • Find out the variation of Internal resistance with distance of separation • Find out Variation of internal resistance with area of electrodes • With conc. Of electrolytes • Draw inferences after conducting the practical	• PPT Based on the topic • A set of up for calculating internal resistance will be used this comprises of connecting wires, sand paper, resistance box , battery and leclanche cell. All these things are available in physics practical lab	• What is internal resistance of a cell due to ? • A car has a fresh storage battery of EMF 12 V and internal resistance of 0.05 ohm. If the starter motor draws a current of 90 A, what is the terminal Voltage of the battery when the starter is on?	• Write any two Factors On which internal resistance of cell depends • A cell of EMF E and internal resistance **r** is connected across a variable resistor R . Plot a graph showing the variation of terminal Potential V with resistance R. Predict from the graph the condition under which V becomes equal to E.

Lesson Plan

Class –X11 Subject –Physics Topics –Total Internal Reflection Teacher's Name: Anil Kumar

Aims and Objective	Teaching aids and its source	Assessments Questions	Home assignment
• Understand the phenomenon of total internal reflection with the help of examples from daily life and visuals mentioned in PPT. • Understand the effect of light when it passes through transparent medium. • Define refraction and its cause. • Define refractive index and established a relation between refractive index and critical angle. • Use snell's Law to solve numerical problems	• Power point presentation • Laser beam being passed on water in a beaker.	• Why does a ray of light beam towards normal as it passes from air to glass • Why does a diamond shiner? • State the factors on which refractive index of a medium depend. • When does Snell's Law of refractive fail?	• The Critical angle for glass air interface is C and for glass water interface is C′ how are C and C′ related. • Explain why A crack in a window pane appears silvery The bubbles of air rising up in a water tank appear silvery when viewed from top • Does critical index depend on colour of light?

• Investigate the properties of light as it crosses from glass as it crosses from glass to air at various angle. • Define critical angle. • Practical applications of TIR of incidence & angle of refraction.			

Lesson plan

Date & Day: 21/5/2018 Name of Teacher: AlokChaturvedi Class- XII

Designation: PGT PHYSICS

Subject: PHYSICS

Topic: Potentiometer and its application

NAME OF CHAPTER	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

Chapter- 3 Current electricity	To *know about potential Gradient * comparison between potentiometer and Voltmeter *Use of Potentiometer in measurement of internal resistance	*Learners will be able to know i) importance of potentiometer over voltmeter ii)Principle of potentiometer iii) Applications of potentiometer iv) Can solve the related numerical problems	To demonstrate (1) principle of potentiometer (2) Experiment to demonstrate calculation on (1) internal resistance (2)comparison of EMF	PPT related to topic will be shown in suitable time. Video related to the topic will be shown and explained	1 what is principle of potentiometer 2 What is formula for calculation internal resistance of a primary cell 3 On what factor sensitivity of potentiometer depends 4 why potentiometer is preferred over a voltmeter 5.Write· two possible causes for one sided deflection in a potentiometer experiment.	Q1 Derive formula for potential gradient Q 2.with the help of circuit diagram explain how you will calculate internal resistance of a cell using potentiometer Q 3 with the help of circuit diagram explain how you will compare EMF of two primary cell using potentiometer

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

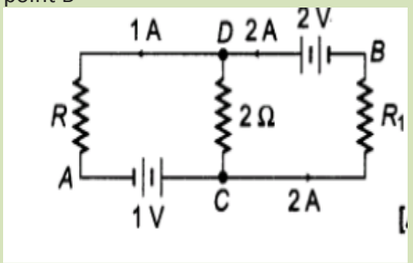
Lesson plan

Date& Day: 17/05/2018 (THURSDAY) **Name of Teacher:**RASHMITA MEDAK

Class:XII **Designation:**PGT PHYSICS

Subject:PHYSICS **No. of students:** 33

Topic:KIRCHHOFF'S LAW AND ITS APPLICATION

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER: 9 1.Kirchhoff's First law or Current law 2. Kirchhoff's2nd law or voltage law 3. Sign Conventions 4.Problems on Kirchhoff's law 5.Wheatstone Bridge 6.Problems on Wheatstone Bridge 7.Metre Bridge 8.Problems on Metre Bridge	*Basic Concept of current and Electricity * Application of Kirchhoff's law *Balanced Wheatstone Bridge and its condition *Metre Bridge Formula *Solution of Numerical *Questions By the learners.	Learners will be able 1. Todefine and differentiate Kirchhoff's first law and 2nd law. 2.To explainbalanced Wheatstone bridge condition 3.To explain metrebridge.practically. 4. To derivethemetre bridge formula. 5.To apply Kirchhoff's law to solve the Numerical &Questions based on the topics	* Use of resistance box, wire, galvanometer, voltmeter, ammeter to explain Wheatstone Bridge * Use of Metre Bridge Apparatus to explain the concept of metre bridge	PPT on theKirchhoff's law and its application. Demonstration of apparatus to explain Wheatstone bridge and metre bridge	1.StateKirchhoff's law. 2. Write the balanced condition of Wheatstone bridge. 3. Why is it generally preferred to obtain the balance point near the middle of the bridge wire in meter in meter bridge experiments? 4. What is the principle of Metre bridge? 5. Which material is used for meter bridge wire and why? 6. What is the expression for the ratio of resistances in balanced Wheatstone bridge?	1. In the given circuit, assuming point A to be at zero potential, use Kirchhoff's rules to determine the potential at point B  2. Explain Briefly how Kirchhoff's law is justified. 3. Numerical problem related to the topic from the textbook. 4. In a meter bridge, two unknown resistances R and S when connected in the two gaps, give a null point at 40 cm from one end. What is the ratio of R and S?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Model Lesson plan

Class :XII Sci
Subject :Physics
Unit :III Magnetic Effect Of Current And Magnetism
Topic :Cyclotron
Date of commencement :17.05.2018
Date of completion :17.05.2018
No of periods required : 1

A.Gist of the Lesson

Cyclotron- Principle , Construction, Working , Expression For Max K.E. , Uses and Limitations

B. Objectives and expected learning outcomes.

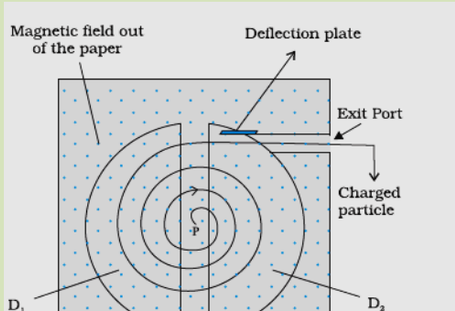
4. Students will able to understand about cyclotron.
5. Students will able to solve applications based on cyclotron

C. Teaching Aids

PPT , White Board , Videos on Principle and Working Of Cyclotron

D. Content of the lesson :

CYCLOTRON :The cyclotron is a machine to accelerate charged particles or ions to high energies. It was invented by E.O. Lawrence and M.S. Livingston in 1934 to investigate nuclear structure.
PRINCIPLE :The cyclotron uses both electric and magnetic fields in combination to increase the energy of charged particles.As the fields are perpendicular to each other they are called *crossed fields*. Cyclotron uses the fact that the frequency of revolution of the charged particle in a magnetic field is independent of its energy.
CONSTRUCTION : It consists of two D-shaped hollow evacuated metal chambers D1 and D2 called the dees. These dees are placed horizontally with



their diametric edges parallel and slightly separated from each other. The dees are connected to a high frequency oscillator which can produce a potential difference of the order of 100000 volts at frequency =10,0000000 Hz. The two dees are enclosed in an evacuated steel box and are well insulated from it. The box is placed in a strong magnetic field The magnetic field is perpendicular to the plane of the dees. P is a place of ionic source or positively charged particle.

THEORY &WORKING :The positive ion to be accelerated is produced at P. Suppose, at that instant, D1 is at negative potential and D2 is at positive potential.Therefore, the ion will be accelerated towards D1. On reaching inside D1, the ion will be in a field free space. Hence it moves witha constant speed in D1 say v.

But due to perpendicular magnetic field of strength B, the ion will describe a circular path of radius r in D1,

given by $Bqv= mv^2/r$

where m and q are the mass and charge of the ion.

Therefore, **$r=mv / Bq$---------(1)**

Time taken by ion to describe a semicircular path is given by

$$t= \frac{\pi r}{v} = \frac{\pi}{v} x \frac{mv}{qB} \quad (because\ of\ eq\ (1)$$

$$t = \frac{\pi m}{qB}$$

Thus, this time is independent of both the speed of the ion and radius of the circular path. In case the time during which the positive ion describes a semicircular path is equal to the time duringwhich half cycle of electric oscillators is completely, then as the ion arrives in the gap between the two dees, the polarity of dees is reversed that is D1 becomes positive and D2negative. Therefore, the positive ion is accelerated towardsD2 and it entersD2 with greater speed which remains constant in D2.The ion will describe a semicircular path of greater radius due to perpendicular magnetic field and again will arrive in a gap between the two dees is exactly at the instant, the polarity of the two dees is reversed. Thus, the positive ion will go on accelerating every time it comes into the gap between the dees and will go on describing circular path of greater and greater radius and finally acquires a sufficiently high energy. The accelerated ion can be removed out of the dees from window W, by applying the electric field across the Deflecting plates E and F.

TIME PERIOD AND CYCLOTRON FREQUENCY :

Time period T = 2t = $\frac{2\pi m}{qB}$

Cyclotron frequency $f_c = 1/T = \frac{qB}{2\pi m}$, Hence it is independent of velocity/ energy and radius of the charged particle

RESONANCE CONDITION :

Frequency Of charged Particle = Frequency of Oscillator

MAXIMUM K.E. Of ELECTRONS : **(K.E)max** $= \frac{1}{2}\frac{q^2B^2R^2}{m}$

USES : (i) used in Nuclear Physics to study the Nuclear Reactions (ii) It is used to implant ions into solids (iii) Used in hospitals to produce radioactive substances which can be used in diagnosis and treatment

LIMITATIONS :

(i) Cyclotron cannot accelerate uncharged particles like neutron

(ii) Cyclotron cannot accelerate electrons because of its small mass

(iii) It Cannot accelerate positively charged particle with large mass due to relativistic effect.

(E) RECAPTULATION :

Q1. Give the principle of Cyclotron ?

Q2. Give one use and one limitation of cyclotron

Q3. What is the expression for Cyclotron Frequency

Q4 What is Resonance Condition

(F) HOME ASSIGNMENT :-

1. What are the main functions of CroseedElectric and Magnetic Fields in a Cyclotron.Why is a cyclotron not suitable for accelerating electrons ? 1
2. Why a cyclotron cannot accelerate neutrons ? 1
3. State the underlying principle of a cyclotron. Write briefly how this machine is used to accelerate charged particles to high energies. 2 **[CBSE Delhi 2014]**
4. Write down some uses of cyclotron 2
5. With the help of a labeled diagram , state the underlying principle of a Cyclotron. Explain clearly how it works to accelerate the charged particles
   Show that the Cyclotron frequency is independent ofspeed/ energy of the particle. Is there an upper limit on the energy acquired by the particle ? Give reason. [**CBSE Delhi 2011, All India-2013, 2009**]

Rajeev Kumar
PGT (Physics)
KV SAINJ

Lesson plan

Date & Day: 21/05/2018 (MONDAY) **Name of Teacher: TILAK RAJ**

Class: XII **Designation: PGT PHYSICS, K.V. NANGALBHUR**

Subject: PHYSICS

Topic: DIPOLE MOMENT OF REVOLVING ELECTRONE AND MAGNETIC FIELD INTENSITY DUE TO AN MAGNETIC DIPOLE

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
Magnetic Dipole Moment Magnetic Dipole Moment of revolving electron. Axial line and equatorial line of magnetic dipole Magnetic dipole moment on axial line of a magnetic dipole Magnetic dipole moment on axial line of a magnetic dipole	Observation skill how a current carrying coil behave as a magnetic dipole. Calculation- calculation and derivation of dipole moment of revolving electron. Calculation- Magnetic dipole moment on axial line of a magnetic dipole Magnetic dipole moment on equatorial line of a magnetic dipole	After the completion of topic The students will be able to 2.ABLE TO DERIVE EXPRESSION FOR MAGNETIC DIPOLE MOMENT OF REVOLVING ELECTRONE 3. ABLE TO DERIVE EXPRESSION FOR MAGNETIC DIPOLE MOMENT ON AXIAL AND EQUITORIAL LINE OF MAGNETIC DIPOLE	**PPT will be shown .** **Video lesson on given topics**	Magnetic dipole moment Will be explained with the help of mathematical expression . Magnetic Dipole Moment of revolving electron will be cleared with the help of diagram and mathematical expression. A modal of carrying loop will be shown to the students Magnetic dipole moment on axial line of a magnetic dipole Magnetic dipole moment on axial line of a magnetic dipole will be explained cleared with the help of diagram and mathematical expression.	1.What is dipole moment? 2.Derive expression for Dipole Moment of a Revolving electron. 3. Derive expression for magnetic field intensity on axial line of a magnetic dipole. 4. Derive expression for magnetic field intensity on axial line of a magnetic dipole. 6.Compare magnetic field intensity on axial and equatorial line of a magnetic dipole.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 24/05/2018 (Thursday)
Name of Teacher: Mr. SumitMehra
Class: XII Designation: PGT PHYSICS
Subject: PHYSICS No. of students: 40
Topic: Magnetic Materials

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER:2 1. Type of Magnetic Materials 2. Dia magnetic Material and its origin 3. Para magnetic Material and its electron theory 4. Ferromagnetism its electron theory	*Diamagnetism- Its examples , and cause of diamagnetism * Why diamagnetism is not affected by temperature * Para magnetism- Its examples , and cause . * Ferromagnetism- Its examples , and cause of	Learners will be able 1.ToDefine dia, para and ferromagnetic substances. 2.Diffrentiate between dia, para and ferromagnetic substances 3.Theories of dia, para and ferromagnetic substances and effect of temperature on their magnetic properties. 5.To solve conceptual Questions based on the topics	* Use of dia, para and ferromagnetic materials * Use of apparatus provided by INDOSAW to explain the behavior of dia, para and ferromagnetic materials in the external magnetic fields.	Power point presentation to explain the cause of dia, para and ferromagnetism. Videosand images to explain the behavior of these substances when placed in external magnetic field.	Q.1.Explain any three differences between diamagnetic, paramagnetic and ferromagnetic substances. Q.2 Why a diamagnetic material has no net magnetism in the absence of external magnetic field. ? Q.3 How temperature affects the magnetic properties of Ferromagnetic substances? Q4..What is meant by domains? What is the role played by them in	Q.1. How is the intensity of magnetisation of a paramagnetic material related to the temperature? Q.2. In what direction diamagnetic material aligns itself when placed in magnetizing field. Q.3. The magnetic susceptibility of a magnetic material is 2.3×10^{-5}. What will be the magnetic nature of the substance? Draw a diagram to show the

	Ferromagnetism				ferromagnetism.	magnetic field pattern if substance is placed in the uniform magnetic field.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 24:05:2018 (Thursday)Name of Teacher: MR. ARVIND KUMAR JHA

Class: XII SCIENCE Designation: PGT PHYSICS

Subject: PHYSICS No. of students: 37

Period No. : 01 ST

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

Chapter: 5 *Magnetic effects of electric current & Magnetism *Ampere's Circuital law *Applications of Ampere's Circuital Law	*To understand Ampere's Circuital law *Explanation of Direction of magnetic field	Learners will be able to 11. State Ampere's Circuital law 12. Apply of Ampere's Circuital lawto find magnetic field due a straight current carrying conductor 13. Straight solenoid 14. Toroid	Derivation for the expression of i)Ampere's Circuital law ii) Magnetic field due to a straight current carrying conductor. $B=\frac{2I}{4\pi R}$ iii) For a straight solenoid $B = \mu_0 n I$	PPT will be shown to the learners	• State Ampere's Circuital Law • Apply Ampere's Circuital law to find magnetic Field at a point due a current carrying straight conductor. • Draw the diagram of M.F. Due a straight solenoid.	Q1. Apply Ampere's Circuital law to find magnetic Field at a point due a current flowing through a toroid?

Teacher's Signature_____ Sign of Principal _____ Sign of Inspector_____

Lesson plan

Date& Day: 17/05/2018 (THURSDAY)Name of Teacher:NEELAM AGARWAL

Class: XII **Designation: PGT PHYSICS**
Subject:PHYSICS **No. of students: 32**
Topic: Ampere's Circuital Laws **Period No. 7TH**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER: 4 Ampere's Circuital Law & it's application i) Solenoid ii)Toroid	*Basic Concept of Ampere's circuital law *They would derive the expression for magnetic for solenoid &toroid.	Learners will be able * To derivethe formula for magnetic field for solenoid &toroid. *The learner would solve the numerical based on these concepts.	*Take a circular loop of naked wire and pass the current through a wire in the center of it. The magnetic needle	Video onAmpere's circuital law would be shown to student for their better understanding of concept.	1.What is a solenoid? How will you represent the magnetic field around a solenoid when some current is passed through it? 2. A circular coil of wire consisting of 100 turns, each of radius 8.0 cm carries a current of 0.40AWhat is the magnitude of the magnetic field **B** at the centre of the coil?	Q.1 State and prove Ampere's law ? Q.2 Using Ampere's law derive an expression for magnetic field due to toroid ?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: **Name of Teacher: O. P. UPADHYAY**
Class: XII **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students:**
Topic: Graphs of A.C. **Period No. :**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER14: A.C. (i) graphs on resistive circuit, capacitive circuit, inductive circuit and LCR circuit. (ii) conceptual and numerical based on them	To *draw and interpret of different graphs with various device used in a.c. supply * solve the numerical problems based on these graphs.	*Learners will be able to i) Draw the graph showing the variation of impedance with frequency , V and I with t of ac source ii) understand the various factors on which impedance depends on iii) apply series LCR circuit in communication.	i)Derivation of the formula. ii) Drawing the graph. iii) Explanation of the topic.	PPT will be shown in suitable time. Drawing graphs on graph paper will be shown	5. Draw the variation in capacitive reactance and inductive reactance with frequency of 6. Does resistance depends on frequency of ac source? 7. What is the power of pure inductive circuit? 8. What is the phase angle between current and voltage in pure capacitive circuit	Q1.An AC source of voltage $V = V_m \sin \omega t$, is applied across a series LCR. Draw the phasor diagram for this circuit (i) $X_L > X_C$ (ii) $X_L < X_C$ (iii) $X_L = X_C$. An a.c. source of 200 volt ,50 Hz. Is connected across a 300 ohm Resistor and a capacitor of $25/\pi$ μF in series. Calculate (a) the reactance (b)impedance and (c)current in the

						circuit

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: INDU GOSWAMI**

Class: XII **Designation: PGT PHYSICS**

Subject: PHYSICS

Topic: LCR CIRCUITS AND RESONANCE

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
*LCR Circuit * Resonance * Quality factor	*Basic Concept Of inductor ,capacitor and resistance * Concept of resonance *Solution of Numericals *Questions By the learners.	Learners will be able 1.To define LR circuit 2. To define RC circuit 3.To define LCR circuit	Use of examples from daily life	. PPT on LCR circuit and resonance	1.The peak value of a.c. is 20A. What is its r.m.s. value? 2.What is the value of power factor for LCR series circuit in resonance? 3.What do you mean by the admittance of an a.c. circuit? 4.What is wattless current? 5.The equation of an alternating current is I = 20 sin 300 πt. Calculate the frequency and peak value of current?	1.Write two advantages of a.c. over d.c ? . 2.An ideal capacitor consumes no electric power in an a.c. circuit. Explain. 3.Define quality factor of an LCR series circuit. What is its physical significance? 4.An electric bulb connected in series with an inductor does not light up to full brilliance immediately when the current is switched on. Explain why?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 20/05/2018 (SUNDAY) **Name of Teacher: NIRMALA**
Class: XII **Designation: PGT PHYSICS K.V. NO 4 JALANDHAR CANTT**
Subject: PHYSICS
Topic: POWER IN AC CIRCUITS

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
UNIT : 4 **TOPIC:** **Power in ac circuits** **Power factor** **Wattless current**	Basic concept of 1 Power in ac circuit 2 Mathematical formula for average power in LCR circuit and in pure resistive , inductive and pure capacitive circuit 3 power factor 4 Wattless current.	*Learners will be able to i) Derive the expression for power in AC circuit ii)Analyze the result for pure resistive , inductive and pure capacitive circuit iii) define and derive the formula for power factor iii) DefineWattless current.	PPT will be shown in suitable time. Video lesson on given topics	Q1 What is wattles current? Q2 IN SERIES LCR circuit $V_L = V_C ‡ V_R$,What is the value of power factor for this circuit. Q3 The power factor of an AC circuit is 0.5. What is the phase difference between voltage and current in the circuit? Q4 prove mathematically that the average power over a complete cycle of alternating current through an ideal inductor is zero? Q5 At resonance in ac circuit , what is the value of power factor? Q6 Does it imply that power dissipated , in an accircuit is zero at resonance ?	Q7 Where is the power dissipation in an alternating current circuit? In resistance ,ininductor,or capacitor? Q5 Define power factor . State the conditions under which it is 1) maximum 2) minimum Q6 In a series LCR circuit , obtain the condition under which 1) the impedance of the circuit is minimum and 2) wattles current flow in the circuit? Q7. What is power dissipated by an ideal inductor in ac circuit? Explain. Q8 Prove that power dissipated in an ideal resistor connected to an ac source is V_{FEE}^2/R.

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

LESSON PLAN

Class: XII **Subject: Physics** **Period:** **Date:**

Unit: IV EMI & AC **Topic: Transformer and Its Application**

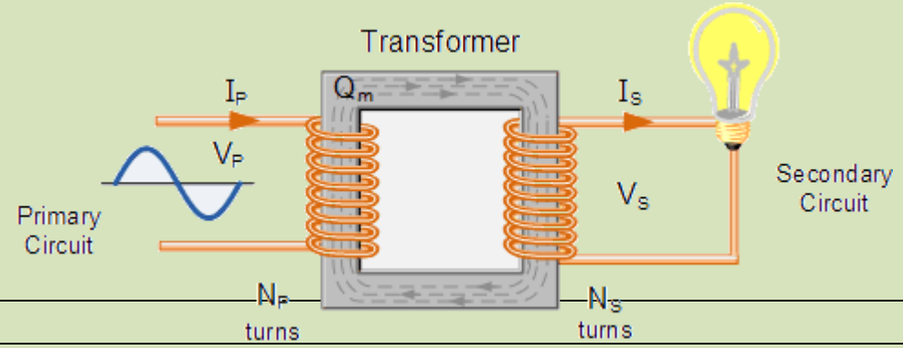
Teacher's Name: Ashok Kumar Gupta, PGT [Physics]

Objectives: (1) Students will be able to learn **Transformer**

(2) Students will be able to apply knowledge of transformer in applications

Teaching Aids: PPT
Previous Knowledge:

4) Knowledge of AC & DC supply
5) Knowledge of Mutual Induction
6) Heating Effect of current



S.N.	Content:

1	# What is a Transformer A **Transformer** is a static electrical machine which transfers AC electrical power from one circuit to the other circuit at the constant frequency, but the voltage level can be altered that means voltage can be increased or decreased according to the requirement.
2	It works on the principle of **Faraday's Law of Electromagnetic Induction/ Mutual Induction** which states that "the magnitude of

	voltage is directly proportional to the rate of change of flux.”
3	Equation of the Transformer Derivation
4	Losses in the Transformer 1. Core or iron losses 2. Hysteresis loss 3. Eddy current loss 4. Copper losses 5. Humming Loss
5	**■ Uses of Transformer** ■ Transformer is used for transmission of A.C. over long distances by stepping it up. ■ It reduces current for a given power requirement, hence reduces losses due to Joule’s heating along the resistance of the transmission line. ■ At the city A.C. is again stepped down to 220V for the consumption.

Recapitulation:

6) Name the devices used for the purpose to obtain DC from AC
7) Which feature make PN-Junction make them suitable for the above said purpose

8) Which one better Half wave or full wave rectifier

Home Assignment:

Q 1 : Explain Principle, construction and working of a transformer.

Q 2 : Discuss losses of energy in a transformer.

Q 3 : Why do we use laminated core in a Transformer.

Q 4 : How can we reduce losses due to Eddy currents in Transformers.

Lesson plan

Date & Day: 21/05/2018 (THURSDAY) **Name of Teacher: JASWINDER LAL**

Class: XII **Designation: PGT PHYSICS, K V SEC-31,CHD**

Subject: PHYSICS **No. of students:**

Topic:ALTERNATING CURRENT **Period No. :**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
Alternating current: representation of AC. Difference between AC &DC. AC applied to resistor,	Basic concept of AC & DC, to draw waveforms, phasor diagrams and write formulas of reactances and to draw them against frequency,	Learner will be able to understand Basic concept of AC & DC, to draw waveforms, phasor diagrams and write formulas of reactances and to draw them against frequency, How to find impedance of L-R, C-R, & LCR circuits, to	To show source of AC & DC, using ac dynamo & battery, to show the circuits or appliances that run on AC & DC	PPT on Alternating current, video to show fatal effects of AC & DC.	What do you mean by AC? What is peak value, mean value & RMS value of AC? Which is more dangerous AC or DC? Draw waveform for AC emf having peak value 310 And write its RMS & mean value.	Draw waveforms, phasor diagrams and write formulas of reactances Draw resistance, inductive reactance & capacitive reactance vs frequency, Derive an expression for impedance of L-R, C-R, & LCR circuits,

inductor, capacitor & their combinations. Impedance of LCR circuit. Power of LCR circuit, resonance.	How to find impedance of L-R, C-R, & LCR circuits, to find expression for power of LCR circuit, to draw resonance curve, And find Q-Factor	find expression for power of LCR circuit, to draw resonance curve, And find Q-Factor, to solve numerical based on impedance, Q-Factor etc. To answer 1 mark, 2 mark & 3 mark questions				Show that current lags behind the emf in case of inductor and leads the emf in case of capacitor. Derive an expression for power of LCR circuit, to draw resonance curve, And find Q-Factor

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: ANJLI JAIN**

Class: XII **Designation: PGT PHYSICS**

Subject: PHYSICS

Topic: ELECTROMAGNETIC WAVES

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
*Electromagnetic waves	*Basic Concept	Learners will be able 1.To define emwaves	Use of examples	.	1.Name the waves which are used in telecommunication. 2. Identify the part of the	1.How are radiowaves produced ? 2. Write the expression

* Electromagnetic spectrum	Of electric and magnetic field * Concept of em waves and its spectrum *Solution of Numericals *Questions By the learners.	2.To learn range of frequency of spectrum 3.To learn E/B = C	from daily life	PPT on electromagnetic spectrum	electromagnetic spectrum to which waves of frequency (i) 10^2 Hz. . 3. Mention the pair of space and time varying E and B fields which would generate a plane em wave travelling in the z-direction ? 4. The range of wavelength of visible light is 390 nm to 780 nm. Calculate the corresponding frequency range. 5.Howare X-rays produced ?	for the velocity of electromagnetic waves in vacuum ,If absolute permittivity and permeability of free space are $\in_0$ = 8.85 x 10^{-12} C^2 N^{-1} m^{-2} and $\mu_0 = 4\pi \times 10^{-7}$ TmA^{-1} ?. 3.Name electromagnetic radiation used for viewing objects through haze and fog. 4.What is the ratio of speed of infrared and ultraviolet rays in vacuum?

Lesson plan

Date & Day: 24/05/2018 (Thursday)
Name of Teacher: Mr. SANJAY KUMAR JHA
Class: XII **Designation: PGT [PHYSICS]**

Subject: PHYSICS **No. of students: 44**

Topic:ELECTROMAGNETIC SPECTRUM

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER:2 1. Definition of varying electric and magnetic fields 2. Formula for plane progressive E and B fields 3. Propagation of E-M Waves. 4. Different types of E-M Waves	*Basic Concept of velocity of E-M Waves and its use in daily life * symbol of e -m wave velocity *Problem solving attitudes * Elementary ideas of production of E-M Waves	Learners will be able 1.To define E-M Waves 2.To explain types ,production ,detection and application of E-M Waves 3.To draw the diagrams of E-M Wave propagation and its dynamics of exchange of e-m energy 4.To derive the formula of speed of E-M Waves 5.To solve the Numerical & Questions based on the topics.	* Use of different sources of E-M Waves * Use of white board and colorful markers to draw diagrams of production. * Use of another examples for application of E-M Waves * Use of X-RAYS, RADIO WAVES specially in modern life	Video to explain ELECTROMAGNETIC SPECTYRUM PPT on the ELECTROMAGNETIC SPECTRUM	. 1 What is X-RAY? 2 What is MICRO-WAVE? 3What is U-V RAY? 4 What is VISIBLE LIGHT? 5 What are different sources of gamma ray?	Q.1. What is the formula for plane progressive wave? Q.2. Write the value range of frequency and wavelength of micro wave. Q.3. What happens when large exposure of U-V Ray , X-ray takes place anywhere on animals? Q.4. Write the formulae for speed of light in empty space and in water medium?

Teacher's Signature___Sanjay Kumar Jha_____ Sign of Principal_____ Sign of Inspector_____

LESSON PLAN

Date & Day: .....
Class: XII
Subject: PHYSICS
Topic: POLARISATION

Name of Teacher: KULDIP SINGH
Designation: PGT PHYSICS
No. of students: .....
Period No. : .....

Topic And Subtopic	Target Competencies/ Learning bjectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
9. WAVE OPTICS i)Polarisation ii) Plane Polarized light iii)Brewster's angle iv)Uses of plane polarized light and polaroids	**BASIC CONCEPT OF** ❖ Polarisation ❖ Plane Polarized light ❖ Brewster's angle ❖ Uses of plane polarized light and polaroids .	Learners will be able 15. To define the Polarisation 16. To differentiate between polarised and unpolarised light. 17. To derive Brewster's angle 18. To explain the Uses of plane polarized light and polaroids	*Activity on Polarization of light with the help of Polaroids *Poalrisation by scattering and reflection	➢ Video on Functioning of Polaroids. ➢ Animation on Poalrisation by scattering and reflection.	1.Draw the diagram of polarized and unpolarized light ? 2.With the help of suitable ray diagram how an unpolarised light can be polarized by reflection from a transparent medium . 3.What is a Polarizing angle ?	1. What is a polarization? 2. What is a Polaroid ? 3. Sun glasses are made of Polaroidsand not of colour glasses 4. Define the term linearly polarized light

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY)
Name of Teacher: UDAY SHANKAR PAUL
Class: XII
Designation: PGT PHYSICS
Subject: PHYSICS
No. of students: 32
Topic: Optical Instruments.
Period No. : 02 nd

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment

CHAPTER: 9 OPTICAL INSTRUMENTS i)simple Microscope ii) Compound Microscope iii)Astronomical Telescope iv) Reflecting type telescope	*Basic Concept of Simple Microscope *Magnification formula * Ray Diagram *Solution of Numerical Questions By the learners.	Learners will be able 1. To derive the magnification formula for simple & compound microscope 2. To draw the ray diagram for simple & compound microscope 3. To explain the normal adjustment mode and the operational mode when the final image is formed at least distance of distinct vision 4. To solve the Numerical Questions based on the topics	*Combination of Three convex lenses so that the final image is magnified. *Drawing of ray diagram	Video of Functioning of Microscope and telescope. PPT on the function of the Microscope and telescope.	a)Draw a ray diagram of compound microscope for the final image formed at least distance of distinct vision? (b) An angular magnification of 30X is desired using an objective of focal length 1.25 cm and an eye piece of focal length 5 cm. How will you set up the compound microscope for the final image formed at least distance of distinct vision? (a) Draw a ray diagram of an astronomical telescope for the final image formed at least distance of distinct vision? (b) An astronomical telescope has an angular magnification of magnitude for distant objects. The separation between the objective and an eye piece is 36 cm and the final image is formed at infinity. Calculate the focal length of the objective and the focal length of the eye piece?	a)A virtual image, we always say cannot be caught on a screen. Yet, when we see a virtual image we are obviously, bringing it on the screen of our eye. Is there a contradiction? (b) Why must both objective and eye piece of a compound microscope have short focal lens? (c) When viewing through a compound microscope, our eye should be positioned not on the eye piece but a short distance away from it for best viewing. Why?

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) **Name of Teacher: SHALINI KUMARI**
Class: XII **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students: 33**
Topic: Reflection of Light.

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER: 9 1.Laws of Reflection 2.Spherical Mirrors 3.The new Cartesian Sign Conventions 4.Principal Focus, Focal Length and Radius of curvature of a Spherical Mirror 5.Relation between f and R 6.Mirror formula for Concave mirror and Convex mirror 7.Linear Magnification 8.Practical applications of Spherical Mirrors	*Basic Concept of reflection * Ray Diagram *Mirror formula *Magnification formula *Solution of Numerical *Questions By the learners.	Learners will be able 1.To define laws of reflection 2.To define spherical mirror 3.To draw the ray diagram for reflection from concave mirror and convex mirror 4.To derive the mirror formula and magnification produced by concave mirror and convex mirror 5.To solve the Numerical &Questions based on the topics	* Use of plane mirror , pins, protector to explain the laws of reflection. * Use of transparent container, convex & concave mirror , two laser lights to explain the concave mirror as converging mirror and convex mirror as diverging mirror.	Video to explain laws of reflection. PPT on the reflection of light.	Q.1 What is the angle of reflection when a light ray is incident on a spherical mirror normal to its surface? Q.2 Show the variation of u and v in case of a convex mirror? Q.3 Which mirror is used as rear view mirror in automobiles? Q.4What are focal length and power of a plane mirror? Q.5 Define mirror formula ?	Q.1An object is placed between the pole and focus of a concave mirror produces a virtual enlarged image. Justify by diagram. Q.2 Derive mirror formula for concave & convex mirror? Q.3Why are mirrors used in search lights parabolic and not concave spherical? Q.4 An object is held in front of a concave mirror of focal length 15cm. The image formed is 3 time the size of the object. Calculate two possible distances of the object from the mirror.

केन्द्रीय विद्यालय संगठन

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson plan

Date & Day: 17/05/2018 (THURSDAY) Name of Teacher: Mamata Singh

Class: XII Designation: PGT PHYSICS

Subject: PHYSICS

Topic:Transformer and AC Generator

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
TRANSFORMER AND AC GENERATOR	TRANSFORMER- • Basic principle • Construction • Working • Efficiency • Loss of energy AC GENERATOR- • Basic principle • Construction • Working • Solution of Numerical Questions By the	Learners will be able *Explain with the help of a labeled diagram, the principle, the construction and working of a transformer and ac generator. *Solve numerical problems based on the above topics	*To measure the input and output voltage of a Step- down transformer . *To show the mutual induction.	*Video of Functioning of Transformer and ac generator. *PPT on the function of the transformer and ac generator.	1. Why cannot a transformer be used to step up d c voltage? 2. Does a transformer change the frequency of ac? 3. Why is the core of a transformer laminated? 4. A transformer steps down 220 volt to 11 volt. What is the transformation ratio? 5. In ac generator, which rule determines the direction of induced emf?	1.A transformer has 500 turns in the primary and 1000 turns in its secondary winding. The primary voltage is 200 V and the load is the secondary is 100Ω. Calculate the current in the primary, assuming it to be an ideal transformer. 2. Draw a schematic diagram showing the nature of alternating emf generated by the rotating coil in the magnetic field during one cycle.

	learners.				6. In India , domestic power supply is at 220V, 30 hz, while in U S A , it is 110 volt, 60 hz. Give one advantage and one disadvantage of 220V supply over !!0 V supply?	

Teacher's Signature_____ Sign of Principal_____ Sign of Inspector_____

Lesson Plan

Date:
Subject: Physics
Topic: Interference
Name of The Teacher:Sh. Satish Kumar Verma
Designation:PGT Physics
School:KV No.1 Kankarbagh Patna.
Gist: Definition, types of interference, conditions for constructive and destructive interference, Young's double slits Experiments,Intensity Patterns , Positions of Central maximum,other Maxima and minima,Graphical representation of interference patterns with respect to path difference.
Co-relation with Previous Topics:
Coherent Sources of light,

Two sources are said to be coherent if they have exactly same frequency, and have zero or constant phase difference. Most of the light sources around us - lamp, sun, candle etc are combination of multitude of incoherent sources of light. Laser is a coherent source i.e. constituent multiple sources inside the laser are phase-locked.

You need coherent sources of light in order to observe effects of certain optical phenomena like Interference in lab. Two parallel slits lighted by a laser beam behind can be said to be two coherent point sources

Superposition of two waves.

The principle of superposition may be applied to waves whenever two (or more) waves travelling through the same medium at the same time. The waves pass through each other without being disturbed. The net displacement of the medium at any point in space or time, is simply the sum of the individual wave displacements. This is true of waves which are finite in length (wave pulses) or which are continuous sine waves.

Activity:

Definition:

Wave interference

It is a phenomenon that occurs when two waves meet while traveling along the same medium. The interference of waves causes the medium to take on a shape that results from the net effect of the two individual waves upon the particles of the medium. Wave interference can be constructive or destructive in nature.

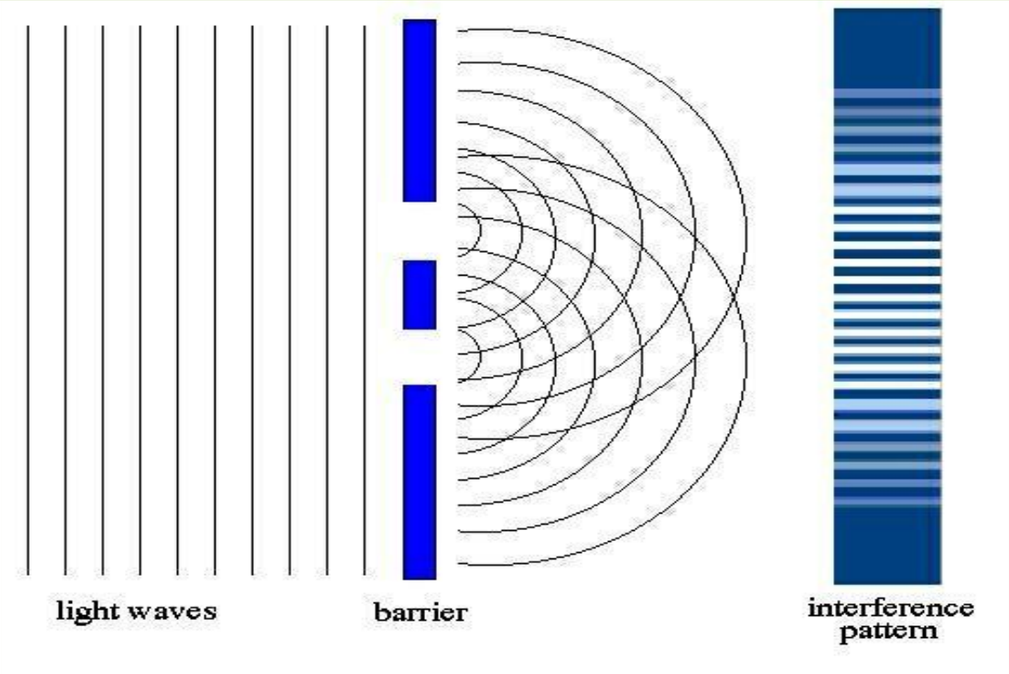
It is of two types

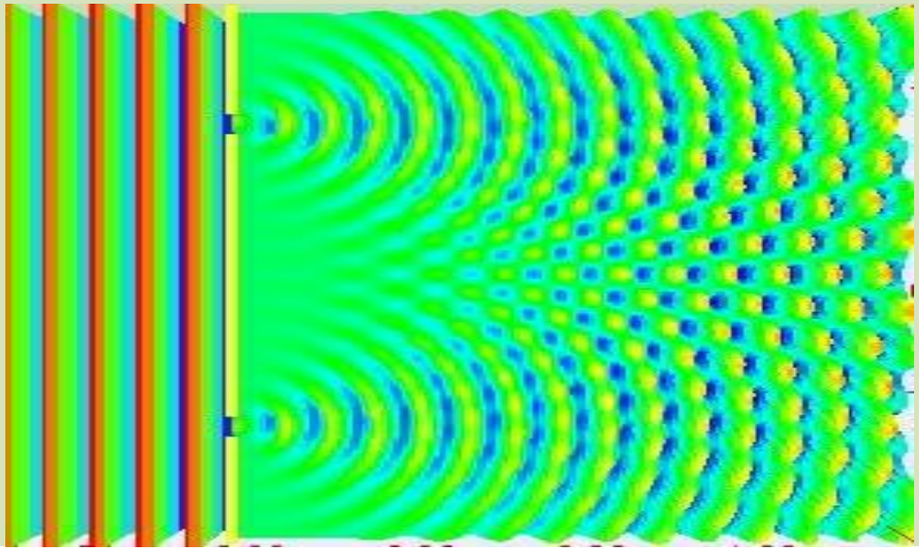
Constructive interference

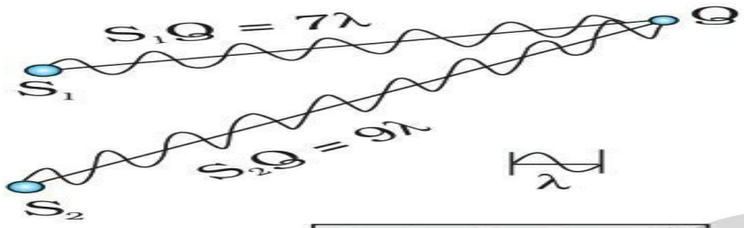
It occurs at any location along the medium where the two interfering waves have a displacement in the same direction. For example, if at a given instant in time and location along the medium, the crest of one wave meets the crest of a second wave, they will interfere in such a manner as to produce a "super-crest." Similarly, the interference of a trough and a trough interfere constructively to produce a "super-trough."

Destructive interference

occurs at any location along the medium where the two interfering waves have a displacement in the opposite direction. For example, the interference of a crest with a trough is an example of destructive interference. Destructive interference has the tendency to decrease the resulting amount of displacement of the medium


light waves
barrier
interference pattern





$S_2Q - S_1Q = 2\lambda$

(a)

$S_2R - S_1R = -2.5\lambda$

(b)

Young's Double Slits Experiment. Consider twosources A and B of wavelength λ. A screen XY is placed parallel to AB at a distance D from the coherent sources. C is the midpoint of AB. O is a point on the screen equidistant from A and B. P is a point at a distance **x** from O, as shown in Fig 5.17. Waves from A and B meet at P in phase or out of phase depending upon the path difference between two waves

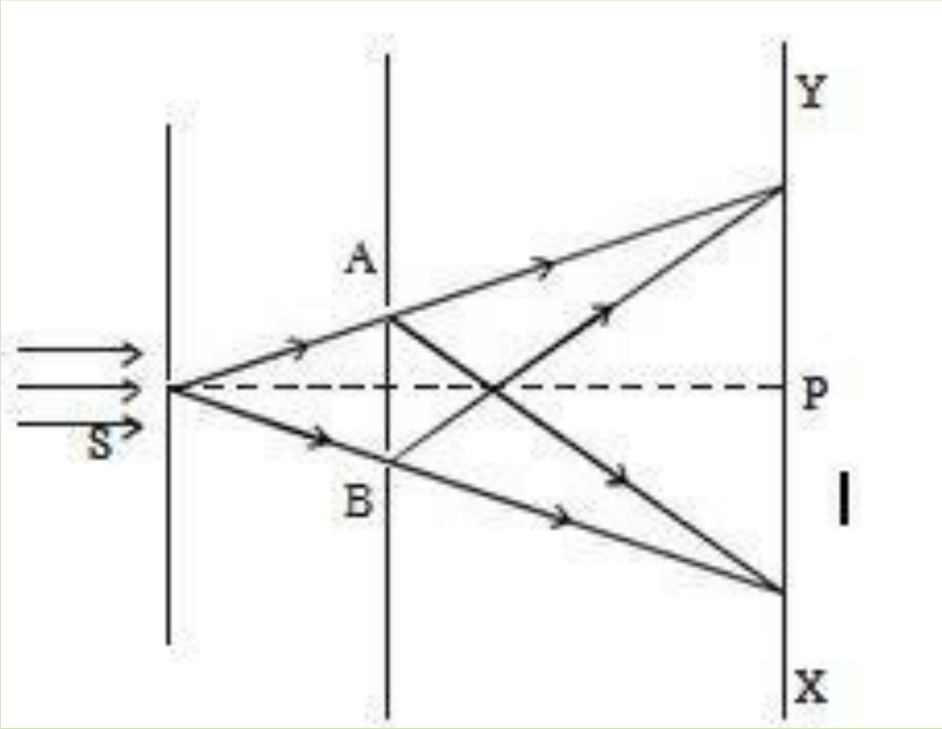
Draw AM perpendicular to BP The path difference δ = BP – AP AP = MP

δ = BP – AP = BP – MP = BM

In right angled ? ABM, BM = d sin θ If θ is small,

sin θ = θ

The path difference δ = θ.d



In right angled triangle COP, $\tan\theta = OP/CO = x/D$

For small values of θ, $\tan\theta = \theta$

Thus, the path difference $\delta = xd/D$

Bright Fringes

By the principle of interference, condition for constructive interference is the path difference = $n\lambda$

$xd/D = n\lambda$

Here, n = 0,1,2.....indicate the order of bright fringes

So, $x = (D/d)\, n\lambda$

This equation gives the distance of the n^{th}bright fringe from the point O.

Dark Fringes

By the principle of interference, condition for destructive interference is the path difference = $(2n-1)\lambda/2$

Here, n = 1,2,3 … indicate the order of the dark fringes.
So, $x = (D/d)\, [(2n - 1)\lambda/2]$

This equation gives the distance of the n^{th}dark fringe from the point O. Thus, on the screen alternate dark and bright bands are seen on either side of the central bright band.

Fringewidth(β)

The distance between any two consecutive bright or dark bands is called bandwidth.

The distance between $(n+1)^{th}$ and n^{th} order consecutive bright fringes from O is given by,

$x_{n+1} - x_n = [(D/d)\, [(n+1)\lambda] - (D/d)\, [(n)\lambda]] = (D/d)\lambda$

Fringewidth, $\beta = (D/d)\, \lambda$

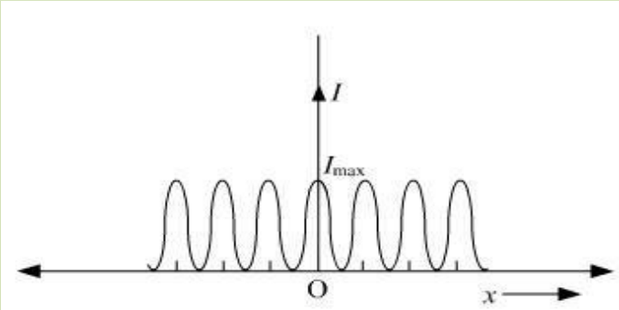
Similarly, it can be proved that the distance between two consecutive dark bands is also equal to (D/d) λ. Since bright and dark fringes are of same width, they are equi−spaced on either side of central maximum.

Condition for Obtaining Clear and Broad Interference Bands

The screen should be as far away from the source as possible.The wavelength of light used must be larger.The two coherent sources must be as close as possible.

Graphical representation of intensity Patterns of interference with path difference

Assignment



1.What is interference?
2.Give the conditions for constructive and destructive
3.find position of dark and bright fringes.
4.derive expression for fringe widths?
5.Give graph showing variation of Intensity of fringes with respect to path difference?

6.In Young's double slit experiment, the intensities at two points P_1 and P_2 on the screen are respectively I_1 and I_2. If P_1 is located at the centre of a bright fringe and P_2 is located at a distance equal to a quarter of fringe width from P_1, then find I_1/I_2.

Signature of the teacher

LESSON PLAN

Date and day – 26/05/2018
Name of Teacher-KUMARRAJESH
CLASS – XII Subject – PHYSICSDesignation - : PGT PHYSICS
No. of students : 40

TOPIC – DUAL NATURE OF RADIATION & MATTER

TOPIC AND SUBTOPIC	TARGET COMPETENCIES/ LEARNING OBJECTIVES	EXPECTED LEARNING OUTCOME	ACTIVITIES PLANNED	AUDIO VISIUAL AIDS	EVALUATION QUESTION (CLASSWORK)	HOME ASSIGNMENT
➢ Dual nature of radiation ➢ Photoelectric effect ➢ Hertz and Lenard's experiment ➢ Einstein's photoelectric equation- particle nature of light ➢ Matter waves- wave nature of particle ➢ De Broglie relation ➢ Davisson –	➢ Basic concept of Photon&itsenegy ➢ Concept of work function, photoelectric effect & threshold frequency ➢ Conclusion of Hertz and Lenard's experiment ➢ Concept of matter -	Learners will be able i. To define photoelectric effect ii. To define work function , threshold frequency iii. To draw circuit diagram of the experiment iv. To draw the various graphs related to the experiment v. To solve numerical & the questions based	➢ Experimental arrangement for the activity related to Hertz and Lenard's experiment with the help of light of different wavelength & intensity ➢ Plotting graphs for the effect of potential ,intensity & frequency with photoelectric current	➢ Video to explain the entire sub topics of this chapter (unit VII) ➢ Ppt on dual nature of radiation & matter with all graphs &derrivations	Q.1)In the wave picture of light , intensity of light is determined by square of the amplitude of wave. What determines the intensity of light in the photon picture of light? Q.2) An electromagnetic wave of wavelength ƛ is incident on a photosensitive surface of negligible work function. If thephoto-electrons emitted from this surface have the de-Broglie wavelength ƛ1, derive relation b/w ƛ and ƛ1.	Q.1)Discuss the dependence of photoelectric current with i. Intensity of incident radiation ii. Potential difference iii. Frequency of incident radiation Q.2)For what kinetic energy of a proton , will the associated de – Broglie wavelength be 16.5nm? Q.3)A proton and an alpha particle are accelerated through the same potential. which one of the two has greater value of de-Broglie wavelength & less Kinetic energy?Justify your answer.

Germer experiment(conclusion only)	waves	on the topic				

Lesson plan

Date & Day: 21/05/2018 (MONDAY) **Name of Teacher: SURENDRA SINGH ARORA**
Class: XII **Designation: PGT PHYSICS**
Subject: PHYSICS **No. of students: 35**
Topic: Nuclei **Period No. : 04th**

Topic And Subtopic	Target Competencies/ Learning objectives	Expected Learning outcome	Activities Planned	Audio Visual Aids	Evaluation Question/Activity (class work)	Home Assignment
CHAPTER14: NUCLEI *composition of nucleus. *isotopes, isobars, isotones *nuclear radius and density *nuclear force	To *define isotopes, isobars, isotones, binding energy, radioactivity *List the characteristics of nuclear forces. *to plot B.E./nucleon curve.	*Learners will be able to i) Draw the B.E/nucleon curve ii) understand the reason for release of energy during nuclear fission and fusion.	i)Explanation of the subtopics. ii) Drawing B.E/nucleon curve. iii) Explanation for energy release in nuclear fission	PPT will be shown with explanation. Video of nuclei will be shown and explained.	i) Define isotopes. Give examples. ii) What is the relation between nuclear radius and mass number? iii) What are the properties of nuclear force? (iv) How do explain the	Q1.write two characteristic properties of nuclear force.Q2. Explain the reason for release of energy during nuclear fission or fusion? Q3. A radioactive sample has activity of 10000 disintegrations/sec after 20 hrs. After next

*mass defect *binding energy *radioactivityα -decay, β-decay, γ-decay *decay law *half life and mean life. *nuclear fission, nuclear fusion.	*Explain the concept of nuclear fission and fusion. *calculate mass defect and binding energy. .	iii) Differentiate between α-decay, β-decay and γ-decay. iv) solve numerical problems of mass defect, binding energy.	and fusion. iv) Explanation of liquid drop model.		binding energy /nucleon curve pattern? (v) How does a nuclei change itself after α-decay? (vi) What is γ-decay? (vii) Define half life? (viii) How do you explain nuclear fission?	10hrs its activity reduces to 5000 disintegrations/sec. Find out its half life and its initial activity.Q4. Plot a curve between no. of nuclei and time for a radioactive nuclei.

Lesson Plan

Class/Section…XII…… Subject…PHYSICS Chapter…Communication system

TOPIC --communication OBJECTIVE 1. Student will able to know about communication. 2. Student will able to use the concept in daily life.

Gist Of The lesson	Black board summery	Questions on topic

asic terminology used in Communication ignal: - Electrical form of message suitable for transmission and reception. Transducer: - A device which converts one form of energy into another form. e.g., Microphone, Loud speaker, Photo detector etc. Noise: - Unwanted signals that tend to disturb the transmission and processing of message signals in a communication system. Attenuation: - The loss of strength of a signal while propagation through a medium. Amplification: - It is the process of increasing the amplitude of a signal using an lectronic circuit. Bandwidth: - It refers to the range of frequencies over which equipment operates or ortion of the spectrum occupied by the signal. Transmitter: - The function of the transmitter is to transmit the modulated signal. Receiver: - The function of the receiver is to receive the transmitted signal. Demodulator: - It separates the base band signal from the modulated wave. Repeater: - It receives the modulated wave and amplify it, then retransmit so as to ncrease the range of communication. lock diagram of a generalized communication system. ropagation of electromagnetic waves **Modulation** lecessity of modulation	Block diagram of a generalized communication system. Communication System Information Source Message Signal Transmitter Transmitted Signal Received Signal Channel Receiver Message Signal Use of Information Noise For given value of transmitting and receiving antenna height, To have maximum range the height of both antenna should be equal.	1. Mention the functions of the transponder? 2. What should be the length of dipole antenna for a carrier wave of 5×10^8 Hz? 3. A device X can convert one form of energy into another. Another device Y can be regarded as a combination of a transmitter and a receiver. Name the devices X and Y. 4. Write the expression for band width in FM 5. What is attenuation? Why sky waves are not used for the transmission of TV signals? 6. Name the two basic modes of communication. Which of these modes is used for telephonic communication?

Name and Signature of the Teacher: VIRESH KUMAR PGT PHYSICS
KV AFS SARSAWA

Group 6

BLUE PRINT OF SESSION ENDING EXAMINATION 2018-19

SL. NO.	UNIT	VSA (1 MARK)	SA I (2 MARKS)	SA II (3 MARKS)	LA (5 MARKS)	TOTAL	
1.	Physical World and Measurement	_	_	3 (1)	_	3 (1)	}20
2.	Kinematics	2(2)_	2 (1)	3(1)		7 (4)	
3.	Laws of Motion	_	2 (1)	3 (1)	5 (1)	10 (3)	
4.	Work, Energy and Power	_	_	6 (2)	_	6 (2)	}17
5.	Motion of System of particles and Rigid Body	_	_	6 (2)	_	6 (2)	
6.	Gravitation	2 (2)	_	3 (1)	_	5 (3)	
7.	Properties of Bulk Matter	1 (1)	_	3 (1)	5(1)	9 (3)	}16
8.	Thermodynamics	_	2 (1)	3 (1)	_	5 (2)	
9.	Behaviour of Perfect Gases and Kinetic Theory of gases	_	2 (1)		_	2 (1)	
10.	Oscillations , Waves, Ray optics		2 (1) 2(1) 2(1)	3 (1) 3(1)	_5(1)	17 (6)	}17
	Total	5 (5)	14 (7)	36 (12)	15 (3)	70 (27)	

(CLASS-XI)

SESSION ENDING EXAMINATION 2018-19

SUBJECT: PHYSICS

CLASS: XI

TIME: 3HRS **M.M.: 70**

GENERAL INSTRUCTIONS:

(i) All questions are compulsory.

(ii) There are 27 questions in total. Questions 1 to 5 are very short answer type questions and carry one mark each.

(iii) Questions 6 to 12 carry two marks each, questions 13 to 24 carry three marks each and questions 25 to 27 carry five marks each.

(iv) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all three questions of five marks each. You have to attempt only one of the choices in such questions.

(v) Use of calculators is not permitted. However, you may use log tables if necessary.

1. A motor cyclist is going in a vertical circle. What is the necessary condition so that he may not fall down?
2. What is the weight of the body of mass 'm' at the centre of earth?
3. Why do different planets have different escape velocities?
4. Hot soup tastes better. Why?
5. Two vectors $\vec{A}$ and $\vec{B}$are directed along y-axis and z-axis respectively. What is the direction of the vector $\vec{B} \times \vec{A}$?
6. Drive second equation of motion.
7. What is limiting friction? State the laws of limiting friction.

8. Prove that$C_p - C_v$= R, where the symbols carry usual meanings.
9. Calculate the temperature at which the r.m.s velocity of O_2 gas molecule will be 1 km/s. Given R = 8.311 $Jmol^{-1}K^{-1}$.
10. At what distance from the mean position, is the kinetic energy in SHM equal to potential energy?

OR

A particle executes S.H.M. given by y = 0.24 cos(400t – 0.5)
in SI units. Find amplitude, frequency and period of vibration.

11. Adarsh a student of class XI has found the factors on which the time period of oscillation of a pendulum depends and arrived at the expression

T = (constant) X $(l/g)^{1/2}$. He wants to know how the length of the pendulum gets affected on the surface of the moon for the same pendulum and arrived at the conclusion that it is l/6.

The length of a seconds' pendulum on the surface of the earth is 1m What will be the length on the surface of the moon

12 A group of students went to a place on excursion. While boating on sea water, the students identified a submerged Torpedo shaped structure. The boys debated among themselves on what they saw. A student by name Sharath considering it as a threat informed the police. The police took necessary steps to protect the country from the enemy submarine. Sharath was rewarded.

A SONAR system fixed in a submarine operates at a frequency 40 kHz. An enemy submarine moves towards the SONAR with a speed of 360 km/hr. What is the frequency of sound reflected by the submarine? Take the speed of sound in water to be 1450m/s.

13 Define isothermal and an adiabatic process. Derive an expression for work done during an isothermal process.

14 a) State the theorem of perpendicular axes and theorem of parallel axes.

b) Use the theorem of parallel axes to calculate moment of inertia of a disc of mass 400g and radius 7 cm about an axis passing through its edge and perpendicular to the plane of the disc.

OR

a) Define torque.
b) Derive an expression for torque in terms of the magnitude of force and the moment arm of the force.

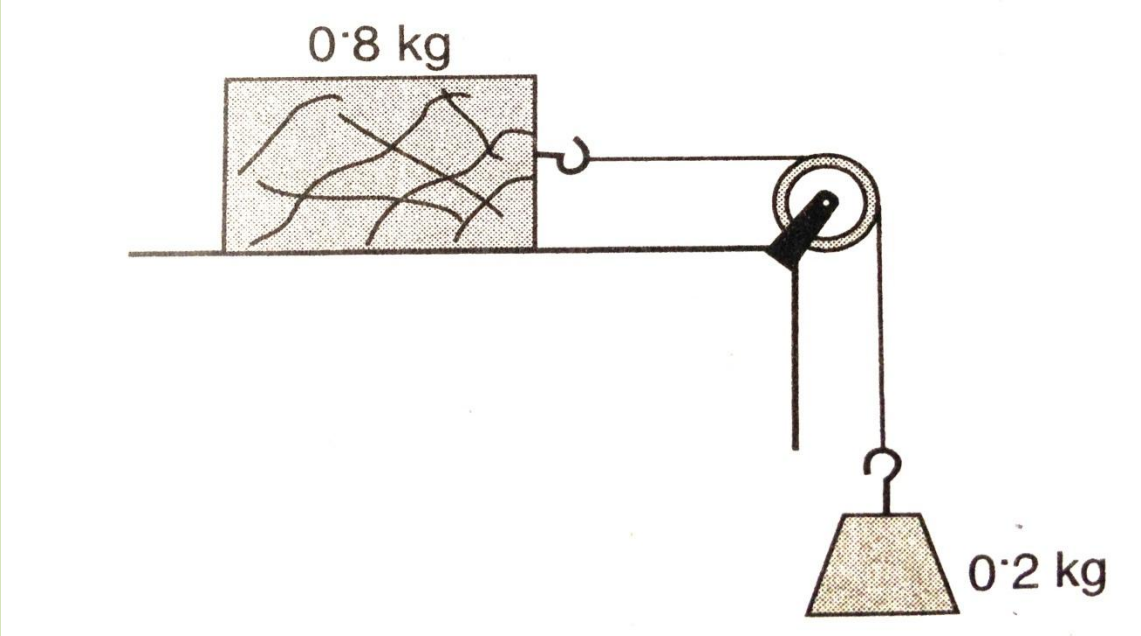
15. What is an elastic collision? Show that in an elastic one dimensional collision,

The relative velocity of approach before collision is equal to the relative velocity of *separation* after collision.

16. Explain how stationary waves are formed. Give the mathematical equation.

17. a) State the laws of limiting friction.

b) A block of mass 0.8 kg is dragged along a level surface by a hanging block of mass 0.2 kg as shown in the figure.



Find tension in the string and acceleration of the system, if the co-efficient of friction between the block and the surface is 0.045.

18. Using Pascal's law, explain with the help of a neat diagram, working of a hydraulic lift. Mention any two situations from your daily life where hydraulic lift is useful.

19. With the help of suitable ray diagram, derive a relation between object distance u, image distance v and radius of curvature R, for convex spherical surface, when ray of light travels from rarer to denser medium.

20 The motion of a car along y-axis is given by v(t)= -12t + 12 where velocity v is in m/s and time t in seconds. Find the instantaneous position of the car as a function of time if at t = 0 it was at 5 m. Also find its acceleration at t = 2 second.

21. What do you mean by acceleration due to gravity? How acceleration due to gravity does varies with height?

22. State the principle of homogeneity of dimensions.

Check the correctness of the relation:

$$\upsilon = \frac{1}{2L}\sqrt{\frac{F}{m}}$$

Where, m is mass per unit length

F is tension

L is length of the string

υ is frequency of the string

23. Define kinetic energy. What percentage of kinetic energy of a moving particle is transferred to stationary particle (elastic collision), when the moving particle strikes with a stationary particle of mass 19 times in mass.

24. (i) Define moment of inertia.

(ii) Three mass points m_1, m_2 and m_3 are located at the vertices of an equilateral triangle of length a. What is the moment of inertia of the system about an axis along the altitude of the triangle passing through m_1.

25. Draw a ray diagram showing the image formation by a compound microscope. Hence obtained expression for total magnification shown by this microscope.

OR

With the help of ray diagram, derive lens maker's formula for convex lens?

26. State and prove Bernoulli's theorem.

A water pipe entering a hose has a diameter of 2cm and speed of water 0.1 m/s^2.

Eventually the pipe tapers the diameter 1cm. Calculate the speed of water in the tapered portion.

OR

a. What is capillarity? Derive an ascent formula for the rise of liquid in a capillary tube.
b. What is the density of water at a depth where pressure is 80atm. Given density at the surface is 1.03×10^3 kg/m^3.

27. Prove that Newton's 2nd law is the real law.
A rocket with a lift of mass 20000kg is blasted upwards with a net upwards acceleration of 5 ms^{-2}. Calculate the initial thrust of the blast.

OR

Drive equation for centripetal acceleration of a body moving in a circular path.
Two masses 8kg and 12kg are connected at the two ends of a light inextensible string that passes over a frictionless pulley. Find the acceleration and tension in the string when the masses are released.

Q.No.	Value Points	Marks Distribution	Total Marks
1	$Mv^2/r \geq mg$ OR $v \geq \sqrt{gr}$ at highest point OR $v \geq \sqrt{5gr}$ at lowest point	1	1
2	Zero	1	1
3	Due to different size and mass	1	1
4	Due to surface tension	1	1
5	Negative x-axis	1	1
6	Correct derivation	2	2
7	Definition and laws	1 +1	2
8	Correct derivation	2	2
9	Correct answer	2	2
10	Correct answer	2or 1+1	2
11	Formula and correct answer	1+1	2
12	Apparent frequency received by an enemy submarine, ν' = {(v + v0)/v} ν= = {(1450 + 100)/1450} x 40 x 103Hz = 4,276 x 10 4Hz. This frequency is reflected by the enemy submarine (source) and is observed by SONAR (now observer) In this case Apparent frequency ν'' = {v/ (v-vs.)} X ν = *1450/(1450-100)]X 4.276 X 10 4Hz = 45.9 kHz.	2	2
13	Definition and expression	1 + 2	3
14	Definition and correct answer Or Definition and expression	1+2	3
15	Definition and proof	1+2	3
16	correct answer	1 + 2	3
17	a) Statement Correct answer	1 + 2	3
18	Diagram + working + two situations	½ + 1½ + 1	3
19	Ray diagram and derivation	1 + 2	3
20	Correct answer	3	3
21	Definition + derive	1+ 2	3
22	Statement + correct answer	1 + 2	3
23	Definition + correct answer	1+2	3
24	Definition + correct answer	1 + 2	3
25	Ray Diagram + correct derivation Or Ray Diagram + correct derivation	2 +3	5
26	Statement + proof + correct answer Or Statement + proof + correct answer	1+2+2	5
27	Proof + correct answer Or Derivation + correct answer	2+3 3+2	5

CLASS XI							
SUBJECT - PHYSICS							
BLUE PRINT							
S.No	Unit	VSA	SA 1	SA 2		LA	TOTAL
1	Physical World And Measurement	1(1)	2(1)				20(9)
2	Kinematics	1(1)		6(2)			
3	Laws of motion	1(1)		9(3)			
4	Work, Energy And Power			6(2)			17(7)
5	Motion Of System Of Particles And Rigid Body			6(2)			
6	Gravitation	1(1)	4(2)				
7	Properties of Bulk Matter	1(1)	2(1)	3(1)			16(5)
8	Thermodynamics					5(1)	
9	Behaviour Of Perfect Gases And Kinetic Theory Of Gases					5(1)	
10	Mechanical waves & ray optics		6(3)	6(2)		5(1)	17(6)
	TOTAL	5(5)	14(7)	36(12)		15(3)	70(27)

Session Ending Examination 2018-19
XI - PHYSICS

Time : Three Hours **Max. Marks : 70**

General Instructions
(a)All questions are compulsory.

(b) There are 27 questions in total.

(c)This question paper has four sections: Section A, Section B, Section C , and Section D.

(d) Section A contains five questions of 1 mark each, Section B contains seven questions of 2 marks each , Sections C contains twelve questions of 3 marks each, Section D contains three questions of 5 marks each.

(e) There is no overall choice. However, an internal choice has been provided in one question of two marks, two questions of three marks and all three questions of five marks each. You have to attempt only one of the given choices in such questions.

(f) Use of calculators is not permitted.

(g) You may use the following physical constants wherever necessary :

$c = 3 \times 10^{8} ms^{-1}$
$h = 6.6 \times 10^{-34}$ Js
$e = 1.6 \times 10^{-19}$C
Boltzmann constant $k = 1.38 \times 10^{23}$J/K
Avogadro's number $NA = 6.023 \times 10^{23}$/mole
Mass of neutron mn= 1.6×10^{-27}Kg

	SECTION A	
1	Give an example of the process where weak nuclear force is present.	1
2	What is the difference between function of Geostationary Satellite and the polar satellite	1
3	What are the factors which affect the atmospheric pressure at a place?.	1
4	Why a horse cannot pull a cart and run in free space?	1
5	Write unit vector of A=2i +3j -k	1
	SECTION B	
6	The mass of a box measured by a grocer's balance is 2.300 kg. Two gold pieces of masses 20.15 g and 20.17 g are added to the box. What is (a) the total mass of the box , (b) the difference in the masses of the pieces to correct significant figures?	2
7	Derive an expression for energy needed for the geosynchronous satellite to orbit the Earth. Or Derive an expression for the minimum velocity required by an object on earth to just escape its gravitational pull.	2
8	Show that acceleration due to gravity decreases with height.	2
9	What is resonance? On what factors does the natural vibration frequency of an oscillating body depend?	2
10	Obtain an expression for height of a liquid in a capillary tube as compared to outside.	2
11	Write two essential conditions for total internal reflection?	2
12	What is resolving power of an optical instrument? Write expression for the resolving power of microscope.	2
	SECTION C	
13	What is static friction? Is it self-adjusting in nature? Give reason in support of your answer.	3
14	Two blocks A and B are attached to an inextensible light string in a vertical direction. The arrangement is pulled vertically upwards by a force F = 120 N. Find: (a) the acceleration of the blocks , and (b) Tension in the strings. (g= 10 m/s^2)	3
15	Derive the relation between coefficients of linear, surface and volume expansion of a solid, α, β andγ. Or State the theorem of continuity and prove Bernoulli's Theorem. What is the limitation of this theorem?	3

16	A person sitting at the top of a tall building is dropping balls at regular intervals of one second. Find the position of the 1st, 2nd and 3rd balls when the 4th ball is just being dropped.	3
17	State the law of conservation of angular momentum. A ballet dancer, dancing on a smooth floor is spinning about its vertical axis with her arms folded with an angular speed of 20 rad /s. Then, she stretched her arm fully so that her moment of inertia about the spinning axis increased by 25%. What will be her new angular speed?	3
18	State parallel axes theorem and perpendicular axes theorem. Define radius of gyration.	3
19	Two bodies are thrown with the same initial velocity at an angle α and (90-α) with the horizontal. What will be the ratio of (i) maximum height attained by them (ii) horizontal ranges? Or At what angle must the two forces (A+B) and (A-B) act so that their resultant is $(A^2+B^2)^{1/2}$?	3
20	Discuss elastic collision in one dimension .Obtain expressions for velocities of two bodies after such a collision	3
21	A light body and a heavy body have same linear momentum. Which one has greater kinetic energy? In which motion, momentum changes but kinetic energy does not?	3
22	Discuss the motion of a vehicle on a banked curved road . What is the advantage of banking of a road?	3
23	How does a beat produced? Two sound notes produce 18 beats in 6 second .What is the beat frequency?	3
24	Establish relation between u,v and f for concave mirror where symbols have their usual meaning.	3
	SECTION D	
25	Explain the formation of standing waves in case of an organ pipe open at one end and closed at the other end. Represent first three modes of vibration diagrammatically and find their frequencies. Or State Newton's formula for velocity of sound in gases. Discuss Laplace correction. What is the effect of density, pressure and temperature on the velocity of sound in air. Explain	5
26	Describe Carnot's heat engine. Draw the PV-indicator diagram for a cycle of operations between two given temperatures and deduce from it the efficiency of the engine. Or Define isothermal and an adiabatic process. Derive an expression for work done during an adiabatic process	5
27	State the postulates of kinetic theory of gases. Derive an expression for the pressure exerted by an ideal gas. Or What is meant by degrees of freedom? State the law of equipartiton of energy. Hence , calculate the values of molar specific heats at constant volume and pressure for monoatomic ,diatomic and triatomic gases.	5

MARKING SCHEME		
Sr.N	**Answer Keys**	marks
1	Radioactive β-decay of the nucleus where nucleus emits an electron and an uncharged particle neutrino.	1
2	Geostationary satellite is used for communication purpose while polar satellite not.	1
3	The height of the atmosphere ,density of atmosphere and the value of g at that place .	1
4	While pulling a cart, the horse, on ground, pushes the ground backwards with his feet. The reaction force due to the ground makes the horse and cart move forwards. In free space, the horse cannot push anything in backward direction and in turn get a forward reaction	1
5	$\frac{2i+3j-k}{\sqrt{14}}$	1
6	(a) 2.3 kg (b) 0.02 g.	1 1
7	Diagram+Derivation Or Diagram+Derivation	1+1 1+1
8	Diagram+Derivation	1+1
9	Definition :The phenomenon of increase in amplitude of oscillation of driven oscillator when frequency of driving force is close to the natural frequency of oscillator Factors – elastic nature and dimensions of the oscillating body.	1 1
10	Diagram+Derivation	1+1
11	1. The ray of light should pass from denser to rarer 2.Angle of incidence must be greater than critical angle.	1 1
12	Definition Resolving power of microscope $=\frac{2\mu sin\theta}{\lambda}$	1 1
13	Definition yes, explanation with any one example	1 1 1
14	diagram (a) 10 m/s^2 (b) 40 N	1 1 1
15	derivation Or Statement + Derivation	3 1+2
16	44.1m 19.6m 4.9 m below the top	1 1 1
17	Statement Calculation 16 rad/s	1 1 1
18	Statements with diagram Definition	1 2
19	(i) $H_1:H_2 = \tan^2\alpha$ (ii) $R_1:R_2 = 1:1$	2 1
20	Explanation with diagram Derivation	1+1 1

21	Lighter body has greater kinetic energy + calculation In uniform circular motion. Or Formula Calculation Angle = $\cos^{-1}\{ (A^2 + B^2)/2(B^2 – A^2) \}$	2 1 1 1 1
22	Derivation of formula Advantage	2 1
23	Explanation + Calculation	1+2
24	Ray diagram Derivation of mirror formula	1 2
25	Explanation Calculation expression for nodes and antinodes or Statement Laplace correction Explanation	1 2 2 1 2 2
26	Explanation Indicator diagram with labeling Theory and calculation Or Definitions Derivation	1 1 3 2 3
27	Statement and explanation Derivation Or Definition Statement + Explanation	2 3 1 2+2

Group 7

BLUE PRINT

CLASS: XI **Session ending exam**

Sr	UNIT	VSA (1 mark)	SA I (2marks)	SA II (3 marks)	LA (5marks)	Total
1	Physical world and Measurement			1		20
2	Kinematics	2	1	1		

3	Laws of motion		1	1	1	
4	Work, energy and power			2		17
5	Motion of system of particles and rigid body			2		
6	Gravitation	2		1		
7	Properties of bulk matter	1			1	16
8	Thermodynamics		1	1		
9	Behavior of perfect gas and kinetic theory of gases		1	1		
10	Oscillations and waves & Ray optics		3	2	1	17
	Total	01 x 5=05	2 x 7= 14	3 x12 = 36	5 x 3 =15	70

KENDRIYA VIDYALAYA
SESSION- ENDING EXAMINATIONS

CLASS – XI **SUBJECT – PHYSICS**
TIME ALLOWED – 3 hours **MAX. MARKS - 70**

General Instructions:
1. All questions are compulsory.
2. There is no overall choice. However, internal choice has been provided in one question of 2 marks, one question of 3 marks & in each question of 5 marks.
3. Questions 1 to 5 carry 1 mark each.
4. Questions 6 to 12 carry 2 marks each.
5. Questions 13 to 24 carry 3 marks each.
6. Questions 25 to 27 carry 5 marks each.
7. Draw neat labeled diagram whenever necessary.

Q.1- What is the velocity of a projectile at its highest point? (1)
Q.2- Draw the variation of displacement with time for a motion with positive acceleration. (1)

Q.3- What are the values of g and G at the center of the earth? (1)

Q.4- Write one application of a polar satellite.
(1)

Q.5- What is the effect of temperature on surface tension of a liquid? (1)

Q.6- A stone, thrown upward with velocity 'v', comes down after time't'. Draw the graph showing the variation of speed vs time and velocity vs time for its entire motion.
(2)

Q.7- Give laws of limiting friction. (2)

OR

Show that angle of friction is equal to angle of repose.

Q.8- Derive the relation for the work done in an adiabatic process. (2)

Q.9- Write the formula for the energy of one mole of a gas. The energy of one mole of a gas is 264 J at 27^oC. At what temperature kinetic energy will become ¾ of its value at 27^oC? (2)

Q.10- To a person standing on the plat form the frequency of the whistle of a train heard by him is 2.4 kHz and 1.6 kHz when the train approaches and recedes away from platform. If velocity of the sound wave is 300 m/s, find the velocity of the train.
(2)

Q11. Prove that focal length of a spherical mirror is f =R/2 (2)

Q.12- Explain with reason why sky is blue? (2)

Q.13- Obtain dimensional formula for universal gravitational constant (G), Planck's constant (h) and universal gas constant (R). (3)

Q.14- A stone is thrown from the top of a tower at an angle 30° down with the horizontal with a velocity of 10 ms^{-1}. If the stone strikes the ground at a distance of 17.3 m from the base of the tower. Calculate the height of the tower. ($g = 10\ ms^{-1}$) (3)

Q.15- (a) What is meant by law of inertia?
(b) How is inertia related to mass of a body?
(c) Why are shockers provided in cars and scooters? (3)

Q.16- State and prove work energy theorem for variable force. (3)

Q.17- Define elastic collision and show that relative velocity of approach is same as that of separation in elastic collision in one dimension. (3)

Q.18- Define orbital velocity of a satellite and derive the relation for it. (3)

Q.19- Give laws of thermodynamics. (3)

OR

Define heat engine and its efficiency. Discuss its various parts.

Q.20-Define Degree of freedom. Establish the relation for Cp, Cv and γ in terms of degree of freedom 'f'
(3)

Q.21- Define Doppler Effect in sound. Derive the relation for the apparent frequency when both the source and observer are moving. (3)

Q.22- State parallel axis theorem on moment of inertia and Find the moment of inertia of a uniform rod of length 'L' and mass 'm' about an axis perpendicular to it and passing through a point which is at a distance 3L/4 from its one end. (3)

Q.23- State the law of conservation of angular momentum. Give two illustrations of this law. (3)

Q.24- With the help of suitable ray diagram derive mirror formula for concave mirror. (3)

Q.25- State and prove Bernoulli's theorem. (3+1+1)
Write any of its two applications.

OR

Define capillarity. $(1+1^1/_2+2^1/_2)$
Give reason for the rise of liquids in capillary.
Derive the relation for the excess pressure in an air bubble of radius R.

Q.26- Define limiting friction and angle of friction.
A body of mass 5 kg is sliding on a surface inclined at an angle 60° with the horizontal. Calculate the acceleration of the body and angle of friction. The coefficient of kinetic friction between the body and the surface is 0.5 and g = 10 ms^{-1} (1+1+3)

OR

Define centripetal force.
Establish the relation for the maximum velocity of a car of mass 'm' turning on a level road turn of radius 'R'.
A car speeding at 72 km/h on a level road takes a sharp circular turn of radius 10 m without reducing the speed. The coefficient of static friction between the road and tyers is 0.5. Will the car slip while taking the turn? Explain briefly. $(1+1^1/_2+2^1/_2)$

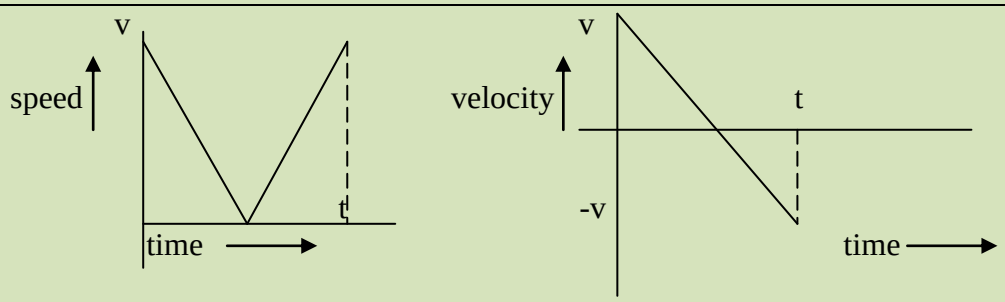
Q.27- Define beats and beat frequency.
Show that when two sound sources are vibrating together the beat frequency is equal to the difference of the frequencies of the sources. (1+1+3)

OR

Define stationary waves.
Derive the equation for the stationary wave in a stretched wire and discuss the modes of vibration in it with suitable diagrams.
$(1+1^1/_2+2^1/_2)$

********** END **********

Marking scheme

Q.No.	Value Points	Total marks
1.	Same as initial horizontal velocity.	1
2.	Correct graph	1
3.	$G = 6.67 \times 10^{-11}\ Nm^2kg^{-2}$ and $g = 0$	½+1/2
4.	Weather forecasting	1
5.	Decreases on increasing temperature	1
6.		1+1
7.	Correct laws OR correct derivation	2
8.	Correct derivation	2
9.	Formula $E = {}^3/_2\ RT$ ($^1/_2$) Formula $E_1/E_2 = T_1/T_2$ ($^1/_2$) Substitution & Calculation ($^1/_2$) Ans. T_2= 225 K or -48^0C ($^1/_2$)	2
10.	Formula $\upsilon = \upsilon_0\, v/(v - v_s)$ when train approaches platform ($^1/_2$) $\upsilon = \upsilon_0\, v/(v + v_s)$ when train recedes platform ($^1/_2$) Substitution ($^1/_2$) Calculation ($^1/_2$) Ans. 60 ms^{-1}	2
11.	Correct diagram ($^1/_2$) Correct derivation (1 ½)	2
12.	Correct explanation (2)	2
13.	$(G) = M^{-1} L^3 T^{-2}$, $(h) = M L^2 T^{-1}$, $(R) = ML^2 T^{-2} K^{-1}$ (1+1+1)	3
14.	Range = $u \cos \Theta \cdot t$ => $t = 2$ s (1) $H = u \sin \Theta \cdot t + 1/2\ g\ t^2$ ($^1/_2$) Substitution ($^1/_2$) Calculation ($^1/_2$) Ans. 30 m ($^1/_2$)	3

15.	Correct answers (1+1+1)	3
16.	Correct answers (1+2)	3
17.	Definition +proof (1+2)	3
18.	Definition+derivation (1+2)	3
19.	Laws of thermodynamics (1+1+1) Or Definition+ derivation (1+2)	3
20.	Definition+relation (1+2)	3
21.	Definition+ derivation (1+2)	3
22.	Correct statement (1) $Icm = mL^2/12$ ($^1/_2$) $I = Icm + m\,a^2$ where $a = 3L/4 - L/2 = L/4$ ($^1/_2$) $I = 7mL^2/48$ (1)	3
23.	Statement (1) Two illustrations with examples (2)	
24.	Ray diagram (1) Derivation (2)	3
25.	Statement of Bernaulli's theorem (1) Proof (3) Two applications ($^1/_2$ + $^1/_2$) OR Correct definition (1) Reason (1 ½) proof (2 ½)	5
26.	Definition of limiting friction (1) Definition of angle of friction (1) Diagram ($^1/_2$) $\Theta = \tan^{-1}(\mu)$ & Normal reaction $N = mg\cos\Theta$ ($^1/_2$) Net force $m\,a = mg\sin\Theta - \mu N$ & $\Theta = \tan^{-1}(\mu)$ ($^1/_2$) Substitution & calculation (1) Ans. $a = 6.15\ ms^{-1}$ & $\tan^{-1}(0.5)$ ($^1/_2$) OR Definition (1) Derivation $v^2 \le \mu\, mg$ (1 ½) formula $v^2 \le \mu\, mg$ ($^1/_2$) Substitution & calculation (1) Ans. yes, car will slip and explanation (1)	5
27.	Definition of beats (1) Definition of beat frequency (1) Derivation (3) OR Definition of stationary waves (1) Derivation of equation of stationary wave in stretched wire (1 ½) Diagram ($^1/_2$) Discussion of various modes of vibrations (2)	5

KENDRIYA VIDYALAYA SANGATHAN
INSERVICE TRAINING –ZIET-CHANDIGARH-2018
SUBJECT: PHYSICS GROUP -9
BLUE-PRINT
CLASS:-XI

SL. No.	Unit	V.S.A.	S.A. I	S.A. II	L.A.	TOTAL	No. of Questions
	MARKS	(1)	(2)	(3)	(5)		
1	PHYSICAL WORLD AND MEASUREMENT	1		1		20	7
2	KINEMATICS			1	1		
3	LAWS OF MOTION		1	2			
4	WORK,ENERGY AND POWER	1	1	1		17	7
5	MOTION OF SYSTEMS OF PARTICLES AND RIGID BODY	1			1		
6	GRAVITATION		1	1			
7	PROPERTIES OF BULK MATTER		1	1		16	7
8	THERMODYNAMICS		1	1			
9	BEHAVIOUR OF PERFECT GASES AND KINETIC THEORY OF GASES	1	1	1			
10	MECHANICAL WAVES AND RAY OPTICS	1	1	3	1	17	6
	TOTAL	5(1)	7(2)	12(3)	3(5)	70	27

KENDRIYA VIDYALAYA SANGATHAN
INSERVICE TRAINING –ZIET-CHANDIGARH-2018
GROUP -9

Class-XI **Full Marks- 70**
Subject- Physics (Theory) **Tme allowed-3 hours**

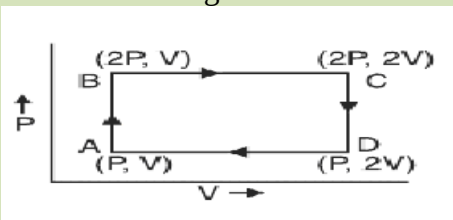
General Instructions:-
(i) All questions are compulsory
(ii) There are 27 questions in total. And Four sections Questions 1 to 5 are very short answer type and carry 1 mark each.
(iii)Questions 6to 12 carry 2 marks each, questions 13 to 24 carry 3 marks each, and question number 23 is of 4 marks
(iv) Questions 25 to 27 are of long answer type carrying 5 marks each
(v)There is no overall choice. However an internal choice has been provided in one question of 2 marks, one question of 3 marks and all questions of 5 marks each.
(vi) You may use the following constants wherever necessary.
$g=10m/s^2$, $G=6.67x10^{-11}Nm^2/kg^2$, Radius of earth R=6400km universal gas constant R=8.31J/mol-K, Avogadro's number $N=6.23x10^{23}$

---

1. Give the number of significant figures in5.300×10^2.
2. Give one example of conservative and non conservative force each.
3. There are two bodies of mass 10kg and 100kg. which one has greater escape velocity on earth surface.
4. Draw the variation of kinetic energy of gas with temperature.
5. Define refractive index.
6. Two mutually perpendicular force of 8N & 6N are acting on a body of mass 10kg find the magnitude and direction of acceleration produced in body?
7. A truck and a car moving with the sane K.E. on a straight road. Their energies are simultaneously switched off which one will stop at a lesser distance? Explain with proper calculation.
8. Can a body in equilibrium while in motion? If yes, give an example.

   OR

   If earth contracts to half its radius what would be the length of the day at equator?
9. State Hook's law. Deduce expression for Young's modulus of material of a wire of length 'l', radius of cross section 'r' loaded with a body of mass m producing an extension 'Δl' in it.
10. An ideal monoatomic gas is taken round the cycle ABCD as shown. Calculate the work done during the cycle.

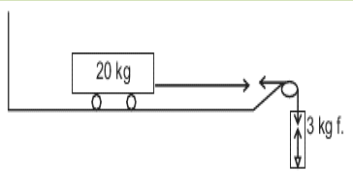


11. Helium is a mixture of two isotopes having atomic masses 3g/mol and 4g/mol. In sample of helium gas, which atoms move faster on average?
12. Define total internal reflection. Write its condition.
13. When the planet Jupiter is at a distance of 824.7million km from the earth, its angular diameter is measured to be 35.7'' of arc. Calculate the diameter of Jupiter.

    OR

    Convert one joule into erg by dimension analysis.
14. Two vectors $\vec{A}$ and $\vec{B}$ are inclined to each other at an angle θ. Using triangle law of vector addition, find the magnitude and direction of their resultant.

15. What is the acceleration of the block and trolley system as in figure, if coefficient of kinetic friction between the trolley and the surface is 0.04? Also calculate tension in the string. (Take g = 10m/s^2 and 27.13N)



16. State and prove work energy theorem for variable force.
17. State the theorem of parallel axis. The MI of a thin rod about an axis passing from its centre is Ml^2 /12. Find its moment inertia about its axis passing from one end.
18. The angular speed of a motor wheel is increased from 1200rpm to 3120rpm in 16 Sec. (i) what is its angular acceleration (ii) how many revolutions does the wheel make during this time?
19. A spherical ball falls in a viscus medium, draw the all forces acting on this ball when it attain constant speed, hence obtain expression for such speed in terms of radius of ball coefficient of viscocity of the medium.
20. State the second law of thermodynamics. Derive C_p - C_v = R using first law of thermodynamics. The symbols have their usual meaning.
21. Two perfect gases at absolute temperature T_1 and T_2 are mixed. There is no loss of energy. Find the temperature of the mixture if the masses of molecules are m_1 and m_2 and number of molecules is n_1 and n_2?
22. The length of a sonometer wire between two fixed ends is 110cm. Where the Two bridges should be placed so as to divide the wire into three segments whose Fundamental frequencies are in the ratio of 1:2:3?
23. Show that the total energy of a body executing SHM is independent of time?
24. A Double convex lens made of glass of refractive index 1.5 has both radii of curvature of magnitude 20 cm. an object 2 cm high is placed at 10 cm from the lens. Find the position, nature and size of the image.
25. With the help of a ray diagram, show the formation of image of a point object by refraction of light at a spherical surface separating two media of refractive indices n_1 and n_2 ($n_2 > n_1$) respectively. Using this diagram, derive the relation $\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$.

OR

(i) Drawaneatlabelledraydiagramofacompoundmicroscope.Explainbriefly itsworking.

(ii) Whymustboththeobjectiveandtheeye-pieceofacompoundmicroscopehaveshortfocallengths?

26. (a) Derive relation for range covered by a projectile thrown with velocity v at angle θ with horizontal. Show that there are two angles of projection to get same horizontal range.

(b) Compare the maximum heights attained by two projectiles thrown at 30^0 and 60^0 with horizontal at same velocities.

OR

(a) Derive relation for centripetal acceleration in uniform circular motion and state its direction. Draw relevant diagram neatly.

(b) A small stone tied to a 28 cm long thread is whirled in a horizontal circle at 10 revolutions in 5 seconds. Find its angular and linear velocities.

27. State Kepler's law of planetary motion. Derive the second and third law of planetary motion.

OR

Define the term orbital speed. Derive the formula for the orbital velocity, time period of a planet around the earth.

PHYSICS MARKING SCHEME FOR CLASS XI

Q. No.	Answer	Marks
1.	Correct significant figure	1
2.	Half mark for each example.	1/2 +1/2
3.	Correct explanation	1
4.	Correct graph	1
5.	Definition and formula of refractive index	½ + ½
6.	Calculation of force and acceleration	1+1
7.	Correct solution KE = F.S =μ mgs	1+1
8.	Yes and example OR Correct solution	1+1 1+1
9.	Statement and explanation	1 1
10.	Formula for work done calculation the work done	½ + 1 $^1/_2$
11.	Correct solution	2
12.	Definition and two condition	3
13.	In both options correct solutions.	3
14.	Statement diagram and proof	1/2 + 1/2+2
15.	Formula and correct solution	1/2 + 2.5
16.	The change in kinetic energy of a particle is equal to the work done on it by the net force. Yes, it is also valid for variable force. $\frac{dK}{dt} = \frac{d}{dt}\left(\frac{1}{2} m v^2\right)$ $= m \frac{dv}{dt} v$ $= F v$ (from Newton's Second Law) $= F \frac{dx}{dt}$ Thus $dK = F dx$ Integrating from the initial position (x_i) to final position (x_f), we have $\int_{K_i}^{K_f} dK = \int_{x_i}^{x_f} F dx$ where, K_i and K_f are the initial and final kinetic energies corresponding to x_i and x_f. or $K_f - K_i = \int_{x_i}^{x_f} F dx$ .....(1) From Eq. (1), it follows that $K_f - K_i = W$	3

17.	Statement Moment of inertia calculation	½ 2.5
18.	Formula and solution	½ +2.5
19.	Derivation of formula	3
20.	Specific heat capacity at constant volume is C_v Specific heat capacity at constant pressure is C_p Derivation-$\Delta Q=\Delta U + P\Delta V$ If ΔQ is absorbed at constant pressure , then change in internal energy will be the heat used only to increase the temperature of the gas at constant volume that if ΔU whereas the amount of work done will be the heat used to expend the gas to change the volume at constant temperature. $\Delta Q = (Cp)\Delta T = \Delta U + W$ $(Cp)\Delta T = Cv\Delta T + R\Delta T$ (as, $P\Delta V= R\Delta T$) $Cp = Cv + R$	½ ½ ½ ½ ½ ½
21.	Formula and solution	1+2
	Formula and solution	1+2
22.	Calculation of energies and graph of energies	1+1+1
23.	Formula and solution	1+2
24.	Formula Solution Position Nature Size	½ 1+½ ½ ½
25	Diagram + derivation OR (i) Diagram + derivation (ii) Reason	1+1+1 2
26	(a) Diagram, derivation of projectile , angles of projection to get same horizontal range (b) Compare the maximum heights OR (a) Derive relation for centripetal acceleration diagram (b) angular and linear velocities	1+1+1 2 2 1 2
27	State Kepler's law of planetary motion Derivation the second and third law of planetary motion OR Orbital speed orbital velocity time period of a planet	1 4 1 2 2

(Group 1)
BLUE PRINT
Class – XII
Subject – Physics

Time: 3 Hrs **M.M.: 70**

NAME OF UNIT & WEIGHTAGE	1 MARK QUESTION	2 MARKS QUESTION	3 MARKS QUESTION	5 MARKS QUESTION
Electrostatics (08)	-	1	2	
Current Electricity (07)	1	-	2	-
Magnetic Effects of Current &Magnetism (08)	-	1	2-	-
Electro Magnetic Induction &AC (08)	-	-	1	1
E.M.W (03)	1	1	-	-
Ray Optics, Optical Instruments &Wave Optics(14)	2	2	1	1
Dual Nature Of Matter (04)	1	--	1	-
Atoms &Nuclei (06)	-	-	2	-
Solids &Semiconducting Devices (07)	-	1	-	1
Principal of Communication (05)	-	1	1	-

PHYSICS EXAMINATION
Class – XII
Subject – Physics

Time: 3 Hrs **M.M.: 70**

General Instructions:-

i) All questions are compulsory.
ii) There are 26 questions in total. Questions 1 to 5 are very short answer type questions and carry one mark each
iii) Question 6 to 10 are short answer questions and carry two marks each
iv) Questions 11 to 22 are also short answer questions and carry three marks each.

v) Question 23 is value based question carry four marks.

vi) Question 24 to 26 are long answer questions and carry five marks each

vii) There is no choice; however an internal choice has been provided in one question of two marks, one question in three marks and all three questions of five marks each. You have to attempt only one of the choices in such questions

viii) 15 minutes time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer during this period

ix) You may use the following values of physical constants wherever necessary :-

$C = 3 \times 10^{8}$ m/s $h = 6.63 \times 10^{-34}$ Js $e = 1.6 \times 10^{-19}$ C

$\mu_0 = 4\pi \times 10^{-7}$ TmA^{-1} $1/(4\pi\varepsilon_0) = 9 \times 10^{9}$ Nm^{2}C^{-2} $m_e = 9.1 \times 10^{-31}$ Kg

Deutron $= {}_1H^2$ Alpha particle $= {}_2He^4$ Proton $= {}_1H^1$

1 A concave lens of focal length 20 cm is placed in contact with convex lens of same focal length. Find the focal length of the combination. 1

2 Two wires of equal length, one copper and other of manganin have the same resistance. Which wire is thicker why? 1

3 Identify the part of the electromagnetic spectrum does the wavelength 10^{-10} m correspond to? Also mention its one use. 1

4 Mention two advantages of reflecting type telescope over refracting type telescope. 1

5 Show graphically, the variation of the de-Broglie wavelength with the potential through which an electron is accelerated. 1

6 An electron is moving at 10^6 m/s in a direction parallel to a straight conductor carrying current of 5 A, separated by a distance of 10 cm in air. Calculate the force experienced by the electron. 2

OR

A coil of N turns and radius R carries a current I. It is unwound and rewound to make another coil of radius R/2, current remaining the same. Calculate the ratio of the magnetic moments of the new coil the original coil.

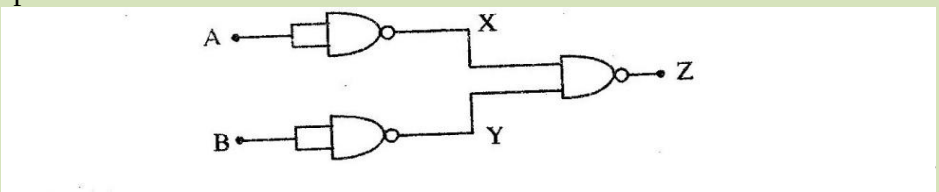
7 An electric dipole is held in a uniform electric field. 2

(i) Show that the net force acting on dipole is zero.

(ii) The dipole is aligned parallel to the field. Find the work done in rotating the dipole through an angle of 180^0.

8 Show that during the charging of a parallel plate capacitor, the rate of change of charge on each plate equals ε_0 times the rate of change of electric flux linked with it. What is the name given to this term? 2

9 You are given a circuit given below. Find the truth table . Hence identify the logic operation carried out the circuit. 2



10 What is sky wave communication and mention its range Why is the mode of propagation restricted to the frequency only up to few MHz? 2

11. Draw the ray diagram of astronomical telescope in normal adjustment. 2

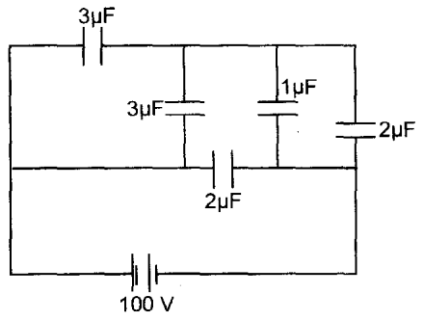
12write four points of difference between interference and diffraction.

13 A potential difference V is applied to a conductor of length l, diameter D. How are the electric field E, the drift velocity v_d and the resistance R affected when, (i) Vis doubled (ii) l is doubled. 3

14 A proton, a deuteron and an alpha particle having the same kinetic energy and allow to pass through a uniform magnetic field perpendicular to their direction of motion Compare the radii of their circular paths. 3

15 State any two important properties of Coherent Sources. Derive the expression for fringe width in Young's double slit experiment of interference pattern. 3

16 Obtain an expression for the capacitance of a parallel plate (air) capacitor. The given figure shows a network of five capacitors connected to a 100V supply. Calculate the total charge and energy stored in the network. 3



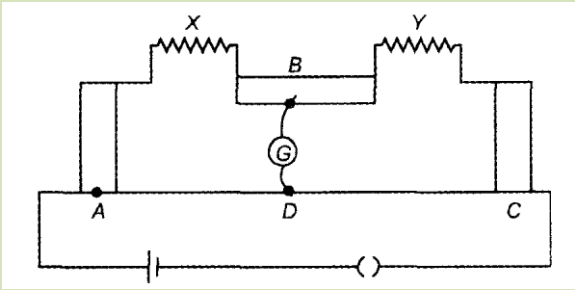
17 Derive the expression for the radius of the nth orbit of hydrogen atom using Bohr' postulates. Show graphically the variation of the radius of the orbit with the Principal quantum number n. 3

18 Obtain an expression for the magnetic moment of an electron moving with a speed v in a circular orbit of radius r. State the rule to find its direction. How does the magnetic moment change when 3
(i) frequency of revolution is doubled
(ii) Orbital radius is halved.

19 Write briefly any two factors which demonstrate the need of Modulation. Draw a suitable diagram to show amplitude modulation using a sinusoidal signal as the modulating signal .Also Define modulating index. 3

20 State Gauss' law. Using it derive expression for electric field due to a uniformly charged spherical shell of radius R for (i) r > R (ii) r< R. Where r is the distance of the point P. Also draw a graph showing variation of electric field with r. 3

21 The figure shows experimental set up of a meter bridge. When the two unknown resistances X and Y are inserted, the null point D is obtained 40 cm from the end A. When a resistance of 10 Ω is connected in series with X, the null point shifts by 10 cm. Determine the values of the resistances X and Y. 3
Find the position of the null point when the 10 Ω resistance is connected in series with resistance 'Y'



22 Obtain the expression for the mutual inductance of a two long co-axial solenoids but having different radii and different number of turnsHow does the mutual inductance of a pair of coils change when 3
(i) The distance between the coils is increased.
(ii) The number of turns in each coil is halved.

23 Two straight long parallel conductors carry currents I_1 and I_2 in the same direction. Deduce the expression for the force per unit length between them. Hence define 1 ampere current. 3

24 Draw a plot of potential energy of a pair of nucleons as a function of their separation. Mark the regions where the nuclear force is (i) attractive (ii) repulsive. Write any two characteristic features of nuclear force. 3

25 State the principle of an a .c. Generator. Explain its working with the help labeled diagram. Also derive expression for the instantaneous value of emf in the rotating coil. 5

OR

A series L-C-R circuit is connected to an A.C. source having voltage $E=E_0 \sin \omega t$. Derive expression for impedance for it. Also find the expression for resonant frequency.

26 Draw a labeled circuit diagram of common –emitter amplifier using n-p-n transistor. Obtain expression for Voltage gain. Draw its input and output wave form. Why common emitter amplifier is preferred over common base amplifier? 5

OR

Draw the circuit diagram of n-p-n transistor as a switch. With the help of graph between input Voltage(V_i) and output Voltage(V_o), explain its working briefly.

27 (a) Obtain lens makers formula using the expression 5

$$n_2/v - n_2/u = (n_2-n_1)/R$$

Here the ray of light propagating from a rarer medium of refractive index(n_1) to a denser medium of refractive index(n_2) is incident on the convex side of spherical refractive surface of radius of curvature R.

(b) How does the focal length of a convex lens vary, if the incident red light is replaced by blue light?

OR

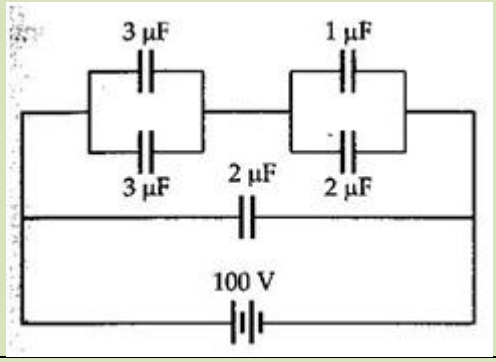
(a) Draw a ray diagram to show refraction of a ray of monochromatic light passing through a glass prism. Deduce the expression for the refractive index of glass in terms of angle of prism and angle of minimum deviation.

(b) Explain briefly how the phenomena of total internal reflection are used in fiber optics.

MARKING SCHEME
Class – XII
Subject – Physics

Time: 3 Hrs **M.M.: 70**

Q. NO.	Value Point/Expected Answer	Marks	Total
1	1/f =1/f1+1/f2 F=0	½ ½	1
2	Manganin wire is thick, because ρ is directly proportional to area	½ ½	1
3	X- rays One application	½ ½	1
4	Any two advantages	½ each	1
5	Correct graph	1	1
6	B= μ0 2I /4π r = 10-5 T F=qvB= 1.6 X 10^{-18} N OR $N_1 R_1 = N_2 R_2$ $N_2 = 2N$ $M_1 / M_2 = (N_1 / N_2) = 1/4$	1 1 1 1	2
7	$F_A = -qE$, $F_B = qE$, $F = F_A + F_B = 0$ W=2PE	1 1	2
8	$q = \varphi\varepsilon_0$ $I = dq/dt = \varepsilon_0 d\varphi/dt$ Displacement current	½ 1 1/2	2
9	Correct Output Table A B Y 0 0 0 1 0 1 0 1 1 1 1 1 OR gate	1 ½ ½	2
10	Definition Range Reason	½ ½ 1	2
11	Labeled diagram	2	2
12	½ mark for one difference	2	2
13	E= V/l, R= ρ l/A $V_d = (eV/ml)\tau$ Case 1:- V is doubled a. E= doubled b. V_d doubled c. R= no change Case 2:- l is doubled a. E= halved b. V_d = halved c. R= double	½ each (6x ½)	3
14	R=mv/qB $R_p/R_d = 1/\sqrt{2}$ Rp/Rα=1/1 $R_p:R_d:R_\alpha = 1:\sqrt{2}:1$	½ 1 1 ½	3
15	Two properties of coherent sources.	1	3

	Derivation $\beta = D\lambda/d$	2	
16	$C_1 = 3+3 = 6\mu F$ $C_2 = 1+2 = 3\mu F$ $C_{12} = 2\mu F$ $C_{eq} = 2+2 = 4\mu F$ $Q = CV = 400\mu C$ $U = 1/2\ CV^2 = 0.04$ J  	½ ½ ½ ½ ½ ½	3
17	Correct Derivation Graph	2 1	3
18	$M = IA = (e/T)\ \pi r^2$ $= \{(e)/(2\pi r/v)\}$ $M = (evr)/2$ a. M becomes doubled. b. M becomes halved .		3
19	Any two factors Three diagrams (modulating ,carrier and modulated wave) Definition of modulation index	1 1 ½ ½	3
20	Statement Diagram Derivation $E_o = 1/(4\pi\varepsilon_0)\ q/r^2$ $E_i = 0$ Graph	½ ½ 1 ½ ½	3
21	$X/Y = 40/60$ $(X+10)/Y = 50/50$ X = 20 Ohm Y = 30 Ohm $x/(y+10) = L/(100 - L)$ L = 100/3 cm	½ ½ ½ ½ ½ ½	3
22	Diagram Derivation (i) decreases (ii) ¼ of its original	½ 1½ ½ ½	3
23	Diagram Derivation $f = (\mu_0/4\pi)\ 2i_1i_2 / r$ Definition of 1 Ampere	½ 1½ 1	3
24	Graph Marking of Range of (a) attractive force & (b) repulsive force Any two characteristics of nuclear force	1 1 1	3
25	Principle Labeled Diagram Working Expression $E = NBA\ \omega \sin \omega t$ OR	1 1 1 2	5
	Phasor's Diagram Expression for impedance $\sqrt{(Z = R^2 + (X_l - X_c)^2)}$ Expression for resonant frequency $f_0 = 1 / (2\prod) \sqrt{LC}$	1 2 2	5

26	Labeled Diagram Expression for voltage gain Input and output wave forms Reason OR Labeled Diagram Graph Working	2 1 1 1 2 1 2	5
27	Labeled Diagram Derivation Decreases because f (focal length) is inversely proportional to refractive index($\mu_v > \mu_r$) OR Labeled Diagram Derivation Working of Optical Fibre.	1 3 1 1 3 1	

(GROUP 2)
CLASS XII PHYSICS (THEORY)
<u>BLUE PRINT</u>

S No	Unit	1 mark	2 marks	3 marks	5 marks	Total
1	Electrostatics Current Electricity	2(1)	2(2)	6(2)	5 (1)	15
2	Magnetic effects of current & Magnetism Electromagnetic induction & Alternating current	1(1)	-------	6(2)	5(1)	16
3	Electromagnetic Wave Optics	1(1)	2(2)	9(3)	5(1)	17
7	Dual Nature of matter	-----	4(2)	6(2)	-------	10
8	Atom & nuclei					
9	Electronic devices	1(1)	2(1)	9 (3)	---	12
10	Communication system					

	Total	5(5)	14(7)	36(12)	15(3)	70(27)

KENDRIYA VIDYALAYA SANGATHAN

(PHYSICS)
Class: XII

Maximum Marks: 70 **Time allowed: 3 Hours**

General Instructions:

(i) All questions are compulsory. There 27 questions in all.
(ii) This question paper has *four*sections :Section A, Section B, Section C and Section D .
(iii) Section A contains *five* questions of *one* mark each, Section B contains *seven* questions of *two* marks each, Section C contains *twelve* questions of *three* marks each, Section D contains *three* questions of *five* marks each.
(iv) There is no overall choice. However, an internal choice has been provided in *one* question of *two* marks, *one* question of *three* marks and all the *three* questions of *five* marks weightage. You have to attempt only *one* of the given choices in such questions.
(v) You may use the following values of physical constants wherever necessary:

$1/4\pi\varepsilon_0 = 9\text{x}10^9\ \text{Nm}^2\text{C}^{-2}$
$h = 6.6 \text{ x } 10^{-34}\text{Js}$
$c = 3 \text{ x } 10^8$ ms-1
$e = 1.6 \text{ x}10^{-19}\text{C}$
$\mu_0 = 4\pi \text{ x } 10^{-7}\ \text{TmA}^{-1}$
$\varepsilon_0 = 8.854 \text{ x } 10^{-12}\ \text{C}^2\ \text{N}^{-1}\ \text{m}^{-2}$
Mass of Proton, $m_p = 1.673 \text{ x}10^{-27}$ Kg

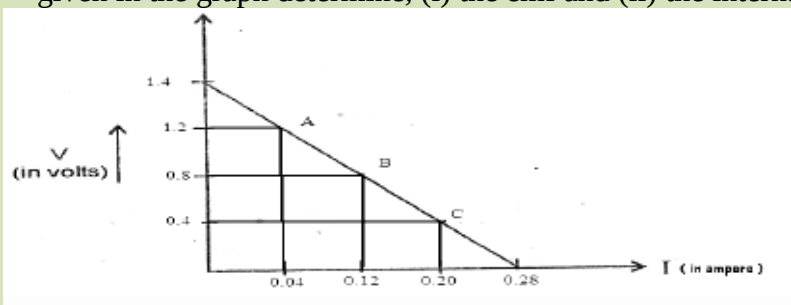
1 a.m.u (U) = 931.5 MeV
Boltzmann's constant. $K = 1.38 \text{ x } 10^{-23}\text{J/K}$
$1\text{eV} = 1.6 \text{ x } 10^{-19}\text{J}$
Avogadro's number $N = 6.023 \text{ x}10^{23}$/mole
Mass of neutron $m_n = 1.675 \text{ x}10^{-27}$ Kg
Mass of electron $m_e = 9.1\text{x}10^{-31}$ Kg

SECTION A

1. Draw equipotential surfaces due to a dipole
2.. How mobility of charge carrier changes with potential difference?
3. What is the unit of L/R.
4. Glass prism has an angle of deviation D in air. What happens to the value of D if the prism is immersed in water?
5. The focal length of an equiconvex lens is equal to the radius of curvature of either face. What is the refractive index of the material of the lens?

SECTION B

6. Potential difference across terminals of a cell were measured (in volts) against different currents (in ampere) flowing through the cell. A graph was drawn which was a straight line ABC. Using the data given in the graph determine, (i) the emf and (ii) the internal resistance of the cell.



7. Draw the labeled diagram of Newtonian Reflecting type telescope. Write any two advantage of reflecting type telescope over refracting type telescope.
8. A proton and an alpha particle have the same velocity. What is the ratio of their de Broglie wavelengths?

9. The half life of a radioactive substance is 30 s. Calculate the decay constant and the time taken for the sample to decay ¾th of the initial value.
10. (a) distinguish between analog and digital forms of communication.
(b) What are repeaters in communication system?

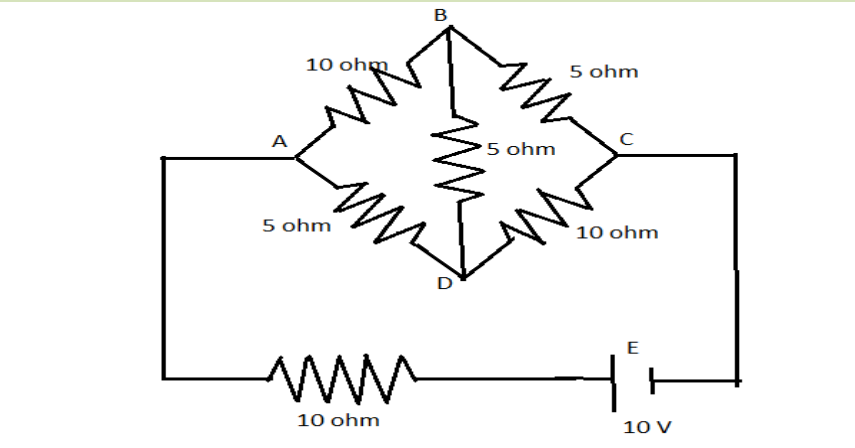
OR

What is sky wave communication? Why is this mode of propagation restricted to the frequencies only upto few MHz?
11. Find the amount of work done in rotating an electric dipole of dipole moment $3x10^{-8}$Cm,from its position of stable equilibrium ,to the position of unstable equilibrium in uniform electric field of intensity 10^4N/C.

12. Define the magnifying power of compound microscope when final image is formed at infinity by must both objective and eyepiece of compound microscope have short focal length? Explain.

SECTION C

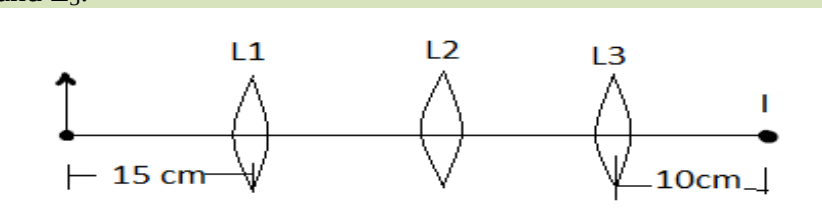
13. A 4μF capacitor is charged by a 200V supply. The supply is then disconnected and the charged capacitor is connected to another uncharged 2μF capacitor. How much electrostatic energy of the system is lost in the process of attaining the steady situation?
14. Determine the current in each branch of the network shown in Fig



15. a) How can a moving coil galvanometer be converted into an ammeter of given range.

b) A galvanometer can be converted into a voltmeter of certain range by connecting a resistance of 980Ω in series with it. When the resistance of 470Ω connected in series, the range is halved. Find the resistance of the galvanometer.

16. Define mutual induction. Derive mutual inductance of two long coaxial straight solenoid but having different radii and different number of turns.
17. Identify the constituent radiation of the electromagnetic spectrum which
a) is used for studying crystal structure.
b) is absorbed by the ozone layer in the atmosphere.
c) produces intense heating effect.
18. Derive lens maker's formula for a convex lens.
19. You are given three lenses L_1 ,L_2 and L_3 each of focal length 10cm. An object is kept at 15cm in front of L_1 , as shown in the fig. The final image is formed at the focus I of L_3 . Find the separation between L_1 , L_2 and L_3.



20. Write Einstein's photoelectric equation and point out any two characteristic properties of photons on which this equation is based.
Briefly explain the three observed features which can be explained by this equation.

OR

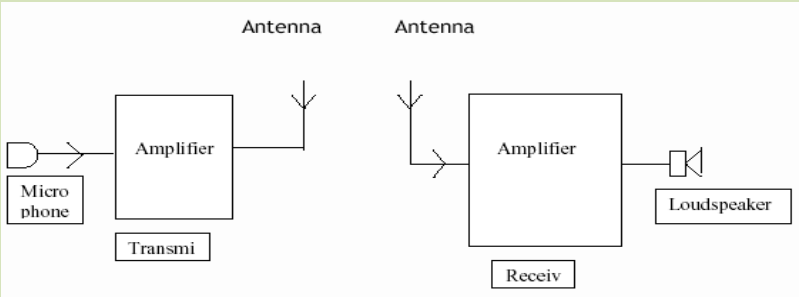
An electron and a photon each have a wavelength 1nm. Find
i).their momenta
ii) the energy of the photon and
iii) the kinetic energy of the electron.

21. Draw a plot of Binding energy per nucleon (BE/A) vs mass number A , for a large number of nuclei lying between 2<A<240. Using the graph explain clearly how the energy is release during nuclear fission and fusion reaction.

22. with the help of circuit diagram explain the working of npn transistor as an amplifier in common emitter configuration.

23. what is zener diode. Explain the working of zener diode as a voltage regulator.Draw its I-V characteristics.

24. A schematic arrangement for transmitting a message signal (20 Hz to 20 kHz) is given below:-
Give two drawbacks from which this arrangement suffers..Describe briefly with the help of a block diagram the alternative arrangement for the transmission and reception of the message signal.



SECTION D

25. In Young's double slit experiment deduce the conditions for (i) constructive, and (ii) destructive interference at a point on the screen. Draw a graph showing variation of the resultant intensity in the interference pattern against position 'x' on the screen.

OR

What is meant by diffraction? Discuss diffraction at a single slit and explain energy distribution. How does diffraction put a limit on the resolving power of an optical instrument?

26. Find the expression for the capacitance of a parallel plate capacitor of area A and plate separation d if i) a dielectric slab of thickness t, and ii) a metallic slab of thickness t, where (t<d) are introduced one by one between the plates of the capacitor. In which case would the capacitance be more and why?

Or

Define electric flux. What is its unit? Show that the electric field intensity at the surface of a charged conductor is given by $E=\sigma/\epsilon_0 n$,where σ is the surface charge density and n is a unit vector normal to the surface in the outward direction.

27. a) Using phasor diagram, drive an expression for the impedance of a series LCR circuit. What do you mean by resonance condition of such a circuit.

b) Describe the use of a series resonant circuit in the tuning of a radio receiver.

OR

Explain with the help of a labelled diagram, the principle, construction and working of a transformer. Why is its core laminated?

Write any two difference between step up and step down transformer

Class XII Physics
(Marking Scheme)

Time Allowed: 3 Hours **Maximum Marks: 70**

SECTION A

1. k depends on nature of medium and choice of units (any one factor) (1)

2. Ring 1 ---clockwise ($\frac{1}{2}$)

   Ring 2----anticlockwise ($\frac{1}{2}$)

3. 

(1)

4. n = 1.47 (must be same) ($\frac{1}{2}$)

   No , it canot be water ($\frac{1}{2}$)

5. Current I = $neAv_d$ (1)

SECTION B

6. Two conditions for TIR

   (i) Light must travel from denser to rarer medium ($\frac{1}{2}$)

   (ii) Incidence angle should be greater than critical angle ($\frac{1}{2}$)

   Since

   $n = \frac{1}{\sin C}$ ($\frac{1}{2}$)

   therefore $\sqrt{2} = \frac{1}{\sin C}$

   or $\sin C = \frac{1}{\sqrt{2}}$ or $C = 45^0$ ($\frac{1}{2}$)

   OR

   a. Since fringe width $\beta = \frac{D\lambda}{d}$, hence if D--- increases so β increases i.e. separation b/w fringes increases (1)

   b. Since fringe width $\beta = \frac{D\lambda}{d}$, Since λ---decreases so β also decreases i.e. fringes comes closer (1)

7. (i) $\alpha = \frac{R-Ro}{Ro\ \theta}$ (1)

   (ii) The resistance of a conductor increases with the rise in temperature due to the increases in collision frequency of electrons with the positive metal ions. (1)

8. Δ E = -0.85-(-3.4) = 2.55 eV ($\frac{1}{2}$)

   Also $\Delta E = \frac{hc}{\lambda} \Rightarrow \lambda = \frac{hc}{\Delta E} = 6.6 \times 10^{-34} \times 3 \times 10^{8} / 2.55 \times 1.6 \times 10^{-19} = 4.853 \times 10^{-7}$ m (1)

   Belongs to Balmer series --- ($\frac{1}{2}$)

9. (a) For briefly explanation of any two common applications of internet ($\frac{1}{2}+\frac{1}{2}$)

   (b) In point-to-point communication mode, communication takes place over a link between a single transmitter and a receiver. Telephony is anexample of such a mode of communication.($\frac{1}{2}$)

   In contrast, in the broadcastmode, there are a large number of receivers corresponding to a singletransmitter.

   Radio and television are examples of broadcast mode ofcommunication. ($\frac{1}{2}$)

10. (i) $r = n\, r_o$

    Or $n = r/r_0 = 21.2 \times 10^{-11} / 5.3 \times 10^{-11} = 4$ (1)

    (ii)$E_n = -13.6/n^2 = -13.6 / 16 = -0.85$eV (1)

11.W=PE(COS$ø_1$ –COS$ø_2$) $ø_1$ =0° (Stable) $ø_2$=180°(unstable)
W=3x10^{-8} x10^4 (cos 0°-cos180°)=6x10^{-4} J.

12. Magnifying power ofof compound microscope is defined as the ratio of angle subtented by final image at the eye to the angle subtented by object at unaided eye.

$m=m_o \times m_e=(L/f \times D/f_e)$

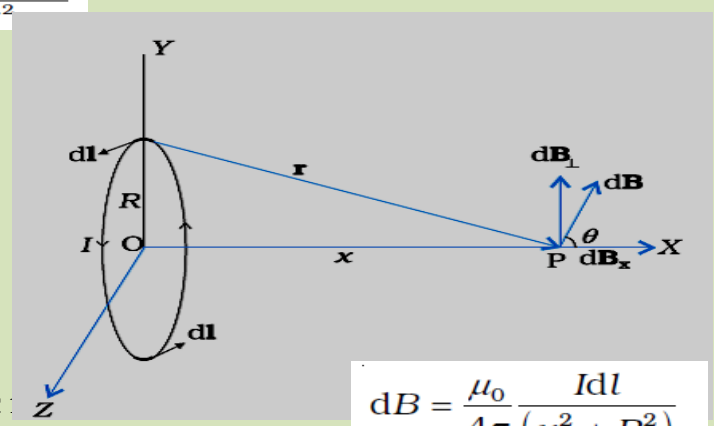
SECTION C

13.For calculating X = 45 Ω (1)
For calculating Y = 30 Ω (1)
For calculating Null point l = 75 cm (1)

14.BiotSavart's Law :-According to this law, the magnetic field due to a small current elent is given by (1)

$$|d\mathbf{B}| = \frac{\mu_0}{4\pi}\frac{I\,dl\sin\theta}{r^2}$$

For correct diagram



For derivation up to magnetic

$$dB = \frac{\mu_0}{4\pi}\frac{Idl}{(x^2+R^2)}$$

($\frac{1}{2}$)

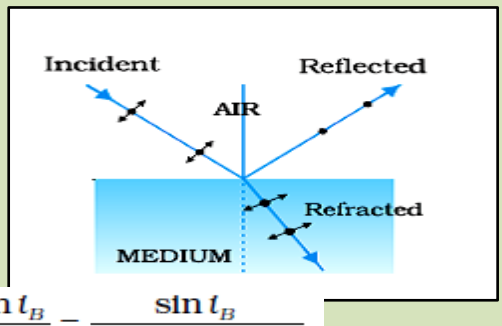
For correct derivation magnetic field due to circular coil on its axis

$$\mathbf{B} = B_x\hat{\mathbf{i}} = \frac{\mu_0 I R^2}{2(x^2+R^2)^{3/2}}\hat{\mathbf{i}}$$

(1)

15.If the vibrations of the waves are randomly in different direction although always perpendicular to the direction of propagation then the light waves are called unpolarized. (1)

For correct diagram & Explanation



($\frac{1}{2}$+$\frac{1}{2}$)

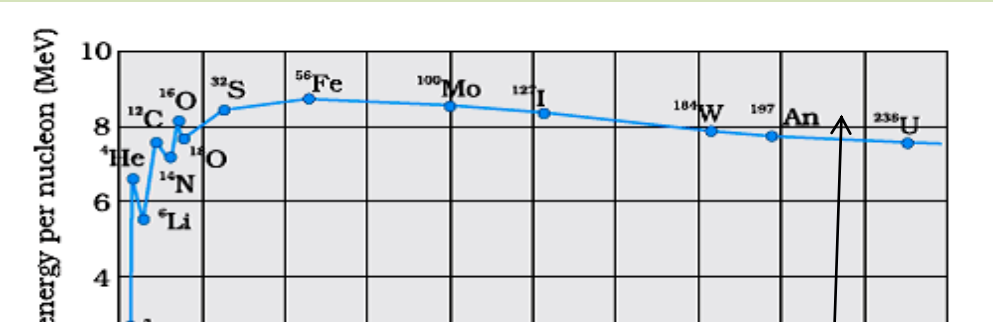
For derivation

$$\mu = \frac{\sin i_B}{\sin r} = \frac{\sin i_B}{\sin(\pi/2 - i_B)}$$

⇨ $\mu = \frac{\sin i_B}{\cos i_B} = \tan i_B$

⇨ i_B = This is known as *Brewster's law.* (1)

16.



($1\frac{1}{2}$)

(i) Prone tofusion (ii) Prone to fission ($\frac{1}{2}$)

Nuclear forces are strongest and short range forces (1)

17.For calculating E = hc/λ = 3.75 eV (1)

As the energy of incident photon is less than the work functions of Mo and Ni, so the metals Mo and Ni will not give photoelectric emission (1)

If the laser is brought closer , intensity of radiation increases. This does not affect the result regarding Mo and Ni , but the photoelectric current will increase for Na and K with the increase in intensity (1)

---

18. (i) For deriving expression for motional emf : ($1\frac{1}{2}$)

$$\varepsilon = \frac{-d\Phi_B}{dt} = -\frac{d}{dt}(Blx)$$

$$= -Bl\frac{dx}{dt} = Blv$$

(ii) For deriving expression for current :I = Blv/R

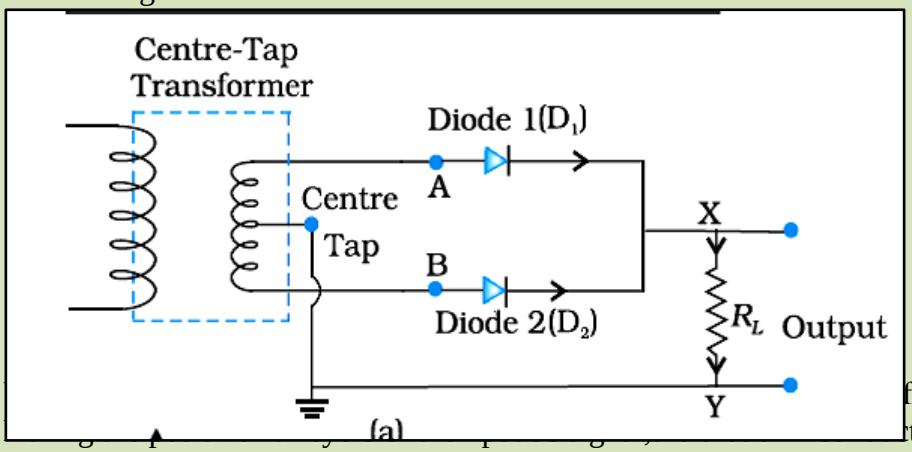
(iii)For deriving expression for force : B^2l^2v/R (1)

---

19. Device X- full wave rectifier . (1/2)

Principle : A diode conducts when it is F.B and do not conduct when it is R.B (1/2)

Circuit diagram



(1)

fullwave rectifier'.

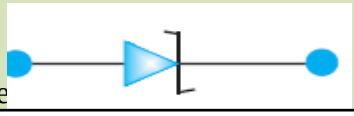
ts andcurrentisthrough A

.During thenegativehalfcycle, the diodeD2 conducts and current is through B (1)

OR

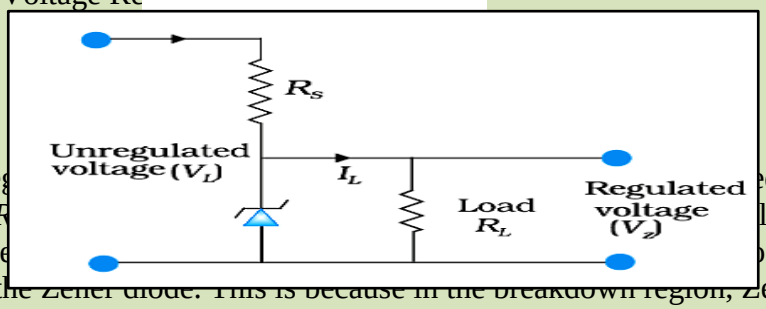
Zener Diode (1/2)

Symbol :



(1/2)

Circuit diagram as Voltage Re



(1)

Working :The unreg ed to the Zener diode through a series resistance R ltage increases, the current through *R*sand Zene ss *R*swithout any change in the voltage across the Zener diode. This is because in the breakdown region, Zener voltage remains constant even though the current through the Zener diode changes. Similarly, if the input voltage decreases, the current through *R*sand Zener diode also decreases. The voltage drop across *R*sdecreases without any change in the voltage across the Zener diode. Thus any increase/

decrease in the input voltage results in, increase/decrease of the voltage drop across *R*swithout any

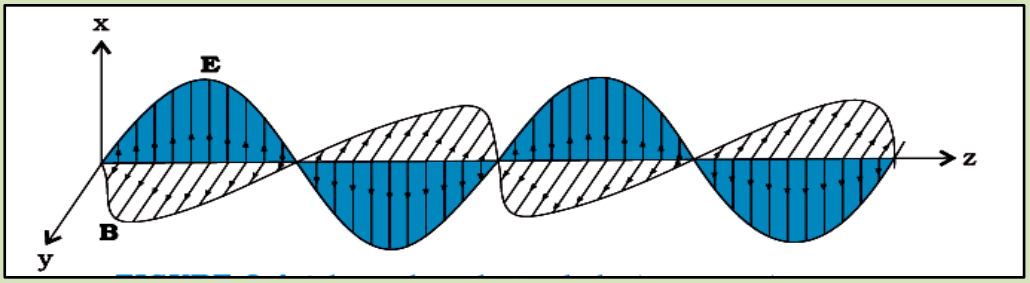
change in voltage across the Zener diode. Thus the Zener diode acts as a voltage regulator. (1)

20. for calculation V_1 = 15 cm (1)
for calculation V_2 = infinity (1)
for calculation V_3= 30cm (1)
(Page 330, NCERT Part II , Example 9.9)

21.(I) Displacement current : the current produced by changing Electric field. (1/2)

$$\varepsilon_0 \left(\frac{d\Phi_E}{dt} \right) = i$$ (1/2)

(ii)

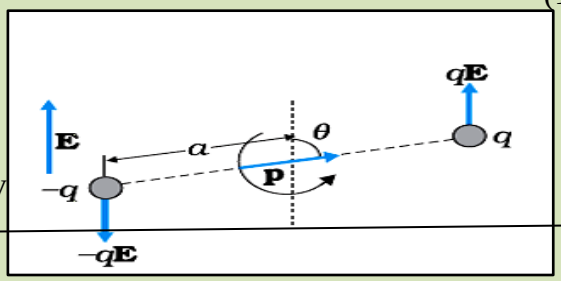


(1)

(iii) Frequency of em waves = frequency of oscillating charge particle = 10^9Hz(1)

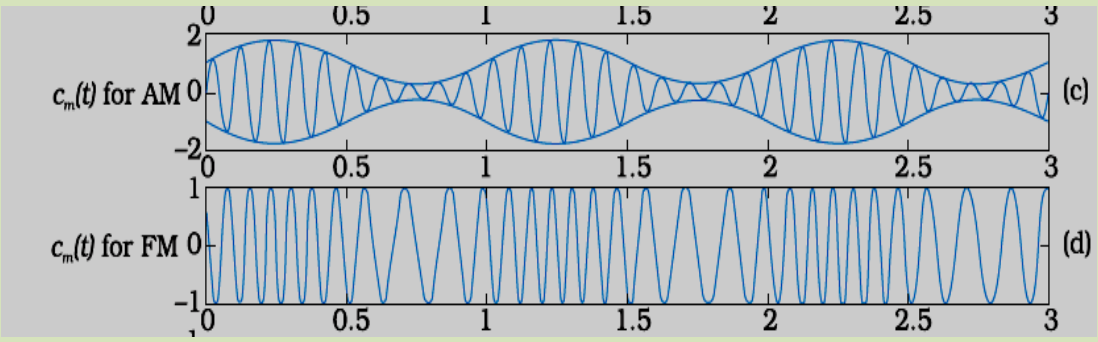
22.There is a force qE on q and a force –qE on –q. Hence net translatory force onthe dipole is zero, since E is uniform. and fig (1/2)

For deriving τ =p E sinΘ
⇨ $\vec{\tau} = \vec{p} \times \vec{E}$ and fig (1 + 1/2)
For identifying any two pairs of perpendicular v



23.For defining Depletion layer
For defing Barrier potential (1)
For Correct explanation on the width of depletion layer (1)
(NCERT Part II , Page 478 & 479)

24. For correct definition AM and FM (1)

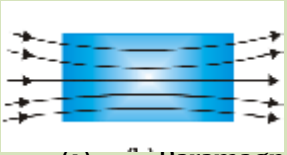


(1)

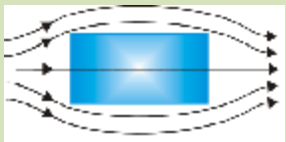
(1)

25.(a) For correct explanation for atom behaving as magnetic dipole (1)
For correct derivation of magnetic moment μ = evr/2 (2)
(NCERT Part –I page 162)

(b)



(i) Paramagnetic



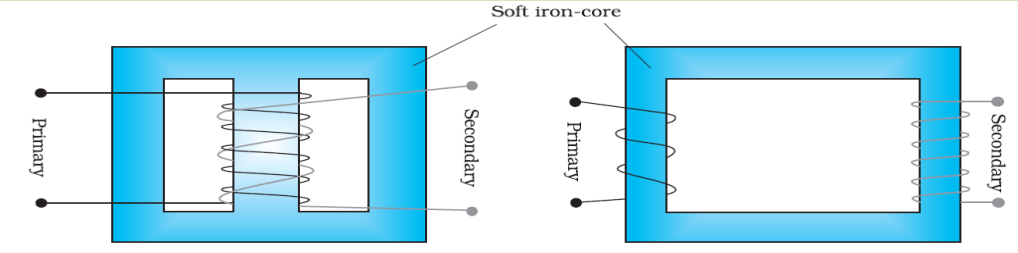
(ii) Diamagnetic

(1)

The above distinguishing feature indicates that diamagnetic substances are repelled by magnetic field and paramagnetic substances are attracted by magnetic field (1)

OR

(a)



(1)

(b) Principle : it is based on Mutual induction (1)

For deriving relation Vs/Vp = Ns/Np (1)

For any two energy losses and their minimisation (1+1)

---

26. (i) For deriving E.F at a point outside the shell and correct figure (2)

$$E = \frac{\sigma R^2}{\varepsilon_0 r^2} = \frac{q}{4\pi\varepsilon_0 r^2}$$

(ii) For deriving E.F at a point on the shell

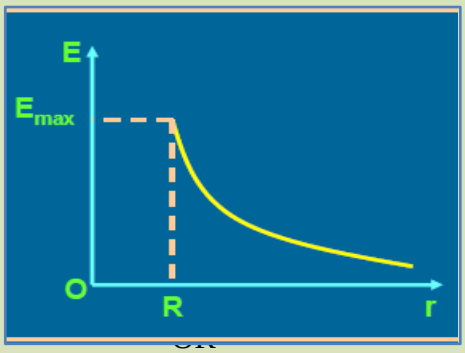
$\boxed{E = q/4\pi\varepsilon_0 R^2}$, R is radius of shell (1)

(iii)For deriving E.F at a point inside the shell

q = 0

⇨ $\boxed{E = 0}$ (1)

For correct graph



(1)

(a) Principle of Capacitor: For correct explanation of principle of capacitor (2)

(b) For Calculating common potential V = 100 V (1)

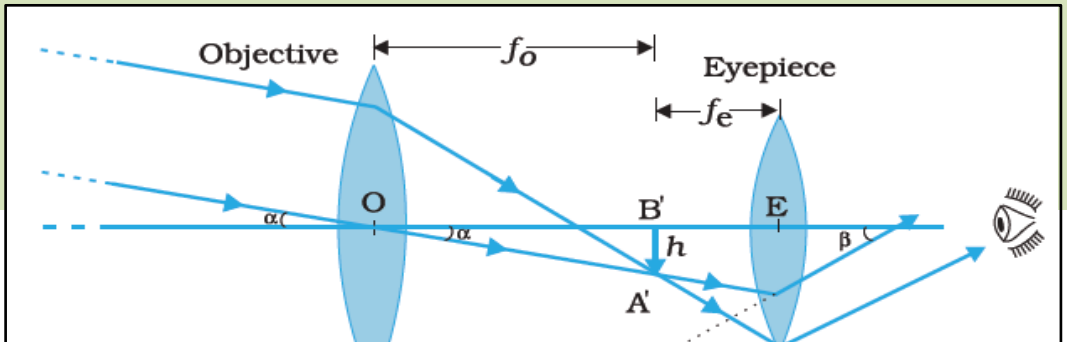
For calculating U_i=12 X 10^{-6}J andU_f = 6 X 10^{-6}J (1)

For calculating Δ U = U_i-U_f = 6 X 10^{-6}J (1)

(NCERT page 2.11 part I)

---

27. (a) The main considerations with an astronomical telescope are its lightgathering power and its resolution or resolving power. (1)



1)

For deriving angular magnification $m = - f_o/f_e$ $(1\frac{1}{2})$

For writing length of telescope $L = f_o + f_e$ (1/2)

(b) For any two advantages (1)

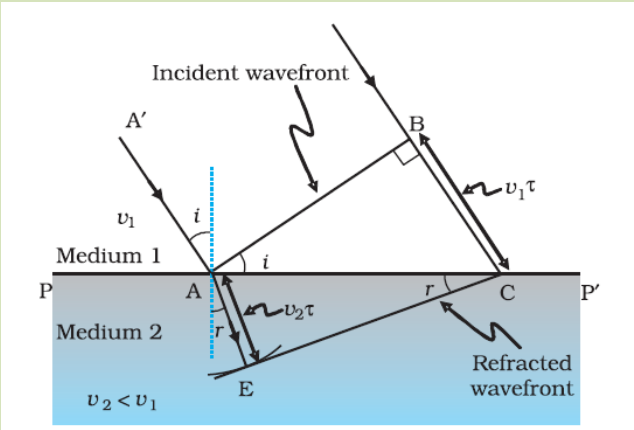
OR

(a) Huygen's Principle :

1. Each point on a wavefront acts as a fresh source of disturbance of light.
2. The new wavefront at any time later is obtained by taking the forward envelope of all the secondary wavelets at that time. (1)

Huygens argued that the amplitude of the secondary wavelets is maximum in the forward direction and zero in thebackward direction; by making this adhoc assumption, Huygens couldexplain the absence of the backwave (1)

(b) Drawing the refracted wave front



$(1\frac{1}{2})$

Obtaining Snell's law of refraction (Fig 10.5 Page 355-356 NCERT book part II) $(1\frac{1}{2})$

GROUP 3

BLUE PRINT FOR MODEL PAPER 2018-19 (CLASS-XII)

S. No.	UNIT	VSA (1 MARK)	SA I (2 MARKS)	SA II (3 MARKS)	LA (5 MARKS)	TOTAL	
1.	Electrostatics			3(1)	5(1)	8(2)	}15
2.	Current Electricity	1(1)		6(2)		7(3)	
3.	Magnetic effect of current & Magnetism	1(1)	4(2)	3(1)		8(3)	}16
4.	Electromagnetic Induction & Alternating current		2(1)	6(2)		8(3)	
5.	Electromagnetic Waves			3(1)		3(1)	}17
6.	Optics	1(1)	2(1)	6(2)	5(1)	14(5)	
7.	Dual nature of Radiation and matter	1(1)		3(1)		4(2)	}10
8.	Atoms and Nuclei	1(1)	2(1)	3(1)		6(3)	
9.	Electronic Devices		2(1)		5(1)	7(2)	}12
10.	Communication systems		2(1)	3(1)		5(2)	
	Total	5(5)	14(7)	36(12)	15(3)	70(27)	

MODEL QUESTION PAPER 2018-19
SUBJECT: PHYSICS
CLASS: XII

TIME: 3HRS **M.M.: 70**

GENERAL INSTRUCTIONS:

(i) All questions are compulsory.

(ii) There are 27 questions in total. Questions 1 to 5 are very short answer type questions and carry one mark each.

(iii) Questions 6 to 12 carry two marks each, questions 13 to 23 carry three marks each, question 23 carries 4 marks and questions 24 to 26 carry five marks each.

(iv) There is no overall choice.

(v) Use of calculators is not permitted. However, you may use log tables if necessary.

(vi) You may use the following values of physical constants wherever necessary:

$c = 3 \times 10^{8}$ m/s
$h = 6.63 \times 10^{-34}$ Js
$e = 1.6 \times 10^{-19}$ C
$\mu_0 = 4\pi \times 10^{-7}$ T m A^{-1}

$\frac{1}{4\pi\epsilon_o} = 9 \times 10^{9}$ N m² C^{-2}
$m_e = 9.1 \times 10^{-31}$ kg

SECTION A

1) A ray of light, incident on an equilateral glass prism ($\mu_g = \sqrt{3}$) moves parallel to the base. Find the angle of incidence for this ray.

2) An α- particle and a proton are moving in a plane of a paper in a region where there is a uniform magnetic field vector B directed normal to the plane of the paper. If the two particles have equal linear momenta, What will be the ratio of radii of their trajectories in the field?
3) Manganin is used for making standard resistors. Why?
4) What will be the ratio of radii of two nuclei of mass numbers 125 and 27?
5) An electron and an alpha particle have same de Broglie wavelength associated with them. Which will have greater Kinetic energy?

SECTION B

6) Write the function of each of the following used in communication system:
   1. Transducer 2. Repeater
7) Calculate the quality factor of a series LCR circuit with L = 2.0 H, C = 2 μF and R= 10 Ω. Mention the significance of quality factor in LCR circuit.
8) The sequence of decay of radioactive nucleus is as given.
   $D \xrightarrow{\alpha} D_1 \xrightarrow{\beta} D_2 \xrightarrow{\alpha} D_3 \xrightarrow{\alpha} D_4$ If the nucleon number and atomic number of D_2 are 176 and 71 respectively, what are their values of D and D_4.
9) A thin prism of refractive index 1.5 produces an angle of minimum deviation 5 degrees for an incident ray of light from air. Calculate the new angle of minimum deviation when the prism is immersed in a liquid of refractive index 1.25.
10) State briefly the processes involved in the formation of p-n junction explaining clearly how depletion region is formed.
11) Name the machine which uses crossed electric and magnetic field to accelerate the ions to high energies. What will happen to the motion of charged particles if the frequency of the alternating voltage is doubled?
12) Show diagrammatically the behavior of magnetic field lines in the presence of paramagnet and diamagnetic substance.

SECTION C

13) Derive an expression for average power in an LCR series circuit connected to a.c. circuit.
    What is the power dissipated in an a.c. circuit in which voltage and current are given by V = 230 sin(ωt + π/2) and I = 10 sinωt ?

14) Write Einstein's photoelectric equation. If the frequency of incident radiation on a photocell is doubled for the same intensity, what change will you observe in (i) photo electric current (ii) stopping potential.

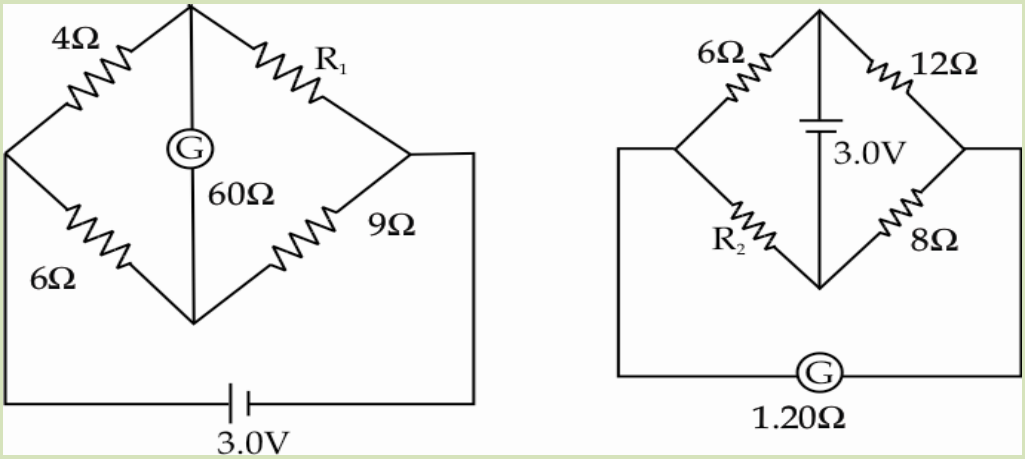
OR

Write two characteristic features observed in photoelectric effect which support the photon picture of electromagnetic radiation.

Draw a graph between the frequency of incident radiation υ and the maximum kinetic energy of the electrons emitted from the surface of photosensitive material. State clearly how this graph can be used to determine Plank's constant and work function of the material.

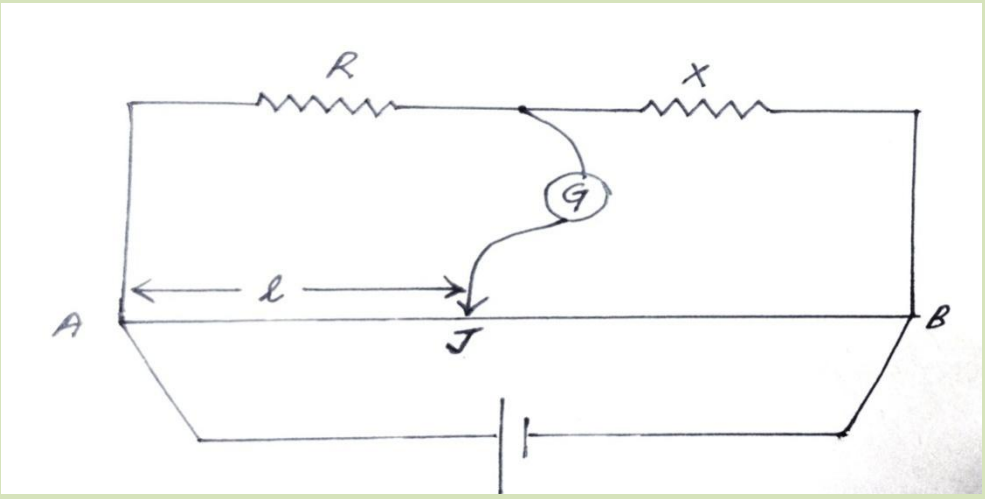
15) State Gauss theorem in electrostatics. Using this theorem, derive the expression for the electric field intensity at any point outside a uniformly charged thin spherical shell.

16) The galvanometer in each of the two circuits does not show any deflection. Find the ratio (R_1/R_2) used in these two circuits.



17) State the principle of working of a meter bridge.

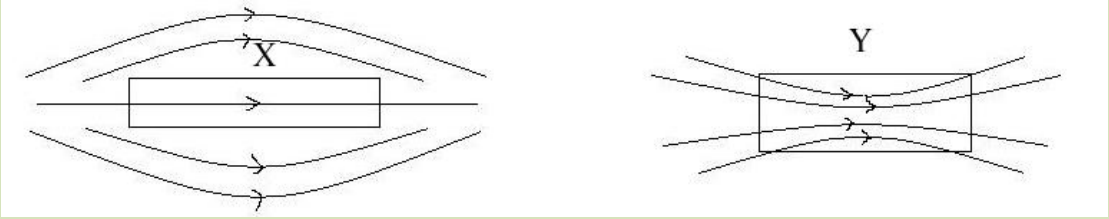
In the meter bridge experiment, balance point was observed at J with AJ = *l*.



(i) The values of R and X were doubled and then interchanged. What would be the new position of balance point?

(ii) If the galvanometer and battery are interchanged at the balance position, how will the balance point get affected?

18) A uniform magnetic field gets modified as shown below, when 2 specimens X&Y are placed in it?



i) Identify the two specimens X&Y.
ii) State the reason for the behavior of the field lines in both cases.
iii) Write the sign of magnetic susceptibly for each specimen.

19) Name the parts of electromagnetic spectrum which is
(a) Suitable for radar system used in aircraft navigation
(b) Used to treat muscular strain
(c) Used as diagnostic tool in medicine.
Arrange their wavelengths in ascending order.

20) A convex lens made up of glass of refractive index 1.5 is dipped, in turn, into (i) a medium of refractive index 1.65, (ii) a medium of refractive index 1.33.
(a) Will it behave as a converging lens or a diverging lens in the two cases.
(b) How will its focal length change in the two media.

21) State Huygen's principle. Using Huygen's principle draw a diagram showing how a plane wave gets refracted when it is incident on the surface separating a rarer medium from a denser medium. Hence verify Snell's law of refraction.

22) What is an AC generator? Give its principle and explain its working with the help of a suitable diagram.

23) Obtain the binding energy per nucleon of the nuclei $_{26}Fe^{56}$ in units of MeV from the following data:-
$m_H = 1.007825$ U
$m_N = 1.008665$ Um($_{26}Fe^{56}$) = 55.934939 U

24) Name the two basic modes of transmission. Which of these modes is used for telephonic communication? Complete the following block diagram depicting the essential elements of a basic communication system.

SECTION D

25) Derive the expression for the energy stored in a parallel plate capacitor of capacitance C with air as medium between its plates having charges Q and –Q. Show that this energy can be expressed in terms of electric field as $1/2\ \varepsilon_0 E^2 Ad$, where A is the area of each plate and d is the separation between the plates. How will the energy stored in a fully charged capacitor change when the separation between the plates is doubled and the dielectric medium of dielectric constant 4 is introduced between the plates(when battery remains connected).

OR

What is an electric dipole? Deduce an expression for the torque acting on an electric dipole placed in a uniform electric field. Hence define dipole moment. An electric dipole of length 2 cm is placed with its axis making an angle of 60° to a uniform electric field of 10^5 NC^{-1}. If it experiences a torque of $8\sqrt{3}$ Nm, calculate the;

(i) Magnitude of charge on the dipole.
(ii) Potential energy of the dipole.

26) (a) What is interference of light? (b) Using Young's Double slit experiment show that the dark and the bright fringes of an interference pattern are of same width.

OR (a) What is diffraction of light? (b) Draw a graph showing the variation of intensity with angle in a single slit diffraction experiment. Write one feature which distinguishes the observed pattern from the double slit interference pattern.

(c) How would the diffraction pattern of a single slit be affected when-?

(i) The width of the slit is decreased.

(ii) Monochromatic source of light is replaced by a source of white light.

27) (a) What is a rectifier? What is its principle? (b) With the help of a circuit diagram explain full wave rectification using junction diodes. Draw the input and output wave forms. (c) The applied input frequency to a rectifier is 50Hz. What will be its output frequency if it is a i) half wave ii) full wave rectifier?

OR Draw a circuit diagram of a common emitter transistor amplifier. Explain its working. Show that the voltage gain, A_V, of the amplifier is given by $A_V = -\frac{\beta_{ac} R_L}{r_i}$, where β_{ac} is current gain, R_L is the load resistance and r_i is the input resistance of the transistor.

What is the significance of the negative sign in the expression for the voltage gain?

ANSWER KEY
SAMPLE PAPER

Q.NO	VALUE POINTS	MARKS
1.	60 degrees	1
2.	r=mv/qb r∝1/q r∝/rp=1/2	½ 1 ½
3.	Temperature coefficient of resistance is low and high value of resistivity	½ 1 ½
4.	5/3	½ ½
5.	electron	1
6.	Correct definition each	1+1
7	Formula of quality factor Correct answer=100 significance	1/2 1 1/2
8	$D_4 \rightarrow$ A=168, Z=67 D $\rightarrow$ A=180, Z=72	½ ½ ½ ½
9	Correct formula	½

	Correct solution	1+ ½
10	Diffusion drift	1 1
11	Correct derivation Power dissipation = 0	2 1
12	Cyclotron Correct formula and reason	½ 1 ½
13	Correct diagram	1 + 1
14	(i)Ip no change (ii)Vs doubles OR Each characteristics Correct graph Plank' constant = slope, work function = y- intercept	$1\frac{1}{2}$ $1\frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}$ 1 $\frac{1}{2}, \frac{1}{2}$
15	1. Statement 2. Correct derivation	1 2
16	From figure (1), $\frac{4}{R1} = \frac{6}{9}$ R1=6Ω From fig(2) $\frac{R2}{6} = \frac{8}{12}$ R_2=4Ω $\therefore \frac{R1}{R2} = \frac{6}{4} = \frac{3}{2}$	1 1 1
17	Correct principle New position 100-l No change	1 1 1
18	X = Diamagnetic material and Y = ferromagnetic material Correct reason Small negative and large positive	1 1 1
19	Corrects names Correct sequence	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$
20	Diverging in (i) and converging in (ii) Correct answers	1+1 1
19	Correct statements Diagram Correct verification	1 1 1
20	Correct name Correct principle Diagram	½ 1 ½

	working	1
21	DM=(26Mp+30Mn)-M Mass defect Δm=0.528461 B.E= Δm*931.5 MeV =492.26 MeV B.E/nucleon =492.26/56=8.79 MeV	½ ½ 1 1
22	i)Point to point mode ii)broadcast mode iii)Point to Point Transmitter → Medium → Receiver	 ½ + ½ ½ ½ + ½ + ½
24	Correct derivation Correct proof Correct answer OR Correct definition Correct derivation Correct definition of dipole moment (a) Correct answer (b) Correct answer	$2\frac{1}{2}$ 1 $1\frac{1}{2}$ ½ 2 1/2 1 1
25	Definition Interference figure Derivation OR Diffraction –Definition Graph Difference Effect on changes	1 1 3 1 1 1 2
26	Rectifier Principle Figure Explanation Wave forms Half wave 50Hz Full wave 100 Hz. OR Circuit Working Correct derivation Significance of negative sign	1 1 ½ ½ ½ ½ ½ ½ 1 1 2 1

GROUP 4
BLUE PRINT

SUBJECT-PHYSICS **CLASS XII**

S No	Unit	VSA 1 mark	SA 2 marks	SA 3 marks	LA 5 marks	TOTAL
1	Electrostatics	2(2)	2(1)	6(2)	5(1)	15(6)
2	Current Electricity					
3	Magnetic effects of current & Magnetism	-	2(1)	9(3)	5(1)	16(5)
4	Electromagnetic induction & Alternating current					
5	Electromagnetic Wave	1(1)	2(1)	9(3)	5(1)	17(6)
6	Optics					
7	Dual Nature of Radiation and Matter	-	4(2)	6(2)	-	10(4)
8	Atom & Nuclei					
9	Electronic Devices	2(2)	4(2)	6(2)	-	

10	Communication System					12(6)
	Total	5(5)	14(7)	36(12)	15(3)	70(27)

MODEL QUESTION PAPER

2018-19

SUBJECT-PHYSICS **CLASS XII**

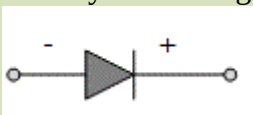
TIME ALLOWED: 3 HOURS M.M. : 70

(a)This question paper consist of four sections A, B, C, and D .All questions are compulsory.
(b)There 27 questions in total. Questions 1 to 5 carry one mark each, questions 6 to14 carry two marks each, questions 15 to 24 carry three marks each, and questions 25 to 27 carry five marks each.
© There is no overall choice. However, an internal choice has been provided in one question of two marks and one question of three marks and all the three questions of five marks each. You have to attempt only one of the given choices in such questions.
(d)Use of calculators is not permitted.
(e)You may use the following physical constants wherever necessary:

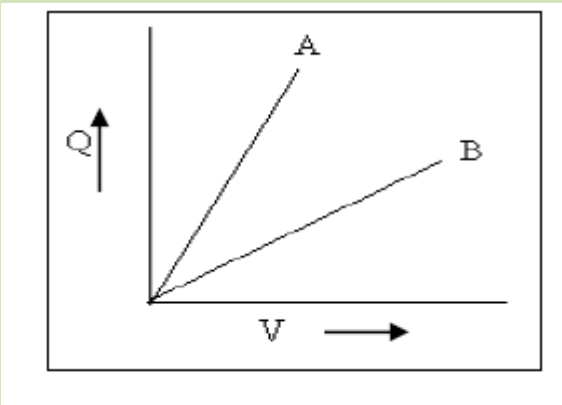
$1/4\pi\varepsilon_0 = 9x10^9\ Nm^2C^{-2}$
$h = 6.6x10^{-34}Js$
$c = 3x10^8\ ms-1$
$e = 1.6x10^{-19}C$
$\mu_0 = 4\pi\ X\ 10^{-7}\ TmA^{-1}$
Mass of electron $m_e = 9.1x10^{-31}$ Kg

1 a.m.u (U = 931.5 MeV
Boltzmann's constant. $k=1.38x10^{-23}J/K$
$1eV = 1.6x10^{-19}J$
Avogadro's number $N = 6.023x10^{23}$/mole
Mass of neutron $m_n = 1.6x10^{-27}$ Kg

1) If the radius of the Gaussian surface enclosing a charge halved, how does the electric flux through the Gaussian surface change?
2) What happens to the drift velocity (v_d) of electrons and to the resistance R if length of a conductor is doubled by stretching (keeping potential difference unchanged)?
3) In Young's double slit experiment if the distance between two slits is halved and distance between the slits and the screen is doubled , then what will be the effect on fringe width?
4) Identify the biasing given in the figure

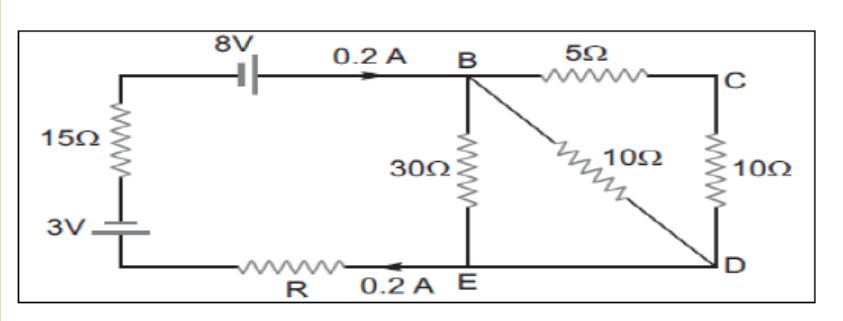


5) What is the function of a 'Repeater' used in communication system?
6) The given graph shows the variation of charge Q versus potential difference V for capacitors C1 and C2. The two capacitors have same plate separation, but the plate area of C2 is double than that of C1.Which of the lines in the graph correspond to C1 and C2 and why?



7) How is the mutual inductance of a pair of coils affected when:
(i) Separation between the coils is increased?
(ii) The number of turns of each coil is increased?

8) Electromagnetic waves with wavelength
   (i) λ_1 are used to treat muscular strain.
   (ii) λ_2 are used by a FM radio station for broadcasting
   (iii) λ_3 are used to detect fracture in bones
   (iv) λ_4 are absorbed by the ozone layer of the atmosphere.
   Identify and name the part of electromagnetic spectrum to which these radiations belong.
9) The equivalent wavelength of a moving electron has the same value as that of a photon of energy 6×10^{-17} J. Calculate the momentum of the electron.
10) How does one explain, using de Broglie hypothesis, Bohr's second postulate of quantization of orbital angular momentum?
11) What do the terms 'depletion region' and 'barrier potential' mean for a p-n junction?
12) What is ground wave communication? Explain why this mode cannot be used for long distance communication using high frequencies.
13) Define electric dipole moment. Write its S.I unit. Derive an expression for dipole field intensity at any point on the axial line of an electric dipole.
14) Calculate the value of the resistance *R* in the circuit shown in the figure so that the current in the circuit is 0.2 A. What would be the potential difference between points *B* and *E*?



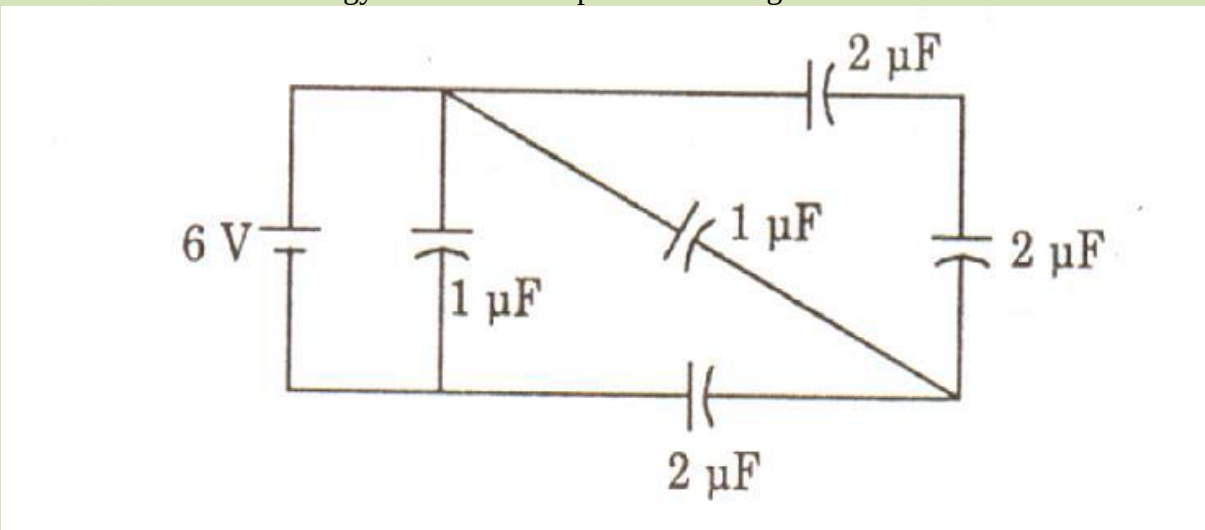
15) The susceptibility of a magnetic material is -2.6×10^{-6}. Identify the type of magnetic material and state its two properties.
16) Define the term magnetic moment of a current loop. Write the expression for magnetic moment when an electron revolves at a speed v around an orbit of radius r in hydrogen atom.
17) (a) For an a.c., $i = i_m \sin \omega t$, show that the average power dissipated in a resistor R over a complete cycle is $\frac{1}{2} i_m^2 R$
   (b) A light bulb is rated at 100 W for a 220 V a.c. supply. Calculate the resistance of the bulb.
18) What do electromagnetic waves consists of?
   Suppose that the electric field part of an electromagnetic wave in vacuum is
   $E = [(3.1 \times 10^4 \text{ N/C}) \cos \{(1.8 \text{ rad /m})\, y + (3.14 \times 10^6 \text{ rad /s})\, t\}]\hat{i}$.
   (i) What is the frequency?
   (ii) In which direction is the wave travelling?
19) Discuss briefly refraction from rarer to denser medium at a convex spherical refracting surface when the image formed is real.
   Prove that $\frac{n_2}{v} - \frac{n_1}{u} = \frac{n_2 - n_1}{R}$
20) (a) In a double slit experiment using light of wavelength 600 nm, the angular width of the fringe formed on a distant screen is 0.1°. Find the spacing between the two slits.
   (b) Light of wavelength 5000 Å propagating in air gets partly reflected from the surface of water. How will the wavelengths and frequencies of the reflected and refracted light be affected
21) Write Einstein photoelectric equation and use it to explain:
   (i) Independence of maximum energy of emitted photoelectrons from intensity of incident light,
   (ii) Existence of threshold frequency for emission of photoelectrons.
22) Define the terms decay constant and half-life of a radioactive sample. Derive the relation connecting the two.
23) Write two important considerations used while fabricating a Zener diode.
   Explain, with the help of a circuit diagram, the principle and working of a Zener diode as voltage regulator
24) What does the term LOS communication mean? Name the types of waves that are used for this communication. Which of the two-height of transmitting antenna and height of receiving antenna - can affect the range over which this mode of communication remains effective?

OR

Distinguish between ‘point to point’ and ‘broadcast’ communication modes. Give one example of each.

25) Obtain an expression for the capacitance of a parallel plate (air) capacitor.

Find the total energy stored in the capacitors in the given network

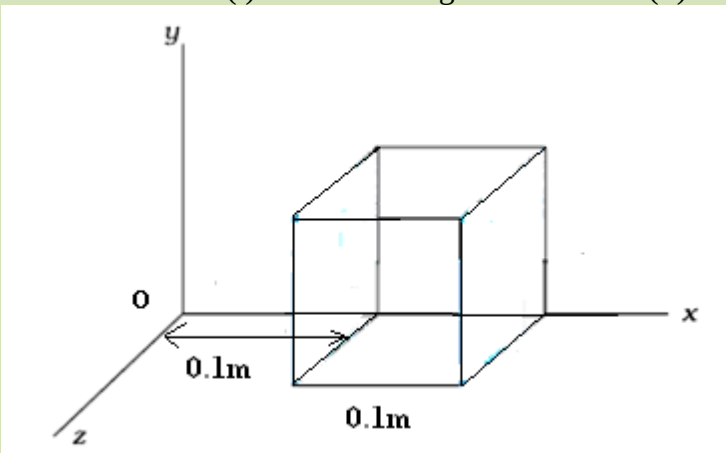


Or

Use Gauss’s law to obtain an expression for the electric field due to an infinitely long straight uniformly charged wire. The electric field components due to a charge inside the cube of side 0.1m are as shown:

Ex = αx .where α = 500 N/Cm, Ey =0, Ez =0

Calculate (i) the flux through the cube and (ii) the charge inside the cube.



26) State the principle of cyclotron and draw a labeled diagram of it

(b) Using Biot- Savart’s law, derive the expression for the magnetic field due to a current carrying circular loop of radius R, at a point which is at a distance x from its center along the axis of the loop.

Or

State the law which relates to generation of induced emf in a conductor being moved in a magnetic field.

Apply this law to obtain an expression for the induced emf when one ‘rod’ of a rectangular conductor is free to move in a uniform, time independent and ‘normal’ magnetic field.

Apply the concept of the Lorentz (magnetic) force acting on a moving charge to justify the expression obtained above.

27) Draw a ray diagram showing the image formation by a compound microscope. Hence obtained expression for total magnification when the image is formed at infinity.

(b) A figure divided into squares, each of size 1 mm^2, is being viewed at a distance of 9 cm through a magnifying lens of focal length 10 cm, held close to eye. What is the magnification produced by the lens? How much is the area of each square in the virtual image?

or

(a) Use Huygens' principle to show the propagation of a plane wavefront from a denser medium to a rarer medium. Hence find the ratio of the speeds of wavefronts in the two media.

(b) (i) Why does an unpolarised light incident on a polaroid get linearly polarised ?

(ii) Derive the expression of Brewster's law when unpolarised light passing from a rarer to a denser medium gets polarised on reflection at the interface.

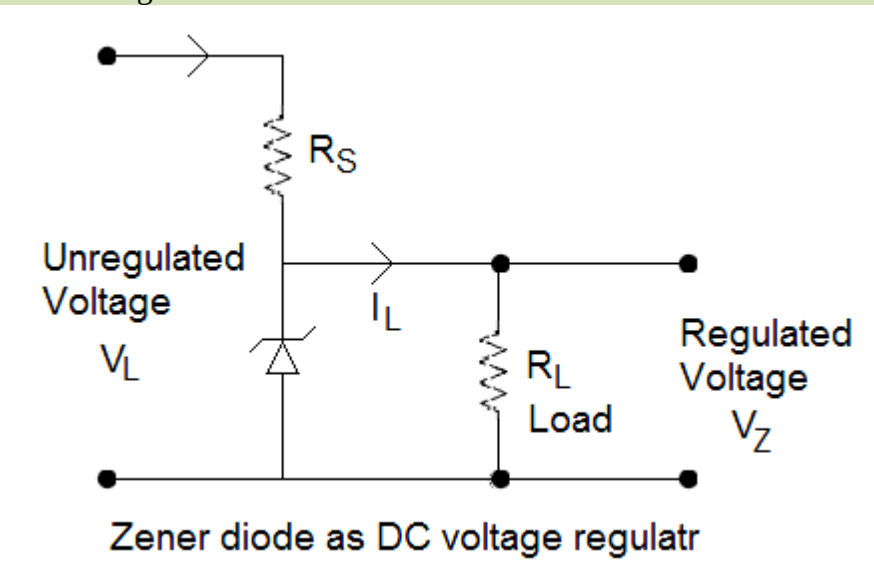
MARKING SCHEME- SELECTION TEST

PHYSICS CLASS XII

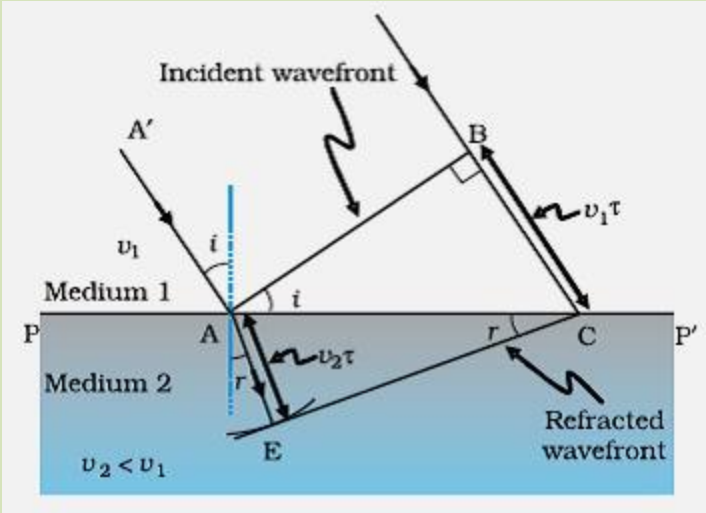
1	No change	1	1
2	v_d halved and R becomes four times)	½, ½	1
3	fringe width increases four times $\beta = \frac{\lambda D}{d}$	1	1
4	Reverse bias	1	1
5	A repeater picks up a signal, amplifies it, and re transmits it, thereby extending the range of a communication system. Alternatively Amplifies and retransmits the signal.	1 Or 1	1
6	$C = \frac{\varepsilon_0 A}{d}$	1	
			2

	As plate area of C2 is double to that of C1 i.e. C2 = 2 C1 Slope of Q-V graph = $\frac{Q}{V} = C$, As slope of A is greater than of B, so A corresponding to larger capacitance and B to smaller capacitance. So lines corresponding to C1 and C2 are B and A respectively	1	
7	(i) When the separation between the two coils is increased, the flux linked with the secondary due to the current in the primary, decreases. Hence the mutual inductance decreases. (ii) Mutual inductance increases when the number of turns in each coil is increased, because M ∝ N1N2	1 1	2
8	λ1 = Ultra violet waves, λ2 = Radio waves, λ3 = Infra red rays, λ4 = microwaves	½+½ +½+½	2
9	Photon: $h\nu = E = \frac{hc}{\lambda}$ or $\lambda = \frac{hc}{E}$ Electron: $\lambda = \frac{h}{p}$ $\therefore \frac{h}{p} = \frac{hc}{E}$ or $p = \frac{E}{c} = 2\times10^{-25} kgms^{-1}$	½ ½ 1	2
10	Writing $2\pi r = n\lambda$ De Broglie formula $\lambda = \frac{h}{p}$ Getting Bohr‟s second postulate	½ ½ 1	2
11	Definition	1+1	2
12	In ground wave communication, the e.m. wave glides over the earth‟s surface. At high frequencies, the rate of energy dissipation of the signal increases and the signal gets attenuated over a short distance. <u>Alternatively</u> As the ground wave glides over the earth surface, its changing magnetic field induces an electric current, on the surface. At higher frequency the rate of variation (of magnetic field) is larger inducing a larger current, so energy dissipation of the signal is more. So the higher the frequency the more rapid is the signal alternation.	1 1 Or 1 1	2
13	Def & unit derivation	½+½ 2	3
14	5Ω and 10Ω are in series $R_{BCD} = 5\Omega + 10\Omega = 15\Omega$ Now, R_{BCD}, 10 Ω and 30 Ω are in parallel $\frac{1}{R_{BE}} = \frac{1}{15} + \frac{1}{10} + \frac{1}{30} = \frac{2+3+1}{30} = \frac{6}{30} = \frac{1}{5}$ $R_{BE} = 5\Omega$ $(15 + 5 + R) \times 0.2 = 8 - 3 = 5$ $(20 + R) = 25$ R= 5Ω ∴ Potential difference $V_{BE} = I$R= 0.2× 5 = 1 V	2 1	3

15	The magnetic material having negative susceptibility is diamagnetic in nature. Two properties: (i) This material expels the magnetic field lines. (ii) They have the tendency to move from stronger to weaker part of the external magnetic field. (iii) Such substances are repelled by a bar magnet.	1 1 1	3
16	Definition, Derivation	1 2	3
17	**1.** a) Average power consumed in resistor R $$P_{av} = \frac{1}{T}\int_0^T i^2 R\, dt$$ $$= \frac{i_m^2 R}{T}\int_0^T sin^2 \omega t\, dt$$ $$= \frac{i_m^2 R}{2T}\int_0^T (1 - \cos 2\,\omega t\,)dt$$ $$= \frac{i_m^2 R}{2T}\left[\int_0^T dt - \int_0^T \cos 2\,\omega t\, dt\right]$$ $$= \frac{i_m^2 R}{2T}[T - 0]$$ $$= \frac{i_m^2 R}{2}$$ (b) in case of ac $$P_{av} = \frac{V_{rms}^2}{R} = \frac{V_{eff}^2}{R}$$ $$\Rightarrow R = \frac{V_{rms}^2}{P_{av}} = \frac{220 \times 220}{100}$$ $$= 484\ \Omega$$	2 1	3
18.	Electric & magnetic fields perpendicular to each other, Freq=5x10^5 Hz, wave travelling along y-direction	1 1 1	3
19	Diagram , derivation	1 2	3
20	(a) Angular width of fringes $$\theta = \frac{\lambda}{d}$$ where d = separation between two slits Here θ=0.1^o=0.1×$\frac{\pi}{180}$ radian $$\therefore d = \frac{600 \times 10^{-9} \times 180}{0.1 \times \pi} m$$ $$= 3.43 \times 10^{-4} m$$ $$= 0.34\ m$$ (b) For Reflected light: For air, $\mu_{air} = 1$ Wavelength remains same i.e, $\lambda_a = \frac{\lambda}{\mu_{air}} = 5000$ Å $= 5000 \times 10^{-10}$m	1	3

	Frequency remains same i.e, $\nu = \frac{c}{\lambda} = \frac{3\times10^8}{5000\times10^{-10}} = 6\times10^{14}\text{Hz}$ For Refracted light: For water, $\mu_{water} = 1.33$ $\lambda_{water} = \frac{\lambda}{\mu_{water}} = \frac{5000\ \text{Å}}{1.33} = 3759\times10^{-10}\text{m}$ i.e, Wavelength decreases Frequency remains same i.e, $\nu = \frac{c}{\lambda} = \frac{3\times10^8}{5000\times10^{-10}} = 6\times10^{14}\text{Hz}$	2	
21	K.E max $= \frac{1}{2}mv^2 = hv - \phi_0$ (i) Number of photoelectrons emitted per second from a metal surface depends on the number of photons incident on that surface in one second. If intensity of the incident radiations in increased therefore the number of photoelectrons emitted increases. Therefore K.E max is independent of the incident lights intensity. (ii) If $< v_0$, K.E max is negative which is impossible.	1 1 1	3
22	Decay constant may be defined as the reciprocal of time during which the number of radioactive atoms of a radioactive substance falls to 37% of its original value. The half-life of a radioactive substance is defined as the time during which half of the atoms of the radioactive substance present will disintegrate. Relation between them $T = \frac{0.693}{\lambda}$	½ ½ 2	3
24	Two important considerations Heavy doping of both p and n sides Appropriate „break down voltage" under reverse bias Circuit diagram  Principle: Even small reverse bias voltage (5V) can produce a very high electric field because the depletion region is very thin Working - The unregulated DC voltage is connected to the Zener diode through a series resistance RS such that the Zener diode is reverse biased. In break down region, the Zener voltage remains constant even though the current through Zener diode changes.	½ ½ ½ ½ 1	3

	This helps to regulate the output voltage		
25	Line Of Sight Communication Space Waves Both Height of transmitting antenna and height of receiving antenna. OR Point-to-point communication mode: In this mode, communication takes place over a link between a single transmitter and a receiver. For example Telephony Broadcast mode: In this mode, a large number of receivers corresponding to a single transmitter. Radio and television are examples of broadcast mode of communication.	1 1 1 Or 1½ 1½	3
26	$C = \frac{\epsilon_0 A}{d}$ 3.6 x 10 $^{-5}$ J Or $E = \frac{\lambda}{2\pi\epsilon_0 r}$ (i) 0.5 Nm^2/C (ii) 44.2 x 10 $^{-12}$ C	2 3 Or 3 2	5
27	Principle Labelled diagram Derivation Or Statement of Faraday's law of e-m induction Derivation of the expression for induced emf 'Justification' on the basis of the concept of Lorentz's force	1 1 3 Or 1 2 2	5
27	a) correct ray diagram and expression for image b) area of each square (i.e, object) = 1 mm^2 u = 9cm, f = +10 cm For a thin lens $\frac{1}{v} = \frac{1}{f} + \frac{1}{u} = \frac{1}{10} - \frac{1}{9} = \frac{1}{90}$ V=90 cm Magnification, $m = \frac{v}{u} = \frac{90}{9} = 10$ Area of each square in the virtual image =(10)^2 X 1 mm^2 = 100 mm^2	1 2 2	

	a)  Proving $\frac{V_2}{V_1} = \frac{Sin_i}{Sin_r}$ b) (i) Reason (ii)Brewster law	or 1 2 1 1	5

Group 5 <u>Blue Print of Question Paper</u>

S.No.	UNITS	VSA	SA -1	SA -2	LA	MARKS
1	ELECTROSTATICS AND CURRENT ELECTRICITY	2(2)	2 (1)	6(2)	5 (1)	15(6)
2	MAGNETIC EFFECT OF ELECTRIC CURRENT AND MAGNETISM EMI AND AC	1(1)	4(2)	6(2)	5 (1)	16(6)
3	ELECTROMAGNETIC WAVES OPTICS	1(1)	2 (1)	9(3)	5(1)	17 (6)
4	DUAL NATURE OF MATTER & RADIATION ATOM & NUCLEI	-	4 (2)	6(2)	-	10(4)
5	SEMI-CONDUCTORS COMMUNICATION SYSTEMS	1(1)	2 (1)	9(3)		12(5)
	TOTAL	5(5)	14(7)	36(12)	15(3)	70(27)

Kendriya Vidyalaya Sangathan
2018-19
Class : XII

Time : 3.00 hrs. **Subject : Physics** **Max. Marks 70**

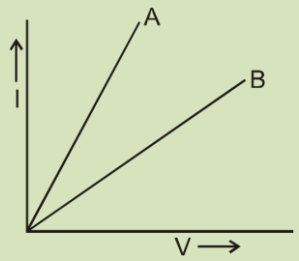
General instructions ;

(i) All questions are compulsory. There are 27 questions in all.
(ii) This question paper has four sections : Section A, Section B, Section C and Section D.
(iii) Section A contains five questions of one mark each, Section B contains seven questions of two marks each, Section C contains twelve question of three marks each and Section D contains three questions of five marks each.
(iv) There is no overall choice. However, an internal choice has been provided in one question of two marks, one question of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
(v) Use log tables, if necessary. Use of calculators is not allowed.

$c = 3 \times 10^8$ m/s $h = 6.63 \times 10^{-34}$ Js
$e = 1.6 \times 10^{-19}$ C $\mu_0 = 4\pi \times 10^{-7}$ T m A^{-1}
$\varepsilon_0 = 8.854 \times 10^{-12}$ C^2 N^{-1} m^{-2}
$m_e = 9.1 \times 10^{-31}$ kg Mass of neutron = 1.675×10^{-27} kg
Mass of proton = 1.673×10^{-27} kg

SECTION-A

1. Define reactance of a capacitor. Write its S.I. unit?
2. Why do the electrostatic field lines not form closed loops?
3. Which basic mode of communication is used for telephonic communication?
4. Two metallic resistors are connected first in series and then in parallel across a d c supply. plot of I-V graph is shown for the two cases, Which one represents a parallel combination of the resistors and why?



5. For the same angle of incidence, the angle of refraction in two media A and B are 25º and 35º respectively. In which medium is the speed of light less?

SECTION-B

6. How does one explain, using de Broglie hypothesis, Bohr's second postulate of quantization of orbital angular momentum?

7. The equivalent wavelength of a moving electron has the same value as that of a photon of energy 6×10^{-17} J. Calculate the momentum of the electron.

8. Distinguish between 'intrinsic' and extrinsic' semiconductors.

9. One day Sarita was playing with a magnet. She observers that when it falls freely through metal pipes of various thicknesses and same length time of fall is found different .Give the reason ?

10 You are given two converging lenses of focal length 1.25 cm and 5 cm to design a compound microscope. If it is desired to have a magnification of 30, find out the separation between the objective and the eyepiece.

OR

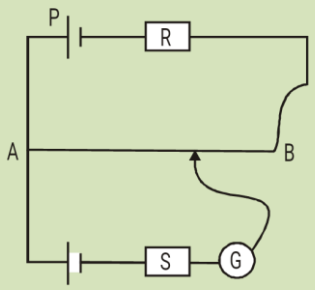
A small telescope has an objective lens of focal length 150 cm and eyepiece of focal length 5 cm. What is the magnifying power of the telescope for viewing distant objects in normal adjustment?

If this telescope is used to view a 100 m tall tower 3 km away, what is the height of the image of the tower formed by the objective lens?

11. In the potentiometer circuit shown, the null point is at X. State with reason, where the balance point will be shifted when.

(a) resistance R is increased, keeping all other parameters unchanged.

(b) resistance S is increased, keeping R constant.



12 While passing through a road Sonam observers that some sound is coming from a cubical device mounted over four electric poles.Name the device and give the reason behind sound.

SECTION - C

13. How are the following types of electromagnetic waves produced?

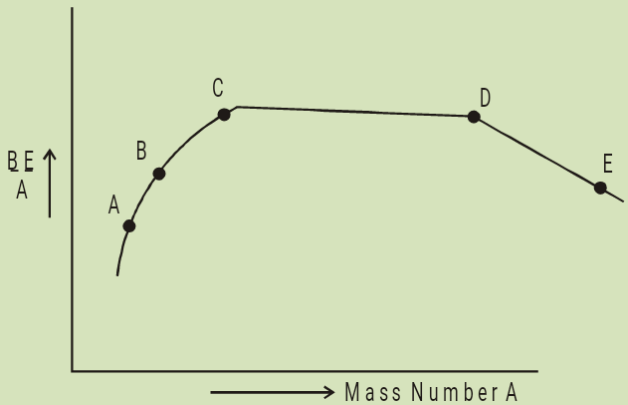
(i) Microwaves

(ii) Infra-red waves

Write two important uses of each of the above electromagnetic radiations.

14. An object is placed 15 cm in front of a convex lens of focal length 10 cm. Find the nature and position of the image formed. Where a concave mirror of radius of curvature 20 cm should be placed so that the final image is formed at the position of the object itself?

15. (a) The figure shows the plot of binding energy (BE) per nucleon as a function of mass number A. The letters A, B, C, D and E represent the positions of typical nuclei on the curve. Point out, giving reasons, the two processes (in terms of A, B, C, D and E), one of which can occur due to nuclear fission and the other due to nuclear fusion.



(b) Explain with example, whether the neutron-proton ratio in a nucleus increases or decreases during a β - decay

16. In the study of Geiger- Marsdon experiment on scattering of α-particles by a thin foil of gold, draw the trajectory of α-particles in the coulomb field of target nucleus. Explain briefly how one gets the information on the size of the nucleus from this study.
From the relation $R = R_0 A^{1/3}$, where R_0 is constant and A is the mass number of the nucleus, show that nuclear matter density is independent of A.

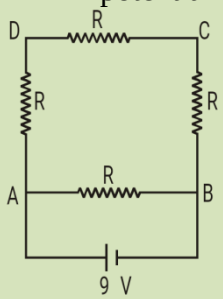
OR

(1) State Radioactive disintegration law and derive the expression for instantaneous number of undecayedatoms left in the sample.
(2) Define (a) Half life time (b) disintegration constant & relate them.

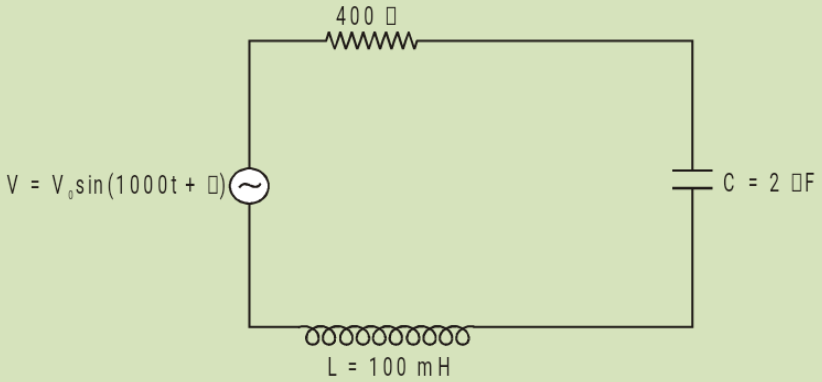
17. Draw a block diagram of a detector for AM signal and show, using necessary processes and the waveforms, how the original message signal is detected from the input AM wave.

18. A potential difference V is applied across a conductor of length L and diameter D. How is the drift velocity, v_d, of charge carriers in the conductor affected when (i) V is halved, (ii) L is doubled and (iii) D is halved? Justify your answer in each case.

19. A 16 ohm resistance wire is bent to form a square. A source of emf 9V is connected across one of its sides as shown. Calculate the current drawn from the source. Find the potential difference between the ends C and D. If now the wire is stretched uniformly to double the length and once again the same cell is connected in the same way, across one side of the square formed, what will now be the potential difference across one of its diagonals?



20. (a) Determine the value of phase difference between the current and the voltage in the given series LCR circuit.



(b) Calculate the value of the additional capacitor which may be joined suitably to the capacitor C that would make the power factor of the circuit unity.

21. Draw a circuit diagram to study the input and output characteristics of an n-p-n transistor in common emitter configuration. Explain briefly how this arrangement is used to obtain the typical input/output characteristics of a transistor. Draw the graphs showing the nature of input/output curves.

22. (a) Explain with the help of a diagram, how depletion region and potential barrier are formed in a junction diode.
(b) If a small voltage is applied to a p-n junction diode how will the barrier potential be affected when it is (i) forward biased, and (ii) reverse biased?

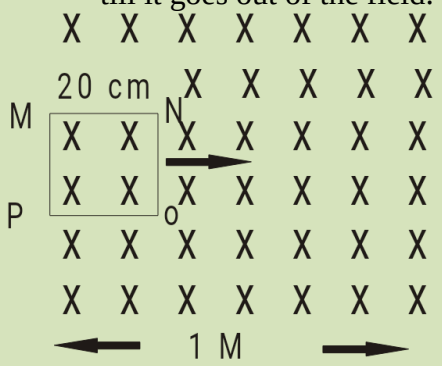
23. Answer the following questions :
(a) In a double slit experiment using light of wavelength 600 nm, the angular width of the fringe formed on a distant screen is 0.1°. Find the spacing between the two slits.
(b) Light of wave length 5000 Å propagating in air gets partly reflected from the surface of water. How will the wave lengths and frequencies of the reflected and refracted light be affected?

24. Draw a schematic sketch of a cyclotron. Write its working principle. Obtain the necessary mathematical expressions to show how this machine is used to accelerate charged particles.

SECTION - D

25. a) Define self- inductance of a coil. Obtain an expression for the energy stored in a solenoid of self-inductance 'L' when the current through it grows from zero to 'I'

b) A Square loop MNOP of side 20 cm is placed horizontally in a uniform magnetic field acting vertically downwards as shown in the figure. The loop is pulled with a constant velocity of 20cm/s till it goes out of the field.



i) Depict the direction of the induced current in the loop as it goes out of the field. For how long would the current in the loop persist?

ii) Plot a graph showing the variation of magnetic flux and induced emf as a function of time.

OR

a) Draw the magnetic field lines due to a circular loop of area A carrying current I .Show thatit acts as a bar magnet of magnetic moment (I x A).

b) State Ampere's circuital law. Using it show that the magnetic field B at a distance r outside the straight infinite wire carrying current I is given by $B = \mu_0 I/(2\pi r)$

26. (a) Define a wavefront.

(b) Using Huygens' principle, draw the diagrams to show the nature of the wavefronts when an incident plane wavefront gets

(i) reflected from a concave mirror

(ii) refracted from a convex lens.

(c) Draw a diagram showing the propagation of a plane wavefront from rarer to a denser medium and verify Snell's law of refraction.

OR

(a) A concave mirror produces a real and magnified image of an object kept in front of it. Draw a ray diagram to show the image formation and use it to derive the mirror equation.

(b) A beam of light converges at a point P. Now a lens is placed in the path of the convergent beam 12 cm from P. At what point does the beam converge if the lens is

(i) aconves lens of focal length 20 cm?

(ii) a concave lens of focal length 16 cm?

27. (a) Define electric flux. Write its SI unit.

'Gauss's law in electrostatics is true for any closed surface, no matter what its shape or size is." Justify this statement with the help of a suitable example.

(b) Use Gauss's law to prove that the electric field inside a uniformly charged spherical shell is zero.

OR

(a) Derive the expression for the energy stored in a parallel plate capacitor. Hence obtain the expression for the energy density of the electric field.

(b) A fully charged parallel plate capacitor is connected across an uncharged identical capacitor. Show that the energy stored in the combination is less than that stored initially in the single capacitor.

****

MARKING SCHEME & VALUE POINT

S.No.	Value points	Marks	Total Marks
1.	Definition	½	1
	Unit Ohm	½	
2.	Correct Explanation	1	1
3.	Point to Point Communication	1	1
4.	Line A	½	1
	Correct Reason	½	
5.	In Medium A	½	1
	Correct Reason	½	
6.	Correct Explanation	2	2
7.	Correct Calculation Method	1½	2
	Ans 2×10^{-25} kg m/sec	½	
8.	Two correct differences	1 × 2	2
9.	Due to eddy current &explaination	1 × 2	2
10.	Correct Calculations	1½	2
	Result L = 6.25 cm	½	
	OR		
	Correct Calculation for M	½	2
	M = 30 cm	½	
	Correct Calculation for H	½	
	H = 0.05 m	½	
11.	(a) Correct Explanation	½	2
	Ans Increases	½	
	(b) Correct Explanation	½	
	Ans No change	½	
12	transformer and correct reason for sound.	1 × 2	2
13.	Name of device for each	½ × 2	3
	Two uses of each	½ × 4	
14.	Correct Calculation for V	½	3
	V = 30 cm	½	
	Nature - real	½	
	Correct calculation for D	½	
	D = 50 cm	½	
	Ray diagram	½	
15.	(a) For fission E is broken into C & D	½	3
	Reason	½	
	for fusion A & B give C	½	
	Reason	½	
	(b) decreases& explanation	½ × 2	
16.	Correct Diagram	1	3
	Any Two information	½ × 2	
	Derivation for density	½	
	Correct Explanation	½	
	OR		
	Statement & Derivation	1½	3

	Definitions & Relation	1½	
17.	Block Diagram	1	3
	Wave Diagram	1	
	Correct explanation	1	
18.	(i) Correct Explanation - result halved 1	3	
	(ii) Correct Explanation - result halved 1		
	(iii) Correct Explanation- result no change 1		
19.	Correct calculation for each	1½	3
	Ans. : I = 3 amp ; V_{CD} = 3 Volt ; $V_{Diagonal}$ = 6 Volt	1½	
20.	Correct Calculation	1	3
	(a) θ = 45	½	
	(b) Condition applied $X_L = X_C$& Correct Calculation	1	
	Ans C = 8 μF added with 2μF	½	
21.	Circuit Diagram	1	3
	Correct Explanation	1	
	Diagram for each	½ × 2	
22.	Diagram & explanation	1+1	3
	Explanation for Barrier potential		
	(1) decrease& (2) increases	½ × 2	
23.	Correct calculation for spacing= 0.34 mm	1	3
	Correct Explanation for wave length & Frequency into two cases	½ × 4	
24.	Diagram	1	3
	Principle	½	
	Expressions	1½	
25	(a) Definition	½	5
	Energy derivation	2	
	(b) Current clockwise	½	
	Calculation for t = 1 se		
	Correct Diagram	1	
	OR		
	(a) Lines of Force	1	5
	Correct Derivation	1	
	(b) Ampere's Law	1	
	Correct Derivation	2	
26.	(a) Definition	1	5
	(b) Two Diagrams for each	1	
	(c) Diagram	1	
	Correct verification	2	
	OR		
	(a) Diagram, mirror formula Derivation	1+2	5
	(b) correct Calculation into two cases		
	V_1 = 7.5 cm , V_2 = 48 cm	1 × 2	
27.	(a) Definition of flux with its unit	1	5
	Justification	2	
	(b) Correct Derivation	2	
	OR		
	(a) Expression for energy	2	5
	Expression for Energy density	1	
	(b) Correct Explanation	2	

QUESTION BANK FOR XI(Physics)

1. UNITS AND MEASURMENT

1. What do you mean by order of magnitude of a quantity?[1]
2. How do you find the order of magnitude of a quantity?[1]
3. What does RADAR mean?[1]
4. Which type of waves are used in SONAR?[1]
5. Which method is used to find the height of a tower or that of a mountain?[1]
6. Which is the most accurate clock? [1]
7. What is the difference between mass and weight? [2]
8. Are inertial and gravitational mass of an object different from one another? [2]
9. State the underlying principle of the reflection methods of measuring distances. How is this idea used in RADAR and SONAR? [3]
10. Explain, how the distance of nearby stars can be measured by parallax method? Why cannot the method be used for very distant stars? [3]

Topic-Error Analysis

1. The mass of a body as measured by two persons is 10.2kg and 10.23kg. Which one is more accurate and why?
2. Precisions describe the limitation of the measuring instrument. Is the statement false?
3. If $F = X^2$,find the relative error in F?
4. Round off to four significant figures (i) 36.879 (ii) 1.0084
5. What is the percentage error in volume of a sphere, when error in measuring its radius is 2%?
6. Find the relative error in Z if $Z=\frac{A^4B^{1/3}}{CD^{3/2}}$
7. The resistance R is the ratio of potential difference V and current I. What is the percentage error in R if V is (100 ± 5)V and I is (10±2)A?
8. If displacement of a body is S = (200±0.5)m and time taken by it is t =(20 ± 0.2) s, then find the percentage error in the calculation of velocity.
9. The voltage across a lamp is V = (6.0 ± 0.1) volt and the current passing through it I = (4 ±0.2) ampere. Find the power consumed by the electric lamp. Given that power, P = VI
10. The sides of a rectangle are (10.5 ± 0.2)cm and (5.2 ± 0.1) cm. Calculate its perimeter with error limits.
11. It is required to find the volume of a rectangular block. A vernier calliper is used to measure the length, width and height of the block. The measured values are found to be 1.37cm,4.11cm and 2.56 cm respectively. Calculate correctly, the volume of the block.
12. The diameter of a wire as measured by a screw gauge was found to be 1.328,1.320,1.325, 1.334 and 1.336cm. Calculate (i) mean value of diameter (ii) absolute error in each measurement (iii) mean absolute error (iv)fractional error (v) percentage error (vi) diameter of wire.
13. Show that the maximum error in the quotient of two quantities is equal to the sum of their individual fractional error.
14. What is meant by significant figures? Give any four rules for counting significant figures.
15. The Time period of oscillation of simple pendulum is given by $t = 2\pi\sqrt{\frac{l}{g}}$. What is the accuracy in the determination of g if 10cm length is known to 1mm accuracy and 0.5s ,time period is measured for time of 100 oscillations with a watch of 1 s resolution ?

16. Two resistors of resistance $R_1 = (100 \pm 3)\Omega$ and $R_2 = (200 \pm 4)\Omega$ are connected (i) in series, (ii) in parallel. Find the equivalent resistance of the (i) series combination (ii) parallel combination. Use the relationfor (i) $R = R_1 + R_2$ and for (ii) $\frac{1}{R'} = \frac{1}{R_1} + \frac{1}{R_2}$ and $\frac{\Delta R'}{R'^2} = \frac{\Delta R_1}{R_1^2} + \frac{\Delta R_2}{R_2^2}$

2. KINEMATICS

Q1. What does the slope of v-t graph indicate?
Q2. Under what condition the average velocity equal to instantaneous velocity?
Q.3.The position coordinate of a moving particle is given by $x=6+18t+9t^2$(x in meter, t in seconds) what is it's velocity at t=2s
Q4. Give an example when a body moving with uniform speed has acceleration.
Q5. Two balls of different masses are thrown vertically upward with same initial velocity .Height attained by them are h_1 and h_2, respectively what is h_1/h_2?
Q6. State the essential condition for the addition of the vectors.
Q7. What is the angle between velocity and acceleration at the peak point of the projectile motion?
Q8. What is the angular velocity of the hour hand of a clock?
Q9. What is the source of centripetal acceleration for earth to go round the sun?
Q10. What is the average value of acceleration vector in uniform circular motion?

Topic-Vectors

1. Write the expression for resultant of two vectors obtained from parallelogram law.

2. Name the law of addition of two co-initial vectors.
3. When is displacement not a vector quantity?
4. Define rectangular components of a vector.
5. Write the expression for direction of resultant of two vectors obtained from parallelogram law.
6. How to combine vectors of magnitude 5 and 12 to get a vector of magnitude (i) 17 (ii) 13 (iii) 7?
7. Is it possible that the sum and difference of two vectors has same direction?
8. Under what conditions, the sum and the difference of two vectors will have same magnitude?
9. What is the condition for vectors to be (i) perpendicular (ii) parallel?
10. Is a quantity having a magnitude and direction always a vector?
11. Write expression for(i) scalar (dot) product (ii)vector (or cross) product of two vectors.
12. What is the condition for two vectors to be parallel or anti-parallel?
13. What is the condition for three vectors to be coplanar?
14. Is it possible that resultant of two vectors of equal magnitude has same magnitude as the two vectors have?
15. What are (i) parallel vectors(ii) equal vectors (iii)coplanar vectors (iv)collinear vectors (v) negative vectors (vi) null vector (vii) unit vector
16. What is the magnitude of a scalar multiple of a vector?
    What is the geometrical significance of (i) dot product (ii) cross product of two vectors ?
17. Is it possible to add vectors representing force of 5 newton and 200 dyne?
18. Can the flight of a bird be an example of composition of vector?
19. Can a vector be zero, if one of its components is not zero?
20. Can any of the components of a given vector have greater magnitude than that of the vector itself?

22. State the parallelogram law of vector addition. Derive an expression for the magnitude and direction of the resultant of two vectors using this law.

23. Explain how a vector can be resolved into two rectangular components in a plane.

24.Two vectors **A** and **B** are inclined to each other at an angle Θ. Using triangle law derive an expression for resultant.

25.Find the value of λ so that the vector $\vec{A} = 2\hat{\imath} + \lambda\,\hat{\jmath} + \hat{k}$ and $\vec{B} = 4\hat{\imath} - 2\hat{\jmath} - 2\hat{k}$ are perpendicular to each other.

26. What is the angle made by î +j with x-axis?

27. Prove that when the angle between two vectors of equal magnitude is 2 π/3,the magnitude of their resultant is equal to either of them.

28. Why is it easier to pull a roller than to push it ? Explain by resolution of vectors.

TOPIC-RELATIVE VELOCITY

1. Define term relative velocity.
2. A man moving in rain hold his umbrella inclined to the vertical even through the rain drops are falling vertically downwards. Why ?
3. A boy walks to his school at a distance of 6 km with constant speed 2.5 km/hr and walks back with a constant speed of 4km/hr. What is average speed for the round trip in km/hr? (Ans:-40/13 km/hr)
4. When two bodies move uniformly towards each other,the distance between them decreases by 6 metres/second. If Both the bodies move in the same direction with their same speeds, the distance between them increases by 4 meter/second. What are the speeds of the two bodies. (Ans:- u=5 m/s , v=1 m/s)
5. On a certain day, rain was falling vertically with a speed of 35m/s. A wind started blowing after sometime with a speed of 12m/s in east to west direction. In which direction should a boy waiting at the bus stop hold his umbrella? (Ans:- 19 degree towards east, with the vertical)
6. To a driver going east in a car with a velocity of 40km/, a bus appear to move towards north with a velocity of $40(3)^{1/2}$ km/h. What is the actual velocity and direction of motion of the bus? (Ans:- 80 km/h ,30 degree east of north)
7. To a person moving eastwards with a velocity of 48km/h, rain appears to form vertically downwards with a speed of 6.4km/h. Find the actual sped and the direction of the rain? (Ans:- 8 km/h 53 degree 7’ 33”)
8. Rain is falling vertically with a speed of 30m/s, a women rides a bicycle with a speed of 30m/s in the north to south direction. What is the relative velocity of rain w.r.t. the women? What is the direction in which she should her umbrella to protect herself from the rain? (Ans:- Vrw=31.6 m/s , 18 degree 26 ‘ with vertical towards south)
9. A man can swim with a speed of 4km/h in still water how long does he take to cross the river 1km wide if the river flows steadily at 3km/h and he makes his strokes normal to the river current? How far from the river does he go,when he reaches the other bank?(Ans:- t=15 min, distance=0.75 km)
10. A train of 150m length is going towards north direction at a speed of 10m/s. A parrot flies at a speed of 5m/s towards south direction parallel to the railway track. Find the time taken by the parrot to cross the train. (Ans:-10 s)
11. The speedometer of a car moving eastward reads 50 km/h. It passes another car which travels westward at 50 km/h (i) Do both the cars have same speed?

(ii)Do they have the same velocity?
(iii)What is the relative velocity of car A w.r.t car B.
(Ans:-100 km/h due east)

12. What do you understand by relative velocity of an object w.r.t another? Obtain an Expression for the relative position of the two objects at time t in terms of their velocities and positions , when motion take place along a straight line.

3. LAWS OF MOTION

1. Which Newton’s laws of motion,gives the definition of force ?

2. A bus weighing 900 kg is at rest on the bus stand. What is the linear momentum of the bus?
3. State the law of conservation of linear momentum.
4. Define impulse and give its SI unit.
5. On what principle, a rocket works?
6. Will the momentum remain constant if some external force acts on the system?
7. Discuss the reaction in the following cases

(i) Person walking along the ground
(ii) a book lying on the desk

8. Why we beat the carpet with a stick to remove dust particles?
9. Whya passenger fall backward when a bus suddenly starts moving from rest position?
10 Why a cricket player lowers his hands while catching a cricket ball?
11 Two bodies of unequal masses moves with same velocity. Which body has large momentum? Explain.
12 Action and reaction are equal and opposite. Why cannot they cancel each other?
13 Why a gun recoils back when it is being fired?
14 Why it is easier to pull a body than to push?
15 A bullet of mass 200 g fired from a gun moving with a velocity of $20ms^{-1}$ hits a wooden log. The bullet stops after travelling a distance of 40 cm in the wooden log. Calculate the retarding force exerted by the log on the bullet.
16 A car of mass 1000 kg is moving with a speed of 36 km h^{-1} on a level road. Calculate the retarding force required to stop the car in a distance of 50 m.
17 A boy of mass 30 kg climbs on a rope which can withstand a maximum tension of 400 N. The rope will break if the child

(i)Climbs up with an acceleration of 4 ms^{-2}.
(ii) Slips down with an acceleration of 6 ms^{-2}.
(iii) Climbs up with a uniform speed of 2 ms^{-2}. Given g = 10 ms^{-1}.

18.A spring balance is attached to the ceiling of a lift. When the lift is at rest spring balance reads 50 kg of a body hanging on it. What will be the reading of the balance if the lift moves :-
(i) Vertically downward with an acceleration of 5 ms^{-2}
(ii) Vertically upward with an acceleration of 5 ms^{-2}
(iii) Vertically upward with a constant velocity.
Take g = $10m/s^2$.

19. A machine gun of mass 10 g bullets at the rate of 10 bullets per second with a speed of 500 $ms^{-1.}$ What force is requiredto hold the gun in position kg fires 20?

20.State Newton's2^{nd} law of motion. Prove that Newton's 2nd law is the real law of motion.

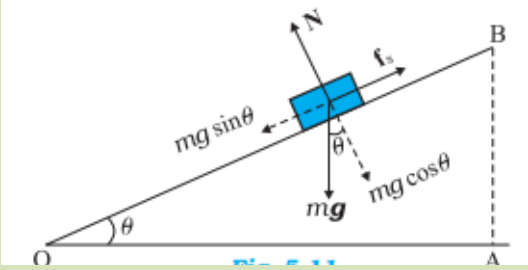
21.Assume a pulley and a massless rope. On one end there is a 10.0kg mass. On the other there is a 34.5kg mass. What is the acceleration of the 34.5kg mass?

22.Define impulse and derive impulse – momentum theorem.

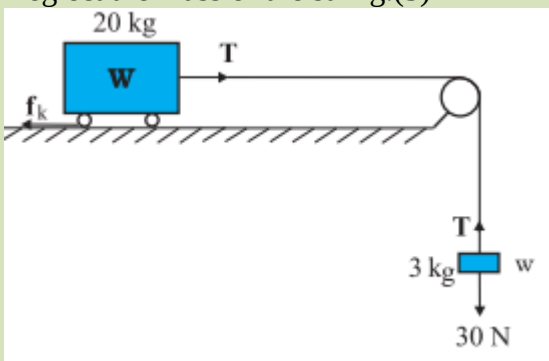
TOPIC-FRICTION

1. Define friction .
2. Define angle of friction and angle of repose . Show that both are numerically equal.
3. Why is the body of aeroplane streamlined ?
4. What do you understand by the term – impending motion .
5. State the absolute unit of force in CGS system and relate it with SI unit of force.
6. Why do we express Newton's second law in component form .

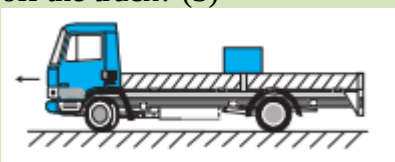
7. List two implication as of newton's second law .
8. A table tennis ball and a cricket ball are moving with same velocity. Which one is easier to catch and why?
9. What is the need of banking a road ? A 1000 kg of car goes round a circular curve on a flat road of radius 50m at a speed of 15km/h,will it be able to move without skidding? Given μ=0.60 . Deduce an expression for the angle of banking.
10. Derive an expression for the velocity of a car on a banked circular road having coefficient of friction = μ hence find the expression for optimum velocity .
11. The distance covered by a body of mass 2 kg is given by x(t)= pt + qt^2 + rt^3 , where p , q , r are 3,4,5 respectively . Find the force acting on body at t = 2s.
12.A shell of mass 200 g is ejected from a gun of mass 4 kg by an explosion that generates 1.05 kJ of energy.Find initial velocity of the shell.
13. Is Newton's 2nd law (F=ma) always valid. Give an example in support of your answer?
14. Action and reaction forces do not balance each other. Why?
15. Can a body remain in state of rest if more than one force is acting upon it?
16. Is the centripetal force acting on a body performing uniform circular motion always constant?
17. The string is holding the maximum possible weight that it could withstand. What will happen to the string if the body suspended by it starts moving on a horizontal circular path and the string starts generating a cone?
18. What is the reaction force of the weight of a book placed on the table?
19. What is the maximum acceleration of a vehicle on the horizontal road? Given that coefficient of static friction between the road and the tyres of the vehicle is μ.
20. Why guns are provided with the shoulder support?
21. While paddling a bicycle, what are the types of friction acting on rear wheels and in which direction?
22. What are the factors on which coefficient of friction depends?
Ans. Coefficient of friction between any two surfaces in contact depends upon
i) material of surfaces
ii) nature of surfaces
23. Rubber tyres are preferred to steel tyres. Why?
Ans. This is because coefficient of friction between rubber tyres and road is smaller than the coefficient of friction between the steel tyres and road.
24. Can we get off a frictionless horizontal surface by jumping?
Ans. No, as frictionless surface offers no reaction.
25. Block A of weight 100 N rests on a frictionless inclined plane of slope angles 30°. A flexible cord attached to A passes over a frictionless pulley and is connected to block B of weight W. Find the weight W for which the system is in equilibrium.
Ans. W = 50 N
26. While paddling a bicycle ,what are the types of friction acting on rear wheels and in which direction?
Ans. Static friction in forward direction and rolling friction in backward direction.
27. A block of mass M is held against a rough vertical wall by pressing it with a finger. If the coefficient of friction between the block and the wall is μ and the acceleration due gravity is g, calculate the minimum force required to be applied by the finger to hold the block against the wall?
Ans. If F is the force of the finger on the book, F = N, the normal reaction of the wall on the book. The minimum upward frictional force needed to ensure that the book does not fall is Mg. The frictional force =μN. Thus, minimum value of F = Mg/μ.
28. Find the maximum and minimum force applied parallel up the incline on a block of mass m placed on it if angle of inclination is θ and coefficient of static friction with the block is μ so that the block remains at rest?
29. State laws of limiting friction
30. Determine the maximum acceleration of the train in which a box lying on its floor will remain stationary, given that the co-efficient of static friction between the box and the train's floor is 0.15.
31. A mass of 4 kg rests on a horizontal plane. The plane is gradually inclined until at an angle θ = 15° with the horizontal, the mass just begins to slide. What is the coefficient of static friction between the block and the surface ?



32. What is the acceleration of the block and trolley system shown in a Fig. if the coefficient of kinetic friction between the trolley and the surface is 0.04? What is the tension in the string?(Take g = 10 m s^{-2}). Neglect the mass of the string.(3)

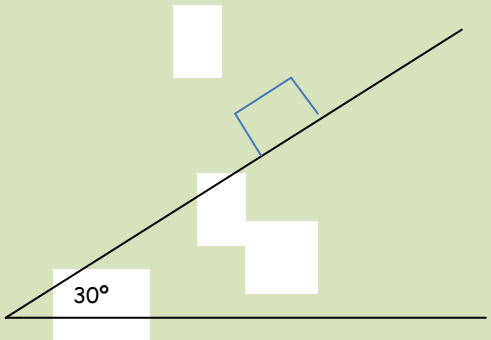


33. The rear side of a truck is open and a box of 40 kg mass is placed 5 m away from the open end as shown in Fig. . The coefficient of friction between the box and the surface below it is 0.15. On a straight road, the truck starts from rest and accelerates with 2 m s^{-2}. At what distance from the starting point does the box fall off the truck? (3)



34. A disc revolves with a speed of100/3 rev/min, and has a radius of 15 cm. Two coins are placed at 4 cm and 14 cm away from the centre of the record. If the co-efficient of friction between the coins and the record is 0.15, which of the coins will revolve with the record? (3)

35.A block of mass 3 kg slides down an incline of angle 30° with acceleration g/4.



Complete the free body diagram and find the coefficient of kinetic friction.

36. State the laws of limiting friction.
37. Prove that the maximum safe speed of a vehicle on a plane curved road of radius r is v= $(\mu rg)^{1/2}$.
38. Determine the coefficient of friction when a body is placed on a rough inclined plane just begins to slide and that moment, the slope of plane is equal to 1in 4.
39. The rear side of a truck is open and a box of 40kg is placed 5m away from the open end the coefficient of friction between the box and surface below it isμ= 0.15. The truck starts moving on a straight road with acceleration of 2m/s^2. At what distance from the starting point does the box fall off the truck? Neglect the size of the box.
40. Derive an expression for the angle at which a cyclist will have to make with vertical while taking a circular turn.
41. An aeroplane required for takeoff at speed of 80 km/hr, the run on the ground being 100m. The mass of the plane is 10000kg and the coefficient of friction between the plane and the ground is 0.2.

Assuming that the plane accelerates uniformly during takeoff the minimum force required by the engine for takeoff.

a. $2x10^4$N b. $2.43x10^4$N c. $4.43x10^4$N d. $8.86x10^4$N

42. A uniform chain of length L lies on a table. If the coefficient of friction is μ , then the maximum length of the chain which can hang from the edge of the table without the chain sliding is –
    a. L/ μ b. L/ $\mu - 1$ c. μ L/ $\mu + 1$ d. μ L/ $\mu - 1$

4. WORK, ENERGY AND POWER

1. Define the conservative and non-conservative forces? Give example of each?

2. A light body and a heavy body have same linear momentum. Which one has greater K. E?

3. If the momentum of the body is doubled by what percentage does its K.E changes?

4. A truck and a car are moving with the same K.E on a straight road. Their engines are simultaneously switched off which one will stop at a lesser distance?

5. What happens to the P.E of a bubble when it rises up in water?

6. Define spring constant of a spring?
7. What happens when a sphere collides head on elastically with a sphere of same mass initially at rest?
8. Derive an expression for K.E of a body of mass m moving with a velocity v by calculus method
9.State and explain work – energy theorem ?

10. A bob is pulled sideway so that string becomes parallel to horizontal and released. Length of the pendulum is 2 m. If due to air resistance loss of energy is 10% what is the speed with which the bob arrives the lowest point? (**Ans :** 6m/s)
11.What is the elastic potential energy stored in a spring?
12.Name the Parameter which is a measure of the degree of elasticity of a body.(**coefficient of restitution)**
13.Give the example of negative work done.(any one)
14.A mass m collides with another mass 2m and sticks to it. What is the nature of the collision?(**inelastic**)
15.Write down characteristic of elastic collision.
16.What should be the angle between the force and the displacement for maximum and minimum work?(0^0,90^0)
17.Give the condition under which a force is called conservative force.(any two)
18.The momentum of an object is doubled. How does its K.E change?(**K.E becomes four times**)
19. A body of mass 2kg is at rest at height of 10m above the ground. Calculate its potential energy and kinetic energy after it has fallen through half the height. Also find the velocity at this instant.
20.A nucleus is at rest. All of a sudden it splits into two small nuclei. What is the angle at which these two nuclei fly apart?
21.Two mutually perpendicular forces of 8N and 6N acts on the same body of mass 10kg.calulate (i) net force acting on the body ,(ii) magnitude of the acceleration of body and (iii) direction of acceleration of the body.
22.. State the law of conservation of mechanical energy. Show that the total energy of a body falling freely under gravity is conserved. Show it graphically.(5)

<u>QUESTIONS BASED ON COLLISION</u>

1.What do you mean by collision and its types? (1)
2. Define elastic and inelastic collision. (1)
3. What do you mean by coefficient of restitution (1)
4.Two bodies are moving towards each other collide and move awayin opposite directions .there is some rise in temperature of the bodies in the process. Explain the reason for the rise of temperature and state what type of reason is it.(1)
5.Explain ,throwing mud on a wall is an example of perfectly inelastic collision. (2)
6.A marble ball is moving with a certain velocity collides elastically with another marble balls of same mass which is initially at rest .If the first ball makes an angle of 40˚ with its initial direction of motion ,then find the angle made by the second ball with the initial direction of motion of the first ball. (2)
7.A body of mass m moving with speed v collides elastically head on with another body of mass m initially at rest.Show that the moving body will come to a stop as a result of this collision.(3)

8.Show that coefficient of restitution for one dimensional elastic collision is equal to 1. (3)
9.A steel ball of mass 100 g is dropped from a height of 40m on a steel plate fixed on the surface of earth.The steel ball after striking the steel plate rebounds to a height of 20m .calculate the cpoefficient of restitution. (3)
10.A bullet of mass 0.012 kg moving with a velocity of 70 m/s gets embedded in a freely suspended wooden block of 0.4kg . What is the velocity acquired by the block? (3)
11.Two balls A and B of mass 0.3 kg and 0.2 kg respectively are moving in a straight line. Ball A moves along positive x-axis with velocity 2.0 m/s approach each other. The head on collision between these balls occurs and thereafter they move in the direction opposite to their original directions. Find(i) the velocities of ball A and B after collision and(ii) the total kinetic energy of balls after and before collision. (5)
12.A particle of mass m and velocity v collides elastically with a stationary particle of mass m. Calculate the angle between the velocity vector of two particle after the collision. (5)
13.Show that in head on collision between two balls of equal masses moving along a straight line , the balls simply exchange their velocities. (5)
14.Discuss the elastic collision between two balls in one dimension and obtain the expression for their velocities after collision.(5)
15.What is inelastic collision ? A moving body collides with a stationary body of different mass. After perfectly inelastic collision , both the bodies stick together and move with a common velocity . Derive an expression for the loss in kinetic energy during the collision.(5)

5. ROTATIONAL MOTION

1.If one of the particles is heavier than the other, to which will their centre of mass shift? (1)
2. Can centre of mass of a body coincide with geometrical centre of the body? (1)
3.Which physical quantity is represented by a product of the moment of inertia and angular velocity? (1)
4.. Which component of linear momentum does not contribute to angular momentum? (1)
5 A disc of metal is melted and recast in the form of solid sphere. What will happen to the moment of inertia about a vertical axis passing through the centre ? (1)
6. What is the rotational analogue of mass of a body? (1)
7 Is radius of gyration of a body constant quantity? (1)
8 Is the angular momentum of a system always conserved? If no, under what condition is it not conserved? (1)
9 What is the advantage of the concept of center of mass?
10.What is a rigid body?
11 What is the analogue of mass in rotational motion?
12 State the theorem of parallel axis.
13 State the perpendicular theorem axis theorem.
14 Two particles of masses M and 3M are placed at a distance ‘a’ apart. Find out position of centre of mass of the two particle system.
15 If the earth contracts to half of its radius . What would be the length of the day.?
16 Derive relation between torque, moment of inertia and angular acceleration
17 Derive the equations of motion for rotational motion.

18 Explain that torque is only due to transverse component of force. Radial component has nothing to do with torque. (3)

19 Show that centre of mass of an isolated system moves with a uniform velocity along a straight line path. (3)

20 If angular momentum is conserved in a system whose moment of inertia is decreased, will its rotational kinetic energy be also conserved ? Explain.(3)

21 How will you distinguish between a hard boiled egg and a raw egg by spinning each on a table top?(3)
22 Equal torques are applied on a cylindrical and a hollow sphere. Both have same mass and radius. The cylinder rotates about its axis and the sphere rotates about one of its diameters. Which will acquire greater speed? Explain.(3)
23 Define centre of mass. Obtain an expression for centre of mass of two particle system and generalise it for n particle system. (5)

24 Find the expression for linear acceleration of a cylinder rolling down on a inclined plane. A ring, a disc and a sphere all of them have same radius and same mass roll down on inclined plane from the same heights. Which of these reaches the bottom (i) earliest (ii) latest ? (5)

25 (i) Name the physical quantity corresponding to inertia in rotational motion. How is it calculated? Give its units. (ii)Find expression for kinetic energy of a body. (5)

26 State and prove the law of conservation of angular momentum. Give one illustration to explain it. 5. State parallel and perpendicular axis theoremDefine an expression for moment of inertia of a disc R, mass M about an axis along its diameter.(5)

QUESTIONS ON EQUILLIBRIUM OF RIGID BODY AND EQUATION OF MOTION

1. Derive equations of rotational motion by calculus method.
2. What do you mean by stale, unstable and neutral equilibrium of a rigid body?
3. A wheel of train of mass 5 kg and radius of 25 cm has been pulled by a force of 50 N, what will be its angular velocity after 5 seconds if it starts from rest?
4. The disc is rotating about its central axis like amerry-go-round. The angular position u(t) of a referenceline on the disk is given by

   $\boldsymbol{\alpha = -1.00 - 0.600t + 0.250t^2}$, with t in seconds, α in radians, and the zero angular positionas indicated in the figure.(a) Graph the angular position of the disc versus timefrom t = 3.0 s to t =5.4 s. Sketch the disc and its angularposition reference line at t = 2.0 s, 0 s, and 4.0 s, andwhen the curve crosses the t axis.
5. A plank of mass 5 kg and length 1 m is supported at its mid-point. An object of mass 2 kg is hanged at distance of 30 cm from mid-point. At what distance a mass of 1.5 kg is to bar hanged so that it will remain in equilibrium?
6. What will be the effect on length if the plank is supported at 40 cm from its first end?
7. Give an example from daily life when the rigid body has (i) only translational equilibrium, (ii) only rotational equilibrium and (iii) in rotational as well as in translational equilibrium.
8. When can you say that the body is in equilibrium?
9. A ladder of length 5 m and mass 2 kg is supported at wall at an angle of 30^0 with ground. Calculate the reaction force applied by wall and the ground.

6. GRAVITATION

1An artificial satellite revolves in its orbit around the earth without using any fuel. But an aeroplane requires fuel to fly at a certain height. Why? 1

2 An artificial satellite is revolving around the earth at a height 200 km from the earth's surface. If a packet is released from the satellite ,what will happen to it? Will it reach the earth?

3 A satellite revolving around earth loses height. How will its time period be changed?

4 Two artificial satellite, one close to the surface and the other away are revolving around the earth. Which has larger speed? 1

5 Should the speed of two artificial satellites of the earth having different masses but the same orbital radius, be the same? 1

6. Which has longer period of revolution, a satellite revolving close or away from surface of earth?

7. What is the sense of rotation of polar satellite of earth and geostationary satellite?

8 What do you mean by gravity.?

9 What is the value of 'g' on surface of earth?

10 Write relation between G and g.

11 Derive an expression of acceleration due to gravity on the surface of earth.

12 Derive the expression for acceleration due to gravity above the surface of earth.

13 Find the weight of a man at a height equal to half the radius of Earth. Given that weight of the man on the surface of earth is 63 N.

14 At what height the acceleration due to gravity reduces to 36 percent of its value on the surface of earth.?

15 On what factors acceleration due to gravity of earth depends?

16 Where will a man weigh more ? (1) at 5km above the surface of earth (2) 5km below the surface of earth.
17 Explain how acceleration due to gravity varies with height.
18 Atmosphere is very thin at the Moon surface, why?
19 Assuming the earth to be a sphere of uniform mass density, would a body weight half way down to the centre of the earth if its weight 250 N on the surface?
20 Does the escape speed of a body from the Earth Depend upon

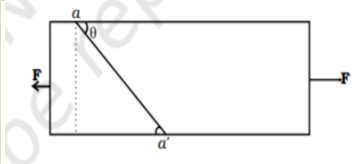
a) the mass of the body,
b) the location from where it is projected
c) the direction of projection
d) the height of the location from where the body is launched?

21 A rocket is fired from the earth towards the Sun. At what distance from the earth centre is the gravitational force on the rocket zero? Mass of the Sun $=2*10^{30}$ kg,Mass of earth$=6*10^{24}$kg and orbital radius$=1.5*10^{11}$ m.
22 Which of the following symptoms is likely to affect an astronaut in space a) swollen feet b) swollen face c) headache d) orientational problem.
23 Asatellite of mass m is in a circular orbit of radius r round the earth. Calculate its angular momentum with respect to centre of the orbit in terms of the mass M of the earth and G.
24 Two satellite A and B go around a planet P in circular orbits having radius 4R and R respectively. If the speed of the satellite A is 3v , find the speed of the satellite B.
25 What is a satellite ? Explain the principle of launching a satellite. 3
26 Suppose there existed a planet that went around the Sun twice as fast as the Earth. What would be its orbital size as compared to that of the earth?
27 State laws of Kepler related with planetary motion. How angular momentum is conserved in rotation of planet around the Sun?
28 Differentiate Escape velocity and Orbital velocity. Obtain the relation between these two. A body is projected out with thrice the speed of 11.2 km/sec, which is escape speed on the earth surface. What is speed of the body far away from the Earth? Ignore the presence of other planetary bodies around.
29 What do you understand by geostationary and polar satellites? Discuss their important uses?
30 What do you understand by orbital velocity ? Derive an expression for the orbital velocity of satellite?
31 Derive an expression for time period of satellite and height of satellite? 5

7.PROPERTIES OF BULK MATTER

1.Write the factors on which modulus of elasticity depends. 1
2. How does modulus of elasticity change with rise of temperature 1
3. Which is more elastic rubber or steel? Explain.
4. Why do we prefer steel to copper in the manufacture of spring? 1
5. How does the Young's modulus change with rise in temperature? 1
6. Why do spring balances show wrong readings after long use . 1
7. Why bridges are declared unsafe after long use. 1
8. Define deforming force and restoring force.
9.Define elasticity and plasticity.
10. What are perfectly elastic bodies?
11. What are perfectly plastic bodies?
12. Define elastic limit.
13. Define stress andstrain.
15. State Hooke's law.
16. Define modulus of elasticity.
17. Define elastic fatigue.
19. Define elastic after effect.
20. Write the factors on which modulus of elasticity depends.
21. What is surface tension?

22. What is surface energy?
23. It is better to wash clothes in hot soap solution. Why?
24. What are cohesion and adhesion force?
25. What are units of surface tension in C.G.S. and S.I. (M.K.S.) system?
26. Why the free surface of water is concave but that of mercury is convex?
27. What is the effect of temperature on the surface tension?
28. Why the free surface of water is concave but that of mercury is convex?
29. Give some practical applications of surface tension.
30. Surface tension of liquid is independent to the area of the liquid surface. Why?
31. What is angle of contact?
32.Consider a long steel bar under a tensile stress due to forces F acting at the edges along the length of the bar (Fig. 9.5). Consider a plane making an angle θ with the length. What are the tensile and shearing stresses on this plane?



(a) For what angle is the tensile stress a maximum?
(b) For what angle is the shearing stress a maximum?
33.Discuss stress strain curve for a loaded steel wire and hence explain the term elastic limit, yield point, permanent set, tensile strength. (3)
34. Calculate the work done (elastic potential energy) when a wire of length L and area of cross – section A is made of material of young's Modulus Y is stretched by an amount x? (3)

40. Write two factors affecting viscosity, which is more viscous – pure water or saline water? (2)
41. As soon as parachute of a falling soldier opens, his acceleration decreases and soon becomes zero?(2)
42. What is viscosity? What are the factors affecting viscous force in a liquid in a tube? (3)
43.Define coefficient of viscosity. And give its SI unit .On what factors does the terminal velocity of a spherical ball through a viscous liquid depends? Write the relation of terminal velocity? (3)
44.Derive equation of continuity. 3
45.Define streamline and turbulent motion. Write any two properties of streamlines. 3
46.State and deduce stokes's law for viscosity. (3)
47.State and prove Bernoulli's theorem. (5)
48.The angle of contact of mercury with glass is obtuse but that of water with glass is acute. Why?
49.If the meniscus is convex, what is the angle of contact?
50. Put a piece of chalk into water. The chalk will emit bubbles in all directions. Explain this phenomenon.
51. Define capillarity. Derive an expression for the ascent of a liquid in a capillary tube.
52.Explain rise of liquid in a tube of inefficient length.
53. Define surface energy. Show that surface tension is numerically equal to the surface energy.
54. Explain surface tension. Discuss an expression of excess pressure inside a liquid drop.
55.Define surface tension. Discuss molecular theory of surface tension.
56.What do you understand by angle of contact? On what factors does it depend? Where is the angle of contact obtuse, acute or zero degree?

QUESTIONS ON THERMAL PROPERTIES OF MATTER

Q1.State and explain heat capacity.
Q2.Why the water warms up much more slowly than the land during summer?
Q3.Why in desert areas, the earth surface warms up quickly during the day and cools quickly at night?
Q4.Explain principle of calorimetry .explain the device which is based on this principle.
Q5.A sphere of aluminium of 0.047 kg placed for sufficient time in a vessel containing boiling water, so that the sphere is at 100 ° C. It is then immediately transferred to 0.14 kg copper calorimeter containing 0.25 kg of water at 20 ° C. The temperature of water rises and attains a steady state at 23 ° C. Calculate the specific heat capacity of aluminium.
Q6.Explain (i) melting ,melting point and normal melting point (ii) Regelation (iii) vaporisation , boiling point and normal BP.

Q7.Define latent heat and explain its types.When 0.15 kg of ice of 0 °C mixed with 0.30 kg of water at 50 °C in a container, the resulting temperature is 6.7 °C. Calculate the heat of fusion of ice. (s_{water} = 4186 J kg^{-1} K^{-1}).

Q8.Derive an expression for thermal conductivity of the material.

Q9.Derive the relationship between (i) β and α (ii) α and γ.

Q10.Show that the coefficient of areal expansion, (ΔA/A)/ΔT, of a rectangular sheet of the solid is twice the coefficient of linear expansion, α.

8. THERMODYNAMICS

Questions based on thermodynamic Process

1. What is thermodynamics?
2. What do you mean by a 'thermodynamic variable'? How is it related with temperature?
3. What is thermodynamic process?
4. Draw PV-diagram for isothermal process.
5. What are necessary conditions for isothermal process?
6. What are necessary conditions for adiabatic process?
7. What is difference between isothermal and adiabatic process?
8. What is difference between isobaric and isochoric process?
9. What is a cyclic process?
10. Is internal energy a system variable? Explain.

Questions on Heat engine and Refrigerator

1. Why Coefficient of performance of a Refrigerator or heat pump cannot be infinite?
2. Sketch a block diagram of heat engine?
3. Explain principal and working of refrigerator.
4. Two engines A and B have their sources at 400K and 350 K and sink at350K and 300 K respectively. Which engine is more efficient and by how much?
5. Sketch a block diagram and explain the working of heat engine?
6. A heat engine operates between a cold reservoir at temperature T_2 =300K and a hot reservoir at temperature T_1. It takes 200 J of heat from hot reservoir and delivers 120J of heat to cold reservoir in a cycle. What could be the minimum temperature of hot reservoir?
7. Differentiate between reversible and irreversible process with examples.
8. Why can't be an engine 100 % efficient? Explain.
9. Why is defrosting necessary for proper functioning of refrigerator?
10. Write the three parts of heat engine and explain their working?
11. Write the three parts of Refrigerator or heat pump and explain their working?
12. Write the various steps followed by the working substance in a Refrigerator?
13. What is the condition for a process to be a reversible process?
14. If a door of a working refrigerator is kept open for a long time in a closed room, Will it make the room warm or cool?
15. A refrigerator is to maintain eatables kept inside at 9^oC. If room temperature is 36^oC. Calculatethe coefficient of performance.

16. Two engines A and B have their sources at 440K and 350K and sinks at 350K and 300K respectively. Which is more efficient and by how much?

10.KINETIC THEORY OF GASES

1. Name the theory which explain the behaviour of gases. ?(1)
2. Which kind of forces neglected for gases. ?(1)
3. Name the scientists who develop the kinetic theory of gases. ?(1)
4. Which feature of gases are explained by kinetic theory? (1)
5. Name the measureable properties of gases explained by kinetic theory. ?(1)
6. Define the root mean square speed. ? (1)
7. State the law of equi-partition of energy ? (1)
8. Define degrees of freedom.(1)
9. What is the average value of energy for a gas in thermal equilibrium at temperature.(1)
10. What is mean free path? (1)
11. Show that average kinetic energy of gas molecules is proportional to the absolute temperature of the gas?
12. What do you mean by degrees of freedom ? Find the ratio of specific heats C_p/C_v) for monoatomic gas ?
13. Show that average K.E of a gas molecule is directly proportional to the temperature of the gas. Hence give the Kinetic Interpretation of temperature ?
14. Calculate the internal energy of 1 g of oxygen at N.T.P?
15. Calculate the number of degree of freedom in 10 cm^3 O_2 at NTP?
16. Calculate the value of rms of a molecule in nitrogen gas at 300 K?

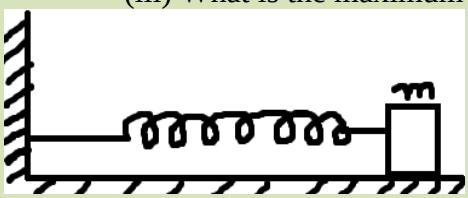
Three Mark Questions

17. On the basis of kinetic theory ,derive an expression for the pressure exerted by an ideal gas. Calculate the degrees of freedom for mono-atomic, diatomic and tri-atomic gas molecules?
18. Calculate the degrees of freedom for mono-atomic, diatomic and tri-atomic gas molecules?
19. A vessel of volume V=5.0 litres contains 1.4g of nitrogen at temperature,T=1800K.Find the pressure of the gas if 30% of its molecules are dissociated into atoms at this temperature . ?
20. Calculate the number of degree of freedom in 10 cm^3 O_2 at N.T.P.?
21. Agaseous mixture consists of 16 g of helium and 16 g of oxygen . Find the ratio Cp/Cv of the mixture ?

10.WAVES AND RAY OPTICS

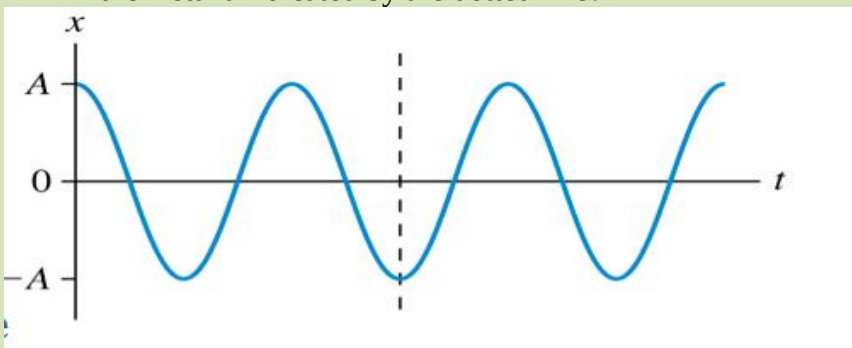
Questions on oscillations of loaded springs

1. A spring of force constant 1200N/m is mounted horizontal table. A mass of 3Kg is attached to the free end of the spring, pulled sideways to a distance of 2.0cm and released.
   (i) What is the frequency of oscillation of the mass?
   (ii) What is the maximum acceleration of the mass?
   (iii) What is the maximum speed of the mass?

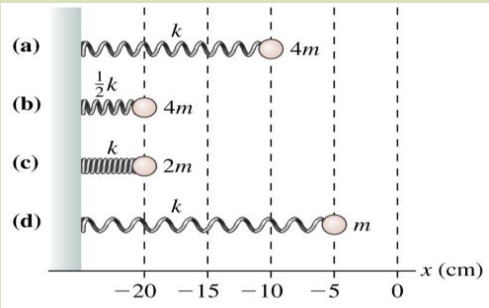


2. What is a spring factor? Derive the expression for resultant spring constant when two springs having constants k_1 and $k_2$are connected in (i) parallel and (ii) in series.
3. What is the restoring force acting on block attached with a spring when it is displaced by x displacement? Name this law.
4. At what point during the oscillation of a spring is the force on the mass greatest?

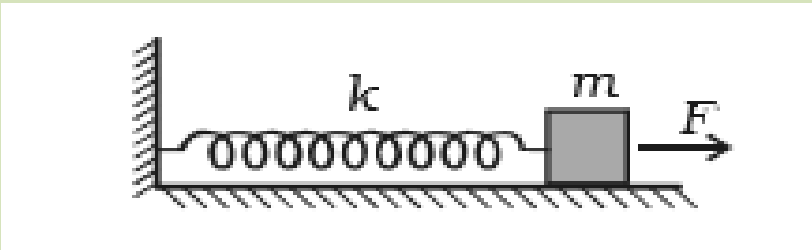
5. A block of mass 15 kg executes SHM under the restoring force of a spring. The amplitude and the time period of the motion are 0.1 m and 3.14 s respectively. Find the maximum force exerted by the spring on the block.
6. A bob of simple pendulum period of vibration of mass in suspended by a spring is T. The spring is cut into n equal parts and body is again suspended by one of pieces. Find then time period.
7. This is the position graph of a mass on a spring. What can you say about the velocity and the force at the instant indicated by the dotted line?



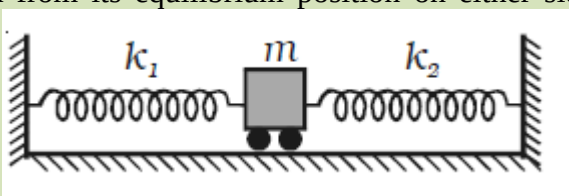
8. Explain the oscillations of a loaded spring and find its relation for the time period and frequency in case of horizontal spring.
9. Four springs have been compressed from their equilibrium position at x= 0 cm. When released, they will start to oscillate. Rank in order, from highest to lowest, the maximum speeds of the oscillations.



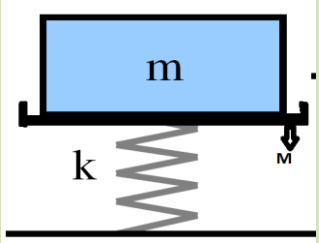
10. A spring of force constant K is cut into two piece such that one piece is double the length of other. What is force constant of longer piece of the spring?
11. A mass m attached to a spring oscillates every 4 seconds. If the mass is increased by 4 kg, the period increases by 1 s. Find its initial mass m.
12. A spring of force constant 1200 N m-1 is mounted on a horizontal table as shown in figure. A mass of 3 kg is attached to its free end and pulled sideways to a distance of 2 cm and released. Calculate (i) the frequency of oscillation (ii) the maximum velocity and (iii) maximum acceleration of the mass iv) total energy ,v)KE at mean position and PE at extreme position.



13. The two identical springs of spring constant K are attached to a block of mass and fixed support as shown below .Show that when mass is displaced from its equilibrium position on either sides, it executes SHM. find the time period of oscillation?



14. A tray of mass M supported by two identical spring. The tray is pressed then it execute SHM and having time period Then a mass m is kept over the tray then time period is T'. What is mass on tray?



15. Velocity of sound increases on a cloudy day. Why? [1]
16. Sound of maximum intensity is heard successively at an interval of 0.2 second on

Sounding two tuning forks together. What is the difference of frequencies of two tuning forks?(2)

17. We cannot hear echo in a room. Explain? [2]
18. Show that the frequency of nth harmonic mode in a vibrating string which is closedat both the ends is 'n' times the frequency of the first harmonic mode. (3)
19. A mass m suspend separately from two springs of springconstant k_1 and k_2 gives time period t_1 and t_2,respectively when connected to the springs individually . If the same mass is connected to both the springs when they are connected parallel. Calculate the time period't' of the combined system? (3)
20. Show that the total energy of a body executing SHM is independent of time? [3]
21. A particles moves such that its acceleration 'a' is given by a = -b x where x =displacement from equilibrium position and b is a constant. Find the period of oscillation? [2]
22. A pipe 20 cm long is closed at one end. Which harmonic mode of the pipe isresonantly excited by a 430 Hz source? Will this source be in resonance with thepipe if both the ends are open? [3]
23. A particle is moving with SHM in a straight line. When the distance of the particlefrom mean position has values x_1 and x_2 the corresponding values of velocities arev_1 and v_2. What is the time period of oscillation?[3]

WAVE MOTION

1. A wave transmitsmomentum? Can it transfer angular momentum too?
2. Frequency is a most fundamental property of a wave. Why?
3. How is energy transmitted in a wave?
4. What is the source of EM wave?
5. Why is longitudinal wave considered as pressure wave?
6. Can transverse wave be produced in air? Why?
7. What is difference between a wave velocity and a particle velocity?
8. We see lightning before thunder. Why?
9. Which type of wave does not require a material medium for propagation?
10. What is the angle between particle velocity and wave velocity in i) transverse waves

ii) Longitudinalwave?

11. The time period of a vibrating source of sound is 0.01s.If speed of sound is 330m/s,what is the wavelength.A wave on a string is described by y(x, t)=.005sin (6.28x-314t), in which all quantities are in S.I.unit .Calculate its amplitude, wavelength, wave vector & frequency.
12. The displacement of a particle in medium can be expressed as

    $Y=10^{-4} \sin (100t +20x+\pi/4)$,

Where x is in meters is in second .What is the speed of the wave?

13. What is the difference between longitudinal wave & transverse wave?
14. For a travelling harmonic wave ,y =2.0cos (10.0 t-0.0080x+.018) where x and y are in cm and t is in sec .What is the phase difference between two points separated by (i) a distance of 0.5m (ii) time gap of 0.5 s.
15. A wave travelling along a string is described by

    Y (x ,t)=0.005sin (80.0x-3.0t)

In which numerical constants are in S.I units .Calculate (a) the amplitude (b) the wave length and (c) the time period and frequency of the wave. Also Calculate the displacement y of the wave at a distance x=30.0 cm and time t=20 sec.

16. Differentiate between wave &pulse?

STANDING WAVE

1. What do you mean by stationary wave/ standing wave/ non propagating wave?
2. Give two examples of daily life which are about stationary wave.
3. Differentiate between nodes and antinodes.
4. String is stretched by tension T, if tension is made doubled, number of loops formed are 16. Calculate the initial number of loops formed.
5. Frequency of a stretched string increased by 5 Hertz tension is increased by 2% .Calculate change in the frequency if tension is reduced by 2%.
6. Fifth overtone of an open organ pipe is Unison with fifth overtone of a closed organ pipe. Then compare their lengths.
7. A wave $y= 2a \sin 2\pi t \cos 2kx$ is formed in a string then draw a diagram showing it.
8. An organ pipe P_1 closed at one end vibrating in its first overtone and another pipe P_2 open at both ends vibrating in its third harmonic are in resonance with the given tuning fork find the ratio of the length of given to that of P_2.

BEATS& Doppler's Effect

1. What is meant by beats? Discuss graphical method of formation of beats
2. Prove that the number of beats per second is equal to the difference between the frequencies of the two superimposing wave.
3. A bus is moving towards a huge wall with a velocity of 5m/s .the driver sounds the horn of frequency 200Hz .what is the frequency of beats by a passenger of bus if the speed of sound in air is 342 m/s.
4. Two tuning forks of frequencies 250Hz and 252Hz are being sounded together. If a loud is produced just now, after what time would the sound be again equally loud?
5. Write the condition for Doppler's effect in sound.
6. What is the cause of Doppler's effect?
9. A sound source is moving towards stationary listener with 1/10th of the speed of sound. What is the ratio of apparent frequency?
10. A source is moving towards stationary observer with some velocity. The frequency of sound heard is 4/23 of its original frequency. What is the velocity of source?
11. A train standing at the outer signal of a railway station blows awhistle of frequency 400 Hz in still air. The train begins to movewith a speed of 10 m s^{-1} towards the platform. What is thefrequency of the sound for an observer standing on the platform?

(Sound velocity in air = 330 m s^{-1}

12. What do you mean by beats?
13. How Beat period is different than Beat frequency? How they are related?
14. Under what condition beats are heard?
15. Under what condition beats are formed?
16. Two tuning forks of frequency 256 Hertz and 280 Hertz are sounded together, how many Beats are heard?
17. A resonance column is Unison with a tuning fork if tuning fork is waxed. In what way length of the Column should be modified to bring them in Unison again.
18. Discuss analytically how beats are formed?
19. Draw a diagram showing formation of Beats by two waves.
20. Deduce an expression for beat frequency if two waves of frequencies N_1 and N_2 are sounded together?
21. Three sources of sounds have frequencies 112 Hz, 116 Hz and 124 Hz are sounded together. Calculate number of Beats heard?

22. "Doppler Effect is observed for all types of waves" comment on the statement.
23. Name two conditions in which Doppler Effect is not observed.
24. What is the difference between longitudinal and transverse Doppler's Effect.
25. Deduce an expression for the apparent frequency heard by an observer moving towards a stationary source.
26. A source of sound crosses stationery listener with 30 m/s speed. Calculate percentage loss in frequency of sound as observed by the listener. (v = 330 m/s)
27. A sound source is moving towards a wall with 30 m/s produces a note of frequency 200 Hz. Calculate frequency of the reflected sound received by the source.

28. A student observes that, there is a change in loudness of the sound when air starts blowing towards him.Can we explain it using Doppler's effect? Justify the reason.
29. A person is sitting at the centre of a circle. A sound source is circulating with finite speed across the circle. Frequency of sound observed by him will be different or equalto actualfrequency?
30. A car is moving towards a wall with a speed 30 m/s. When it is between points A and B as shown in figure,sounds a note of frequency 100 hertz. Calculate frequency of sound heard by observers at A and B.

CAR ⟶ WALL

A B

In above question what is difference in frequencies of sound heard by observers at A and B for sound coming after reflection from the wall.

OPTICS

Refraction -

1.For the same angle of incidence the angles of refraction in three different media are 15^0, 25^0 and 35^0 respectively. Explain in which medium the velocity of light will be minimum?

2. The apparent depth of an object at the bottom of the tank filled with a liquid of refractive index 1.3 is 7.7cm. What is the actual depth of the tank?

3. A plane glass slab is placed on the letters of different colors, then the letters of which color appear to be raised the most and why?

4. What happens to a focal length of a convex lens when (i) it is immersed in water (ii) Monochromatic red light is used instead of white light?

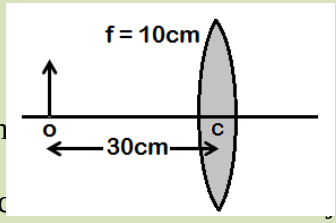
5. The radii of curvature of both the surfaces of the lens are equal. If one of the surfaces is made plane by grounding, then how will the focal length and the power of the lens change?

6. Explain why does a convex lens behave as a converging lens when immersed in water (μ=1.33) and as a diverging lens when immersed in carbon disulphide (μ = 1.6).

7. A convex lens and a concave lens are made of material of refractive index μ_1 and held in another medium of refractive index μ_2. Trace the path of parallel beam of light incident on the lenses when (i) $\mu_1 = \mu_2$ (ii) $\mu_1 > \mu_2$ (iii) $\mu_1 < \mu_2$.

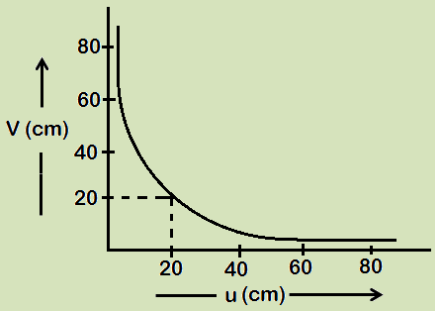
8.Use the lens equation to deduce algebraically what you know otherwise from explicit ray diagrams (i) An object placed within the focus of a convex lens produces a virtual and enlarged image. (ii) A concave lens produces a virtual and diminished image independent of the location of the object.

9. Find the position of the image formed by the lens shown in the figure-

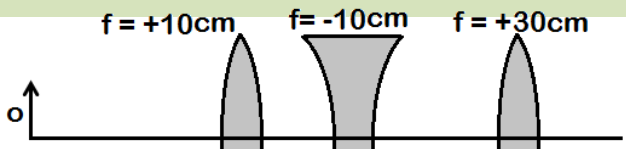


Another lens is placed in contact with th further away from the lens. What is the nature of the second lens?

10. A lens forms a real image of an objec ect from the lens is 4cm and the distance of the image from the lens is v cm. The given graph shows the variation of v with u. (i) what is the nature of the lens? (ii) Using the graph find the focal length of the lens.



11. Find the position of the image formed by the lens combination as shown in the figure -



One mark questions

1. For the same value of angle of incidence, the angles of refraction in three media A, B and C are 15°, 25° and 35° respectively. In which medium would the velocity of light be minimum?
2. Can a microscope function as a telescope by inverting it?
3. For what angle of incidence the lateral displacement produced by parallel sided glass slab is zero?
4. How does the resolving power of a telescope change when the aperture of its objective is increased?
5. Give the ratio of velocities of two light waves travelling in vacuum and having wavelengths $4000A^0$ and $8000A^0$
6. A lens when immersed in a transparent liquid is not visible. Under what condition can it happen?
7. Which of the following do not change during refraction of light frequency, wavelength, speed and intensity?
8. What is the focal length and power of plane glass plate?
9. A person of 6 feet height wants to see his image of head to toe by a plane mirror, what should be minimum length of the mirror?
10. A plane wave front is incident normally on a convex lens. Sketch the refracted wave front.
11. Which phenomenon of light show the transverse nature of light?
12. What is the phase difference between any two points on a wavefront?
13. The refractive index of a medium is $\sqrt{3}$. What is the angle of refraction, if the unpolarised light is incident on it at the polarizing angle of the medium?
14. Color produced by a prism and color produced in soap bubble are different in which way?
15. A ray of light strikes a glass plate at an angle of 60°. If the reflected and refracted rays are perpendicular to each other, find the refractive index of glass.

Total Internal Reflection

1. Define critical angle with reference to T I R.
2. Calculate the critical angle for glass-air surface, if a ray of light which is incident in air on the glass surface is deviated through 15°, when angle of incidence is 45°.
3. Explain briefly how the phenomenon of T I R is used in fiber optics.
4. Write the two essential conditions for T I R to occur.
5. Write the conditions for observing a rainbow. Show by drawing suitable diagrams to explain the formation of rainbow.
6. Explain with diagram the brilliance of diamond based on T I R.
7. A point source of monochromatic light S which kept at the centre of the bottom of a cylinder of radius 15.0cm. The cylinder contain water (μ= 4/3) to a height of 7.0 cm. Draw the ray diagram and calculate the area of water surface through light emerges in the air.
8. Three parallel rays of light- Red, green and blue are incident on the face AB of a right angle prism ABC.The refractive indices of the material of the prism for red,greenand blue wavelengths are 1.39,1.44and 1.47 respectively. Trace the path of the rays of the prism.
9. How will the situation in question No 8, change if these rays were incident normally on one of the faces of an equilateral prism.
10. Calculate the critical angle for a ray of light tending to travel from glass (μ= 5/3) to water to (μ= 4/3).

<u>Questions from optical instrument:-</u>

1. Draw a ray diagram of reflecting type telescope. State twoadvantages of this telescope over refracting type telescope.
2. The length of an astronomical telescope in normal adjustment is 110cm. The magnifying power is 10 find out focal length of objective lens and eye piece.
3. Why does focal length and aperture of astronomical telescope are kept large.Explain,
4. The total magnification of compound microscope is 30. The focal length of eye piece used in it is 5 cm. Find out magnification produced by objective lens if final image formed at near point.

5. What happens to magnifying power and resolving power of compound microscope when length of tube increases?
6. A compound microscope with an objective of 1cm focal length and an eye piece of focal length of 2cm has tube length of 20 cm. Calculate the magnifying power if final image is formed at the near point of the eye.
7. Why is the focal length of an objective in compound microscope is little shorter than the focal length of an eye piece.
8. Two convex lenses of same focal length but apertureA_1&A_2(A_2>A_1) are used as objective lenses into astronomical telescope having identical eye piece.What is the ratio of their resolving power which telescope will you prefer and why? Give reason.
9. Draw a labelled diagram of astronomical telescope in normal adjustment. Hence obtain expression for its magnifying power
10. You are given two converging lenses of focal length 1.25 cm and 5 cm to design a compound microscope.If it is desired to have a magnification of 30, find out the separation between the objective lens and the eye piece.
11. A small telescope has objective lens of focal length 150 cm and eyepiece of focal length 5 cm. What is the magnifying power of the telescope for viewing distant object in normal adjustment?If this telescope is used to view a 100 m tall tower 3 km away, what is the height of the image of the tower formed by the objective lens?

ELECTROSTATICS

Electric Charge and Field

1. Why, the electric field lines do not form closed loops? 1
2. If the distance between two charges is doubled how does the force between them change 1
3. Why two electric field lines never intersect each other? 1
4. Sketch the pattern of electric field lines due to (i) A conducting sphere having negative charge on it and (ii) an electric dipole. 2
5. Why must electrostatic field be normal to the surface at every point of a charged conductor? 2
6. Define relative permittivity (dielectric constant) in terms of electrostatic force. 2
7. Name the physical quantity whose S.I. unit is JC-1. Is it a scalar or a vector quantity? 2
8. "For any charge configuration, equipotential surface through a point is normal to the electric field". Justify the statement 2
9. Two identical charges Q each, kept at a distance r from each other. A third charge q is placed on the line joining the above two charges such that all the three charges are in equilibrium. What is the magnitude, Sign and position of the charge q? 3
10. A positive point charge +q is kept in the vicinity of an uncharged conducting plate. Sketch electric field lines originating from the point on to the surface of the plate. Derive the expression for the electric field at the surface of a charged conductor. 3

11. An electric dipole is held in a uniform electric field (i) show that net force acting on it is zero. (ii) The dipole is aligned parallel to the field. Find the work done in rotating it through the angle 1800. 5
12. State Gauss' theorem in electrostatics and using this theorem, derive an expression for the electric field of an infinitely long line of charge having a uniform charge density. 5
13. (a) State Gauss' law and using this law, derive an expression for the electric field intensity due to a uniformly charged thin spherical shell at a point (i) inside the shell and (ii) outside the shell
(b) Plot a graph showing variation of electric field as a function of r >R and r<R (r being the distance from the centre of the shell and R is radius of the spherical shell) 5

14. Find out the expression for electric field intensities on the axial and equatorial line of an electric dipole, at the distance of r from the centre of dipole. 5
15. Use the Gauss's law to derive the expression for electric field due to long straight wire of charge density λC/m. 5
16. Show that the electric field at the surface of a charged conductor is given by $\vec{E} = \frac{\sigma}{\epsilon_0}\hat{n}$, where σ is the surface charge density and $\hat{n}$ is a unit vector normal to the surface in the outward direction.5

ELECTRIC POTENTIAL AND POTENTIAL ENERGY

1. What orientation of an electric dipole in a uniform electric field corresponds to its (i) stable & (ii) unstable equilibrium? 1

1

2. What should be the work done if a point charge +q is taken from point A to the point B placed at diametrically opposite points on the circumference of a circle of radius R containing another point +q at its centre? 1
3. How much work is done in moving a 500 μ C charge between two points on an equipotential surface? 1
4. The work done in moving a charge 2 C between two points is 6J.What is the potential difference between the points? 2
5. What is equipotential surface? Draw equipotential surfaces due to a pair of two equal and like point charges. 2
6. Two point charges 4μC ,--2μC are separated by distance of 1 m in air .At what point on the line joining the charges the electric potential is zero? (Ans. 2/3 m from 4μC or 1 m from -2μC 3
7. A parallel plate capacitor each with plate area A and separation d is charged to a potential difference V. The battery used to store charge is then disconnected. A dielectric slab of thickness d and dielectric constant is now placed between the plates. What change if any will take place in (I) charge on the plates

   (II) Electric field intensity between the plates.
   (iii) capacitance of the capacitor.
   Justify your answer in each case. 3

8. A parallel plate capacitor is charged by a battery and the battery remains connected, a dielectric slab is inserted in the space between the plates . Explain what changes if any , occur in the values of

   (I) potential difference between the plates
   (II) electric field between the plates
   (III) energy stored in the capacitor. 3

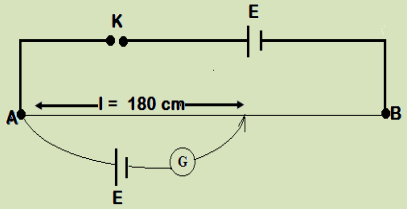
9. Briefly explain the principle of a capacitor. Derive an expression for the capacitance of a parallel plate capacitor, whose plates are separated by a dielectric medium. 5
10. Derive an expression for the energy stored in a parallel plate capacitor C, charged to a potential difference V . Hence derive an expression for the energy density of a capacitor. 5
11. Why must electrostatic field be normal to the surface at every point of a charged conductor?
12. A proton is placed in a uniform electric field directed along the position x-axis. In which direction will it tend to move?
13.
14. In which orientation a dipole placed in a uniform electric field is in a) Stable, b) Unstable Equilibrium?
15. Is electric field intensity a scalar or vector quantity ? Give its SI units.
16. Write the dimensional formula of electric field.
17. How does a free electron at rect move in an electric field?
18. The test charge used to measure electric field at a point should be vanishingly small. Why?

19. At what points dipole field intensity is parallel to the line joining the charges?
20. When an electric dipole is placed in a non-uniform electric field,it experiences non -zero torque& non-zero force.Comment.
21. Derive the expression for the electric field intensity at any point on the equatorial line of an electric dipole ?
22. Define the electric dipole and dipole moment. Give its direction and hence and find an expression for electric field due to this dipole of length 2l at a point on its axial line which is at distance √5l from center of dipole .
23. Two point charges, q =8×10-8 C and Q= -2×10-8 C are separated by a distance of 10 cm in air. What is the net electric field at the mid- point between the charges
24. Give two properties of electric field lines.Sketch them for an isolated positive charge and an electric dipole .
25. Find the energy stored in the capacitor when charged with a potential difference V volts.
26. Show the variation of capacitance C with the charge Q in a graph and write the value of the slope.
27. Briefly explain the principle of a capacitor . Derive an expression for the capacitance of a parallel plate capacitor, whose plates are separated by a dielectric medium.
28. Derive an expression for the energy stored in a parallel plate capacitor C, charged to a potential difference V . Hence derive an expression for the energy density of a capacitor.

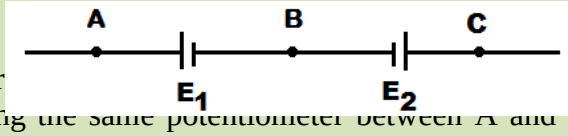
Current electricity

1. What material is used for making the wires of potentiometer and why?
2. Two wires one of copper and other of maganin has equal cross-sectional area and resistance. Which one will be longer?
3. Why a potentiometer with longer wire is preferred?
4. Why a potentiometer with ten wires is preferred over a potentiometer with four wires?
5. How the sensitivity of the potentiometer can be improved?
6. Why potentiometer is preferred over voltmeter for the measurement of the emf of the cell

7. Two wires of the same material, having lengths in the ratio 1:2 and diameter in the ratio 2:3 are connected in series with a battery. Compare the ratio of the potential difference across the two wires.
8. In the figure (ii) below AB is a resistance wire of uniform cross-section having potential gradient of 0.01Vcm-1. (a) If the galvanometer shows zero deflection what will be the emf of the cell? (b) If the internal resistance of the driver cell increases how will change the balance point.

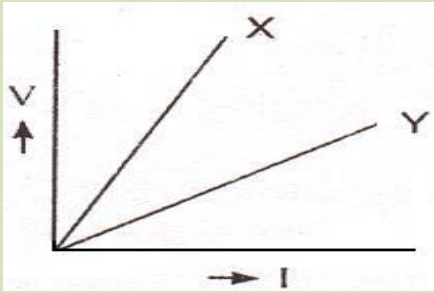


9. Two cells of emf E1 and E2 (E1>E2) are connected a shown-



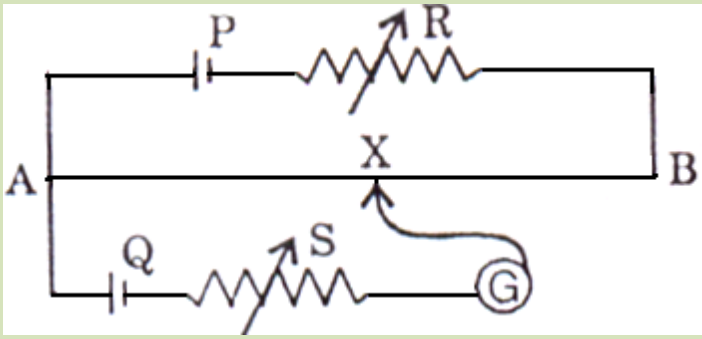
When the potentiometer ng length of the potentiometer wire is 300cm. On connecting the same potentiometer between A and C, the balancing length is 100cm. Calculate the ratio of E_1 and E_2.

1. What is a potentiometer? Define its potential gradient. Of which material is a potentiometer wire normally made and why?
2. Why is a potentiometer preferred over a voltmeter for determining the emf of a cell?
3. State the Principle of working of a potentiometer.
4. State the working principle of a potentiometer. With the help of the circuit diagram, explain how a potentiometer is used to compare the emf's of two primary cells. Obtain the required expression used for comparing the emfs.
5. State the working principle of a potentiometer. With the help of the circuit diagram, explain how a potentiometer is used to calculate internal resistance of a primary cell. Obtain the required expression used to calculate internal resistance.
6. Write two possible causes for one sided deflection in a potentiometer experiment.
7. How can the sensitivity of a potentiometer be increased.
8. The variation of potential difference V with length l in case of two potentiometers X and Y is as shown.



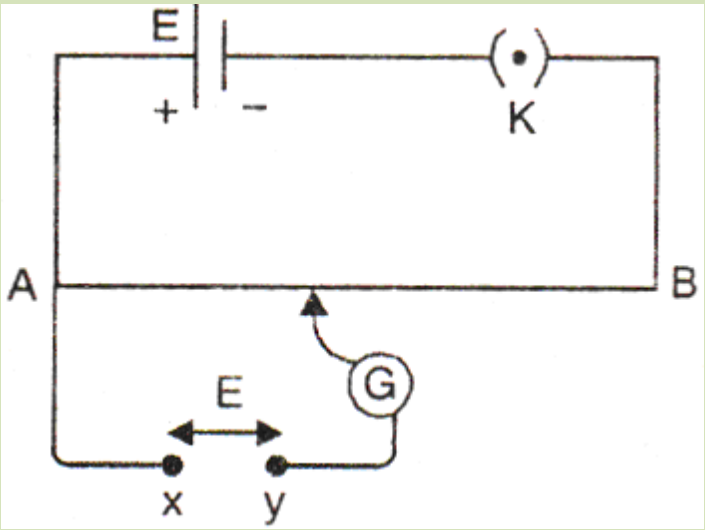
Which one of these two will you prefer for comparing emfs of two primary cells?

9. In the potentiometer circuit shown, the balance point is at X. State with reason, where the balance point will be shifted when



(i) R is increased, (ii) S is increased, keeping R constant. (iii) Cell P is replaced by another cell whose emf is lower than that of cell Q.

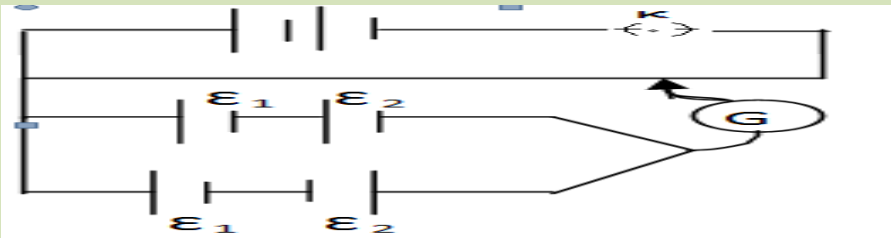
10. For the potentiometer circuit shown in figure, points X and Y represent the two terminals of an unknown emf E`. A student observed that when the jockey is moved from the end A to the end B of the potentiometer wire, the deflection in the galvanometer remains in the same direction.



What may be the two possible faults in the circuit that could result in this observation? If the galvanometer deflection at the end B is (i) more (ii) less, than that at the end A, which of two faults, listed above, would be there in the circuit? Give reasons in support of your answer in each case.

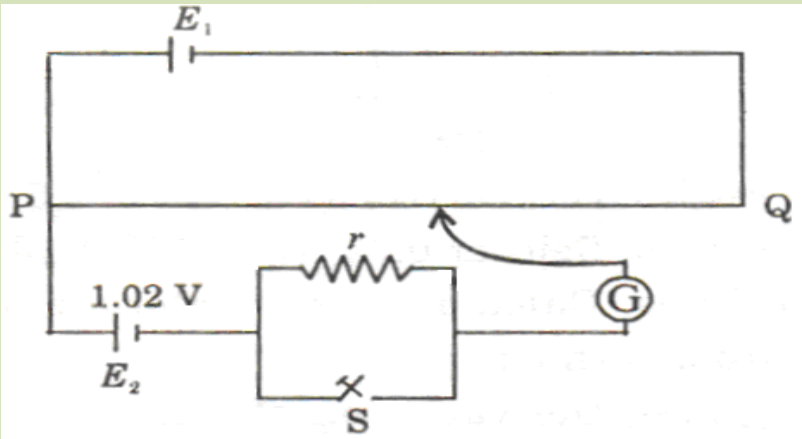
11. In above question If the galvanometer deflection at the end B is (i) more (ii) less, than that at the end A, which of two faults, listed above, would be there in the circuit? Give reasons in support of your answer in each case.

12. In a potentiometer circuit, a battery of negligible internal resistance is set up as shown to develop a constant potential gradient along the wire AB. Two cells of emfs Ɛ1 and Ɛ2 are connected in series as shown in the combination



(1) and (2). The balance points are obtained respectively at 400cm and 240cm from the point A. Find (i) Ɛ 1/ Ɛ 2 and (ii) balancing length for the cell Ɛ 1 only.

13. In a potentiometer circuit shown below E_2 =1.02V, PQ = 10 m. When switch S open, null position is obtained at a distance of 510 cm from P.



Calculate

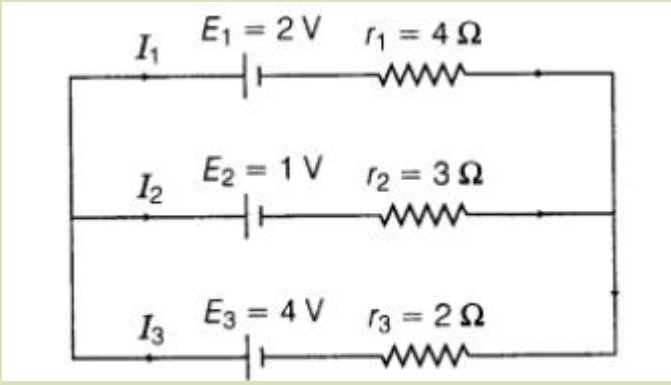
(i) potential gradient

(ii) emf of the cell E_1

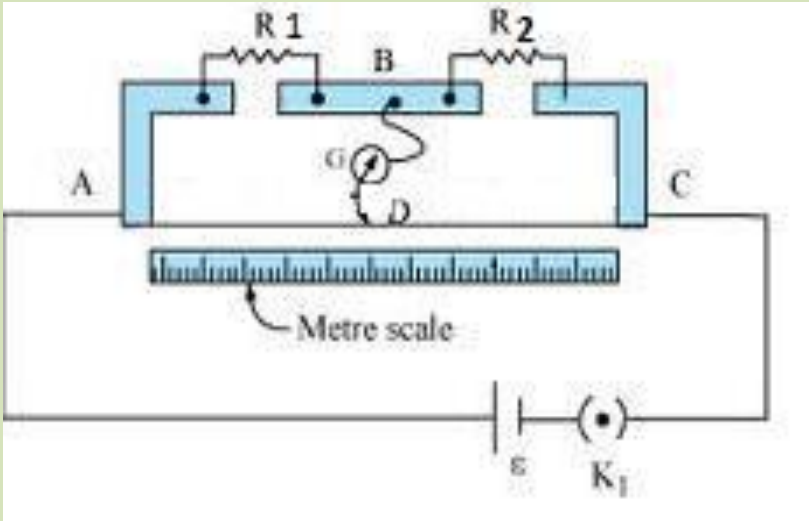
(iii) when switch S is closed, will null point move towards P or Q. Give reason for your answer.

KIRCHHOFF'S LAW & DEVICES

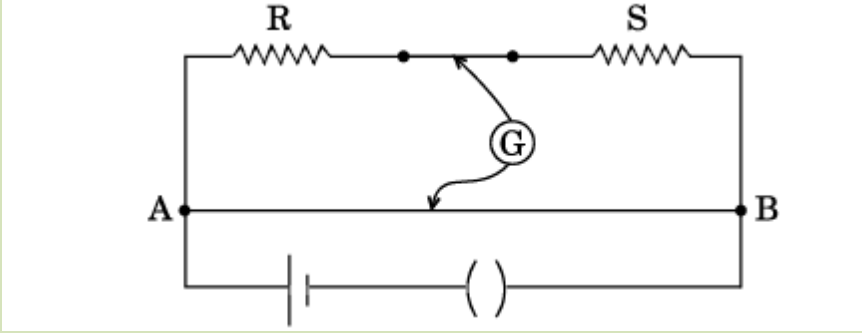
1. State the basic principle on which Kirchhoff's first law is based.
2. When a Wheatstone bridge is said to be balanced?
3. What is the expression for the ratio of resistances in balanced Wheatstone bridge?
4. What is the principle of Meter Bridge?
5. State the two Kirchhoff's rules used in electric networks. How are these rules justified?
6. Use Kirchhoff's rules to obtain conditions for the balance condition in a Wheatstone bridge.
7. Why is the Wheatstone bridge method for measuring resistance more accurate than the other methods?
8. Why is it generally preferred to obtain the balance point near the middle of the bridge wire in meter in meter bridge experiments?
9. Draw the circuit diagram of Wheatstone bridge. Under what condition no current flow through galvanometer?
10. How will you use a meter bridge to compare two resistances? Explain the principle of the experiment and give the formula used.
11. With the help of circuit diagram explain how a meter bridge can be used to find the unknown resistance of the given wire.
12. State Kirchhoff's rules. Use these rules to write the expressions for the currents I1, I2 and I3 in the circuit diagram shown in figure below.



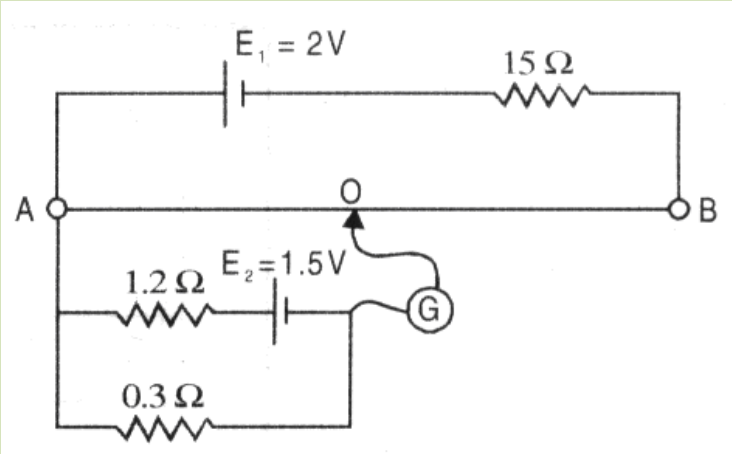
13. In the meter bridge experimental set up, shown in the figure, the null point 'D' is obtained at a distance of 40 cm from end A of the meter bridge wire. If a resistance of 10 is connected in series with R1, null point is obtained at AD = 60 cm. Calculate the values of R1 and R2



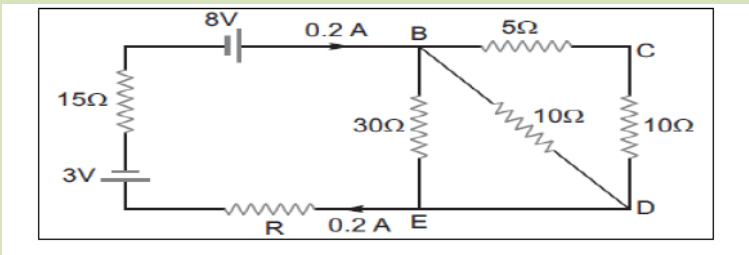
14. In a meter bridge shown in the figure, the balance point is found to be 40 cm from end A. If a resistance of 10 Ω is connected in series with R, balance point is obtained 60 cm from A. Calculate the values of R and S.



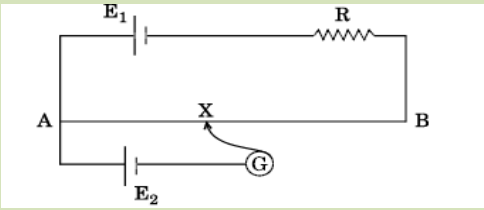
15. AB is one meter long uniform wire of 10 Ω resistance. The other data are shown in the circuit diagram given below, Calculate (i) Potential gradient along AB, and (ii) length AO of the wire, when the galvanometer shows no deflection.



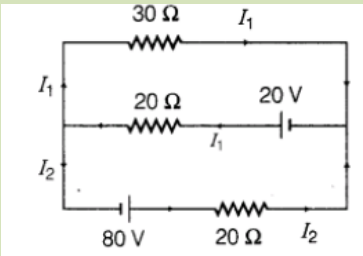
16. Calculate the value of the resistance *R* in the circuit shown in the figure so that the current in the circuit is 0.2 A. What would be the potential difference between points *B* and *E*?



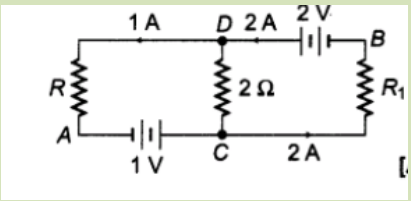
17. In the circuit diagram shown, AB is a uniform wire of resistance 15 Ω and length 1m.It is connected to a cell E1 of emf 2V and negligible internal resistance R. the balance point with another cell E2 of emf 75 mV is found at 30 cm from end A. Calculate the value of the resistance R.



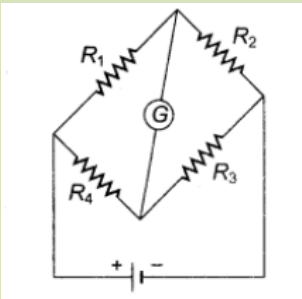
18. In an experiment on meter bridge, if the balancing length AC is X, what would be its value, when the radius of the meter bridge wire AB is doubled? Justify your answer.
19. In a meter bridge, two unknown resistances R and S when connected in the two gaps, give a null point at 40 cm from one end. What is the ratio of R and S?
20. Use Kirchhoff's rules to determine the value of the current Ix flowing in the circuit shown in the figure



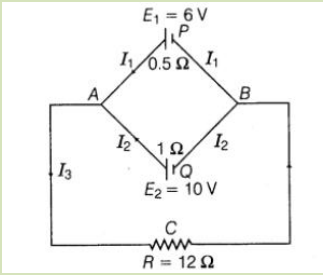
21. In the given circuit, assuming point A to be at zero potential, use Kirchhoff's rules to determine the potential at point B



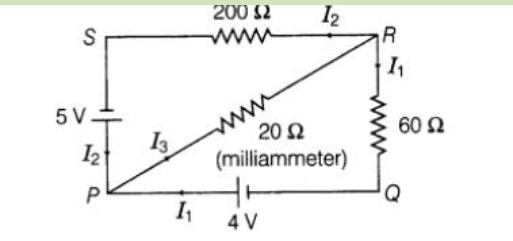
22. For the circuit diagram of a Wheatstone bridge shown in the figure, use Kirchhoff's laws to obtain its balance condition.



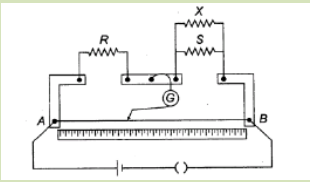
23. State Kirchhoff's rules. Apply Kirchhoff's rules to the loops ACBPA and ACBQA to write theexpressions for the currents I1, I2 and I3 in the network.



24. State Kirchhoff's rules. Apply these rules to the loops PRSP and PRQP to write the expressions for the currents I1, I2 and I3 in given circuit.

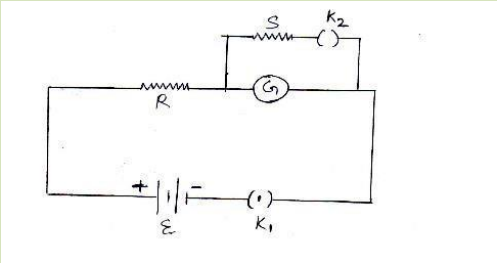


25. In a meter bridge, the null point is found at a distance of l1 cm from A. If a resistance of X is connected in parallel with S, then null point occurs at a distance l2 cm from A. Obtain the formula for X in terms of l1,l2 and S.

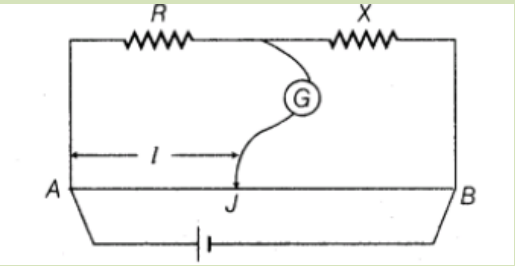


26. The current flowing in the galvanometer G when the key k2 is kept open is I. On closing the key K2, the current in the galvanometer becomes I/n, where n is an integer. Obtain an expression for resistance

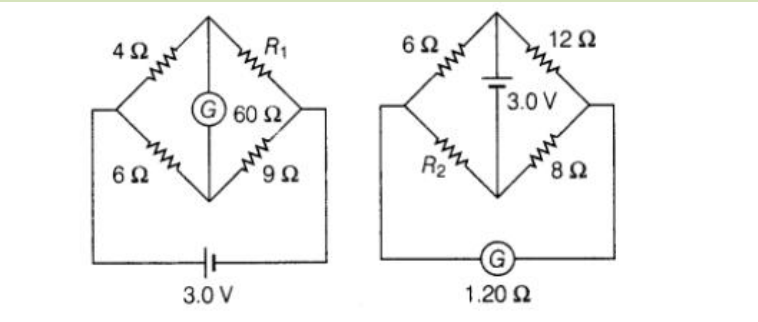
Rg of the galvanometer in terms of R, S and n. To what form does this expression reduce when the value of R is very large as compared to S?



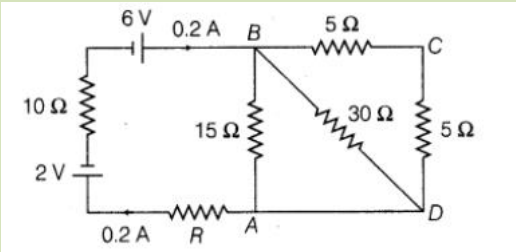
27. In the meter bridge experiment, balance point was observed at J with AJ =l.
(i)The values of R and X were doubled and then interchanged. What would be the new position of balance point?
(ii)If the galvanometer and battery are interchanged at the balanced position, how will the balance point get affected?



28. Define the current sensitivity of a galvanometer. Write its SI unit. Figure shows two circuits each having a galvanometer and a battery of 3 V. When the galvanometer in each arrangement do not show any deflection, obtain the ratio R_1 / R_2 .



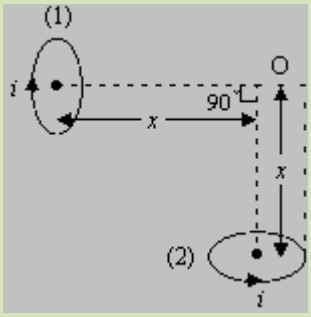
29. Calculate the value of the resistance R in the circuit shown in the figure, so that the current in the circuit is 0.2A. What would be the potential difference between points A and B ?



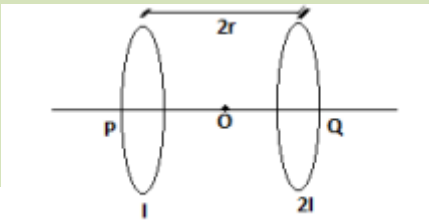
BIOT SAVART'S LAW AND AMPERE'S CIRCUITAL LAW
MAGNETISM

1. What is a solenoid? How will you represent the magnetic field around a solenoid when some current is passed through it?

2. Two small identical circular loops, marked (1) and (2), carrying equal currents, are placed with the geometrical axes perpendicular to each other as shown in figure. Find the magnitude and direction of the net magnetic field produced at the point O.

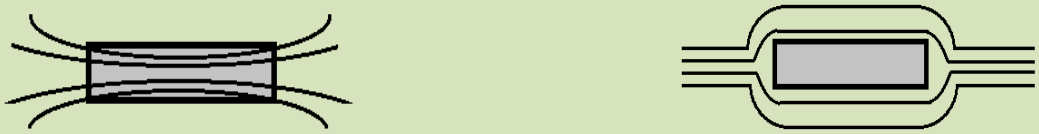


3. A closely wound solenoid 80 cm long has 5 layers of windings of 400 turns each. The diameter of the solenoid is 1.8 cm. If the current carried is 8.0 A, estimate the magnitude of B inside the solenoid near its centre.
4. A circular coil of wire consisting of 100 turns, each of radius 8.0 cm carries a current of 0.40AWhat is the magnitude of the magnetic field B at the centre of the coil?
5. When a cyclotron is said to be in resonance condition?
6. What are the main functions of Crossed Electric and Magnetic Fields in a Cyclotron?
7. Why is a cyclotron not suitable for accelerating electrons?
8. Why a cyclotron cannot be used to accelerate neutrons?
9. Explain the principle of a device that can be used to accelerate heavy charged particles?
10. State the underlying principle of a cyclotron. Write briefly how this machine is used to accelerate charged particles to high energies.
11. Write down some uses of cyclotron
12. An α-particle and a proton are released from the centre of the cyclotron and made to accelerate.
    (a) Can both be accelerated at the same cyclotron frequency? Give reason to justify your answer.
13. Show that the Cyclotron frequency is independent of speed/ energy of the particle.
14. Is there an upper limit on the energy acquired by the particle? Give reason.
15. With the help of a labeled diagram Describe principle , construction, theory and working of a cyclotron. Derive expression for cyclotron frequency and show that it is independent of radius and velocity Obtain the expression for Maximum K.E. Give its limitation
16. A solenoid of length 50 cm having 100 turns carrying a current of 4.5 A find the magnetic field (i) in the Interior of solenoid .
17. How will the magnetic field intensity at the centre of a circular coil carrying current change if the current through the coil is doubled and the radius of the coil is halved.
18. A solenoid is 1m long and 3 cm in mean diameter. It has 5 layers of windings of 800 turns each and carries a current of 5 A. Find Magnetic Field Induction at the center of the solenoid.
19. A current is flowing in a circular coil of radius ‘r’ and magnetic field at its center is B_0. At what distance from the center on the axis of the coil, the magnetic field will be $B_0/8$?
20. The strength of magnetic induction at the center of a current carrying circular coil is B_1 and at a point on its axis at a distance equal to its radius from the center is B2. Find B_1/B_2.
21. Consider a tightly wound 100 turns coil of radius 10 cm, carrying a current of 1 A. What is the magnitude of the magnetic field at the centre of the coil?
22. Two identical circular loops, P and Q , each of radius r and carrying currents I respectively are lying in parallel planes such that they have a common axis. The direction of current in both the loops is anticlockwise. Find the magnitude of the net magnetic field at point O?



23. State Biot Savart's law.
24. Derive an expression for magnetic field at the centre of a current carrying circular loop.
25. Derive an expression for magnetic field at a point on the axis of a current carrying circular loop.
26. State and prove Ampere's circuital law.
27. What is magnetic dipole moment?
28. Derive expression for Dipole Moment of a Revolving electron.
29. What is an axial and equatorial line of a magnetic dipole?
30. Compare magnetic field intensity on axial and equatorial line of a magnetic dipole.
31. Define Bohr's magneton and write its value.
32. How does an atom behave as magnetic dipole?
33. Explain a method to find the direction of magnetic field of a current carrying loop.
34. Draw magnetic field line due to a current carrying coil.
35. Write any three differences between diamagnetic, paramagnetic and ferromagnetic substances.
36. How is the intensity of magnetisation of a paramagnetic material related to the temperature?

37. Two similar bars A and B are made from the same material are placed in the same magnetic field. The magnetic lines of force pass through them as shown in the figure. Which of these bars is paramagnetic and Diamagnetic?



38. What does the area of the hysteresis loop indicate?

39. Why should the material used for making permanent magnets have high retentivity and highcoercivity?

40. Two similar bars A and B made from different materials are placed in non-uniform magnetic field and it is observed that P moves from Stronger to the weaker part of the magnetic field while Q moves from the weaker to the stronger part of the field. Identify the Nature of the magnetic materials used for making the two bars. With the help of the diagram show the behaviour of the field lines when the two bars are placed in external magnetic field.

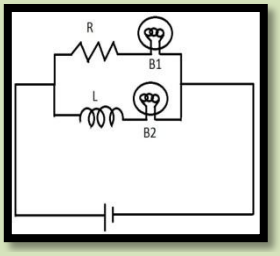
41. The magnetic susceptibility of a magnetic material is 2.3 × 10-5. What will be the magnetic nature of the substance? Draw a diagram to show the magnetic field pattern if substance is placed in the uniform magnetic field.

42. Two magnetic substances A and B have their magnetic permeabilities slightly greater and less than 1. What you can say about the magnetic nature of these substances?

43. Name the materials in each case which are suitable for making permanent magnet and core of the transformer. Justify your answer.

44. Three identical specimen of the magnetic materials Nickel, Antimony and Aluminium are kept in non-uniform magnetic field. Draw the modification of field lines in each case and justify your answer.
45. Two identical loops, one of copper and another of aluminum are rotated with the same speed in the same M.F, In which case, the induced (a) e.m.f. (b) Current will be more and why?
46. Why is spark produced in the gap of switch of a fan, when it is switched off?
47. Coils in the resistance boxes are made from doubled up-insulated wire. Why?
48. A galvanometer connected in an A.C. circuit does not show any deflection. Why?
49. Can we use transformer to step up D.C. voltage? If not, why?
50. What is the relation between rms& peak value of alternating Current?
51. The algebraic sum of potential drop across the various - elements in LCR circuit is not equal to the applied voltage. Why?

52. A copper ring is held horizontally and bar magnet is dropped through the ring with its length along the axis of the ring. Will the acceleration of the falling magnet be equal to, greater than or less than that due to gravity?
53. Define the term Wattless Current?
54. An inductor L of reactance X_L is connected in series with a bulb B to an A.C. source . Briefly explain how does the brightness of the bulb change when
a. Number of turns of the inductor is reduced and
b. A capacitor of reactance $X_C = X_L$ is included in series in the same circuit.
55. Figure shows an inductor L and a resistance R connected in parallel to a battery through a switch. The resistance R is same as that of the coil that makes L. Two identical bulbs are put in each arm of the circuit.



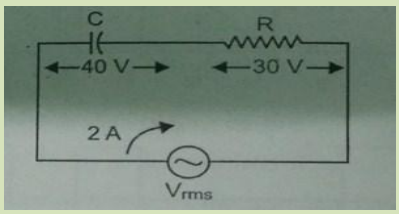
Which of the bulbs lights up earlier, when K is closed?
Will the bulbs be equally bright after same time?
56. The peak value of a.c. is 20A. What is its r.m.s. value?
57. What is the value of power factor for LCR series circuit in resonance?
58. What do you mean by the admittance of an a.c. circuit?
59. What is wattless current?
60. The equation of an alternating current is $I = 20 \sin 300 \pi t$. Calculate the frequency and peak value of current.
61. Write two advantages of a.c. over d.c ?
62. An ideal capacitor consumes no electric power in an a.c. circuit. Explain.
63. Define quality factor of an LCR series circuit. What is its physical significance?
64. An electric bulb connected in series with an inductor does not light up to full brilliance immediately when the current is switched on. Explain why?
65. An a.c. voltage of 100V, 50Hz is connected across a 20 ohm resistance and 2mH inductor in series. Calculate (i) Impedance of the circuit (ii) rms current in the circuit.
66. What is main cause of noise of transformer?
67. How humming sound in a transformer is reduced?Can we use transformer to step up D.C. voltage? If not, why?Why the core of Transformer is laminated?A 60 W load is connected to the secondary of a transformer whose primary draws line voltage. If a current of 0.54 A flows in the load, what is the current in the primary coil? Comment on the type of transformer being used.
68. 11 Kilowatts of power can be transmitted in two ways:220 volts at 50 amperes and 22000 volts at 0.5 ampere.Which is economical? Give reasons for your choice.
69. A transformer has 500 turns in the primary and 1000 turns in its secondary winding. The primary voltage is 200 V and the load is the secondary is 100Ω. Calculate the current in the primary, assuming it to be an ideal transformer
70. The output voltage of an ideal transformer, connected to a 240 V ac. mains is 24V. When this transformer is used to light a bulb with rating 24 V, 24 W, calculate the current in primary.
71. Calculate the current drawn by the primary of a transformer, which steps down 200 V to 20 V to operate a device of resistance 20 Ω. Assume the efficiency of the transformer to be 80%.
72. The primary coil of an ideal step – up transformer has 100 turns and the transformation ratio is also 100. The input voltage and the power are 220 V and 1100 W respectively. Calculate:
    a. Number of turns in the secondary
    b. The current in the primary
    c. Voltage across the secondary
    d. The current in secondary v) Power in the secondary

73. In an ideal transformer, number of turns in the primary and secondary are 200 and 1000 receptively. If the power input to the primary is 10 kW at 200 V, calculate

i) Output voltage and ii) current in primary.

74. A town situated 20 km away from a power plant generating power at 440 V, requires 6000 kW of electric power at 240 V. The resistance of the two wire line carrying power of 0.4 Ω per km. The town gets power from the line through a 3000 – 220 V step down transformer at a substation in the town.
    a. Find the line power losses in the form of heat.
    b. How much power must the plant supply, assuming there is negligible power loss due to leakage?
75. A 60 W load is connected to the secondary of a transformer whose primary draws line voltage. If a current of 0.54 A flows in the load, what is the current in the primary coil? Comment on the type of transformer being used.
76. 11 Kilowatts of power can be transmitted in two ways:220 volts at 50 amperes and22000 volts at 0.5 ampere. Which is more economical? Give reasons for your choice.

77. A transformer has 500 turns in the primary and 1000 turns in its secondary winding. The primary voltage is 200 V and the load is the secondary is 100Ω. Calculate the current in the primary, assuming it to be an ideal transformer
78. The output voltage of an ideal transformer, connected to a 240 V ac. mains is 24V. When this transformer is used to light a bulb with rating 24 V, 24 W, calculate the current in primary.
79. Calculate the current drawn by the primary of a transformer, which steps down 200 V to 20 V to operate a device of resistance 20 Ω. Assume the efficiency of the transformer to be 80%.
80. A circular coil having 20 turns, each of radius 8 cm, is rotating about its vertical diameter with an angular speed of 50 radian s^{-1} in a uniform horizontal magnetic field of magnitude 30 mT. Obtain the maximum,average and r. m. s. values of the emf indued in the coil.If the coil forms a closed loop of resistance 10Ω, how much power is dissipated as heat in it?
81. In series LCR circuit $V_L = V_C \neq V_R$,What is the value of power factor for this circuit.
82. The power factor of an AC circuit is 0.5. What is the phase difference between voltage and current in the circuit?
83. prove mathematically that the average power over a complete cycle of alternating current through an ideal inductor is zero?
84. At resonance in ac circuit , what is the value of power factor?
85. Does it imply that power dissipated , in an ac circuit is zero at resonance ?
86. Where is the power dissipation in an alternating current circuit? In resistance ,ininductor,or capacitor?
87. Define power factor. State the conditions under which it is 1) maximum 2) minimum
88. In a series LCR circui, obtain the condition under which 1) the impedance of the circuit is minimum and 2) wattles current flow in the circuit?
89. What is power dissipated by an ideal inductor in ac circuit? Explain.
90. Calculate wattles current of the given ac circuit



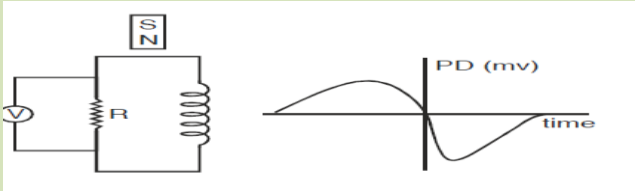
91. Using phasor diagram, derive an expression for the impedance of a series LCR-circuit.
92. What is motional emf. Derive an expression for emf induced by changing area.
93. Define self-inductance. Derive an expression for self-inductance of a long air-cored solenoid of length l, radius r and having N number of turns.
94. Write a mathematical equation which include both Faraday's second law of EMI and Lenz's law. Show that it is in accordance with the law of conservation of energy.

95. An a.c. generator consists of a coil of 2000 turns each of area 80 cm^2 and rotation at an angular speed of 120 r.p.m. in a uniform magnetic field of 4.8×10^{-2} T. Calculate the peak and r.m.s value of e.m.f. induced in the coil.

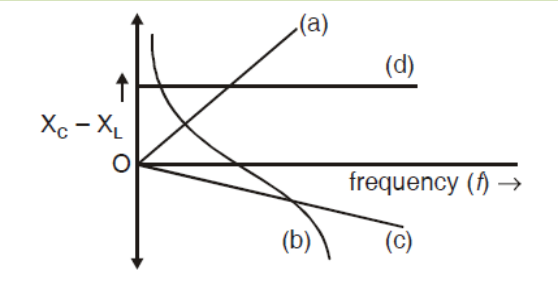
96. A coil has an inductance of 0.03 H. Determine the emf induced in the coil if current changes at the rate of 150 A/s.

ALTERNATING CURRENT

1. Draw the variation in capacitive reactance and inductive reactance with frequency of ac source.
2. Draw the variation in impedance of LCR circuit with frequency of ac source and mark the point of minimum impedance.
3. Draw the phasor diagram for voltage and current in pure (i) inductive circuit (ii) capacitive circuit.
4. An a.c. source of 200 volt, 50 Hz. Is connected across a 300 Ohm resistor and a capacitor of $25/\pi$ μF in series. Calculate (a) the reactance (b) impedance and (c)current in the circuit
5. A capacitor C, a variable resistor R and a bulb B are connected in series to the AC supply. The bulb glow with some brightness. How will the glow of bulb change (i) if dielectric slab is kept in between the plates of capacitor (R is constant). (ii) Resistance R is increased keeping C constant.
6. An AC source of voltage V = Vm Sin ωt, is applied across a series LCR. Draw the phasor diagram for this circuit (i) $X_L > X_C$ (ii) $X_L < X_C$ (iii) $X_L = X_C$.
7. If a series LCR circuit is connected to an AC source of variable frequency and voltage V = Vm Sin ωt, (i)draw a plot showing variation of current with angular frequency ω, for two different values of resistances R1 and R2 (R1 > R2). (ii) Write the condition under which phenomenon of resonance occur. (iii) For which resistance out of two curves a sharper resonance is produced? Explain.
8. An Ac source of voltage V = Vm Sin ωt is connected one by one to three circuit elements 'X' , 'Y' and 'Z'. It is observed that the current flowing in them is in phase with applied voltage with for element X, (ii) leads the voltage in phase by π /2 for element Y, and (iii) lags the voltage in phase by π /2 for element Z.
   (a) Identify the three circuit elements
   (b) Net impedance of circuit when same AC source is connected across series combination of elements X,Y and Z
   (c) If frequency of applied voltage is varied than set up the condition for the frequency when the current amplitude in circuit is maximum
9. A bar magnet M is dropped so that is falls vertically through the coil C. The graph obtained forvoltage produced across the coil Vs time is shown in figure.



   (i) Explain the shape of the graph(ii) Why is the negative peak longer than the positive peak?
10. Which of the following curves may represent the reactance of a series LC combination.



ELECTROMAGNETIC WAVES

1. Name the waves which are used in telecommunication.

2. Identify the part of the electromagnetic spectrum to which waves of frequency (i) 102 Hz (ii)109Hz belong.
3. The range of wavelength of visible light is 390 nm to 780 nm. Calculate the corresponding frequency range.
4. How are X-rays produced?
5. Name electromagnetic radiation used for viewing objects through haze and fog.
6. Electromagnetic waves with wavelength
   i. $\lambda_1$are used to treat muscular strain.
   ii. $\lambda_2$are used by a FM radio station for broadcasting
   iii. $\lambda_3$are used to detect fracture in bones
   iv. $\lambda_4$are absorbed by the ozone layer of the atmosphere.
7. In a plane e.m. wave, electric field has frequency 3 x10^{11} Hz and amplitude 50 Vm^{-1}.Find (i) λ (ii) amplitude of magnetic field.
8. If absolute permittivity and permeability of free space are $\in_0$ = 8.85 x 10^{-12} C^2 N^{-1} m^{-2} and μ_0 = 4 π x 10^{-7} TmA^{-1} Calculate the velocity of electromagnetic waves.
9. Mention the pair of space and time varying E and B fields which would generate a plane em wave travelling in the z-direction?
10. How are radiowaves produced?
11. Write the expression for the velocity of electromagnetic waves in vacuum, If absolute permittivity and permeability of free space are $\in_0$ = 8.85 x 10^{-12} C^2 N^{-1} m^{-2} and μ_0 = 4 π x 10^{-7} TmA^{-1} ?.
12. What is the ratio of speed of infrared and ultraviolet rays in vacuum?
13. An electromagnetic wave consists of oscillating electric and magnetic fields. What is the phase relationship between these oscillations?
14. What are electromagnetic waves?
15. Give the ratio of velocities of light rays of wavelength 4000Åand 6000Åin vacuum.
16. What is electromagnetic spectrum?
17. Name any six electromagnetic waves in increasing order of their frequencies.
18. What are microwaves?
19. Name the electromagnetic waves that have frequencies greater than those of ultra-violet light but less than those of gamma rays.
20. Write two properties of gamma rays.
21. A plane electromagnetic wave travels in vacuum along the Y-direction. Write the (I) ratio of the magnitude and (II) the direction of its electric and magnetic field vectors.
22. State any four properties of electromagnetic waves.
23. Name the part of electromagnetic spectrum, which is suitable for
    i. Treatment of cancer tumours.
    ii. Used for sterilizing surgical instrument.
    iii. Used in dry clothes.
    iv. Used to kill germs in water purifiers.
    v. Used in TV communication systems.
    vi. Radar system used in aircraft navigation.

Ray Optics And Wave Optics

1. Define critical angle with reference to T I R.
2. Calculate the critical angle for glass-air surface, if a ray of light which is incident in air on the glass surface is deviated through 15°, when angle of incidence is 45°.
3. Explain briefly how the phenomenon of T I R is used in fibre optics.
4. Write the two essential conditions for T I R to occur.

5. Write the conditions for observing a rainbow. Show by drawing suitable diagrams to explain the formation of rainbow.
6. Explain with diagram the brilliance of diamond based on T I R.
7. A point source of monochromatic light S which kept at the centre of the bottom of a cylinder of radius 15.0cm. The cylinder contain water (μ= 4/3) to a height of 7.0 cm. Draw the ray diagram and calculate the area of water surface through light emerges in the air.
8. Three parallel rays of light- Red ,green and blue are incident on the face AB of a right angle prism ABC.The refractive indices of the material of the prism for red,greenand blue wavelengths are 1.39,1.44and 1.47 respectively. Trace the path of the rays of the prism.
9. How will the situation in question No 8, change if these rays were incident normally on one of the faces of an equilateral prism.
10. Calculate the critical angle for a ray of light tending to travel from glass (μ= 5/3) to water to (μ= 4/3).
11. What is the angle of reflection when a light ray is incident on a spherical mirror normal to its surface?
12. Show graphically the variation of u and v in case of a convex mirror?
13. Name the mirror used for rear view in automobiles?
14. What are focal length and power of a plane mirror?
15. You read a newspaper, because of the light if reflects. Then why do you not see even a faint image of yourself in the newspaper?
16. An object is placed between the pole and focus of a concave mirror produces a virtual enlarged image. Justify by diagram.
17. Suppose that the lower half of a concave mirror's reflecting surface is covered with an opaque non – reflecting material. What effect will this have on the image of an object placed in front of the mirror?
18. Will the reflected rays converge at a point when a parallel beam of light is incident on a concave mirror of large aperture?
19. Explain why mirrors used in search lights are parabolic? Why do not use concave mirror for same purpose.
20. Light of wavelength 5000 Ǻ falls on a plane reflecting surface. What are the wavelength and frequency of reflected light? For what angle of incidence is the reflected ray normal to the incident ray ?
21. Use the mirror equation to show that an object placed between f and 2f of a concave mirror form an image beyond 2f,
22. Establish relation between f and R of a convex mirror.
23. An object is held in front of a concave mirror of focal length 15cm. The image formed is 3 time the size of the object. Calculate two possible distances of the object from the mirror.
24. An object is placed 10cm in front of a concave mirror of radius of curvature 15cm.Find the position , nature and magnification of the image .
25. If you sit in a parked car, you glance in the rear view mirror R=2m and notice a jogger approaching .If the jogger is running at a speed of $5ms^{-1}$, how fast is the image of jogger moving when the jogger is 39m away.
26. A 5cm long needle is placed 10cm from a convex mirror of focal length 40cm.Find the position, nature and size of the image of the needle. What happens to the size of image when the needle is moved farther away from the mirror ?
27. A square wire of side 3.0cm is placed 25cm away from a concave mirror of focal length 10cm . What is the area enclosed by the image of the wire?(The centre of the wire is on the axis of the mirror, with its two sides normal to the axis)
28. An object is placed at a distance of 40cm on the principal axis of a concave mirror of radius of curvature 30cm. By how much does the image move if the object is shifted towards the mirror through 15cm?
29. An object is kept in front of a concave mirror of focal length 15cm. The image formed is three times the size of the object. Calculate the two possible distances of the object from the mirror.

30. A concave mirror of focal length 10cm is placed at a distance of 35cm from a wall. How far from the wall should an object be placed to get its image on the wall?
31. (a) Why is a concave mirror preffered to a plane mirror for shaving?
(b)A concave mirror is held in water. What would be the change in the focal length of the mirror?
32. State and derive mirror formula for a concave mirror with the help of suitable ray diagram. State the sign conventions used.
33. What type of wave front will emerge from a (1) point source and (2) distant light source?
34. What is the shape of wave front on earth for sunlight?
35. What is the phase difference between any two points on a wavefront?
36. Differentiate between a ray and a wavefront .
37. State Huygens principle.
38. The refractive index of diamond is 2.47 and that of window glass is 1.51. Find the ratio of speeds of light in glass and diamond.
39. Explain Huygen's principle. Name the types of wavefront that correspondsto a beam of light (a)coming from a convex lens when point source placed at focus.
(b)coming from very far off source.
40. Draw the diagrams to show the behavior of plane wavefronts as they(a)pass through a thin prism , (b)pass through a thin convex lens.
41. Calculate the time which light will take to travel normally through a glass plate of thickness 1mm. Refractive index of glass is 1.5.
42. The optical path of monochromatic light is same if it travels 2 cm thickness of glass or 2.25 cm , thickness of water .What is the refractive index of water ?
43. Can a backward wave front exit? Give reason in support of your answers.
44. Prove laws of reflection on the basis of wave theory.
45. Prove Snell's law of refraction on the basis of Huygens principle.
46. Red light of wavelength 750nm enters a glass plate of refractive index 1.5 .If velocity of light in vacuum is $3x10^8$m/s ,calculate velocity ,wavelength and frequency of light.
47. Based on Huygen's principle , draw the incident and refracted wavefront AB and CD when light travelling from air to denser medium incident at an angle of 45° is refracted at an angle of 30° .
48. A light wave has a frequency of $5x10^{14}$Hz. Find the difference in its wavelength in alcohol of refractive index 1.35 and glass of refractive index 1.5.
49. The absolute refractive index of air is 1.0003 and wavelength of yellow light in vacuum is 6000Å .Find the thickness of air column which will contain more wavelength of yellow light than in the same thickness of vacuum.

MAX 35

50. State the condition of destructive interference .
51. Draw a diagram to show the refraction of a plane wave front incident on a convex lens.
52. What is the relation between path difference and phase difference?
53. What is the ratio of slit widths, when the amplitudes of light waves have a ratio $2\sqrt{2} : 1$.?
54. Why is interference pattern not detected , when the two coherent sources are far apart ?
55. Two light waves of amplitudes a_1 and a_2 interfere with each other. Find the ratio of the intensities of a maxima to that of a minima.

2

56. If the path difference produced due to interference of light coming out of two slits for yellow colour of light at a point on the screen be $3\lambda/2$, what will be the colour of the fringe at that point? Give reason

57. Draw the curve depicting variation of intensity in the interference pattern in Young double slit experiment. State conditions for obtaining sustained interference pattern of light.

58. What is the effect on the interference fringes in a Young's double slit experiment due to each of the following operations? Give reason for your answer. (i) Separation between two slits is increased (ii) monochromatic source is replaced by a source of whit light .

59. Two narrow slits are illuminated by a single monochromatic source. Name the pattern obtained on the screen. One of the slits is now completely covered. What is the name of the pattern now obtained on the screen? Draw intensity pattern in the two cases. Also write two differences between the pattern obtained in the above two cases.

60. Two sources of intensity I and 4I are used in an interference experiment. Find the intensity at point where the waves from two sources superimpose with a phase difference (i)Zero (ii) $\frac{\pi}{2}$(iii)π

61. Obtain the expression for fringe width in Young's double slit experiment

62. (a) What are coherent sources of light? Two slits in Young's double slit experiment are illuminated by two different sodium lamps emitting light of the same wavelength. Why is no interference pattern observed?

63. Obtain the condition for getting dark and bright fringes in Young's experiment.

64. What is the effect of the interference fringes in a Young's double slit experiment due to each of the following operations.

    a. The screen is moved away from the plane of the slits:

    b. The monochromatic source is replaced by another monochromatic source of shorter wavelength:

    c. The separation between the two slits is increased.

69. In YDSE using light of wavelength 600nm, the angular width of the fringe formed on a distant screen is 0.10 .Find the spacing between the two slits.

70. The figure below, drawn here, shows a modified Young's double slit experimental set up. If SS_2- SS_1, = λ /4,

    (i) State the condition for constructive and destructive interference

    (ii) Obtain an expression for the fringe width.

    (iii) Locate the position of the central fringe.

71. If the path difference produced due to interference of light coming out of two slits for yellow colour of light at a point on the screen be $3\lambda/2$, what will be the colour of the fringe at that point? Give reasons.

72. A beam of light consisting of two wavelengths,650 nm and 520 nm, is used to obtain interference fringes in a Young's double-slit experiment.(a)Find the distance of the third bright fringe on the screen from the central maximum for wavelength 650 nm.(b)What is the least distance from the central maximum where the bright fringes due to both the wavelengths coincide?

73. The intensity at the central maxima in Young's double slit experimental set-up is I_0. Show that the intensity at a point where the path difference is λ /3 is I_0/ 4.

74. State two conditions to obtain sustained interference of light. In Young's double slit experiment, using light of wavelength 400 nm, interference fringes of width 'X' are obtained. The wavelength of light is increased to 600 nm and separation between slit is halved. In order to maintain the same bandwidth, by what distance screen is to be moved? Find the ratio of the distance of the screen in the above cases.
75. How does the angular separation of interference fringes change, in Young's experiment, when the distance between the slits is increased?
76. How the angular separation of interference fringes in young's double slit experiment change when the distance of separation between the slits and the screen is doubled?
77. In double-slit experiment using light of wavelength 600 nm, the angular width of a fringe formed on a distant screen is 0.1°.Whatis the spacing between the two slits?
78. If the path difference produced due to interference of light coming out of two slits for yellow colour of light at a point on the screen be $3\lambda/2$, what will be the colour of the fringe at that point? Give reasons.
79. State two conditions to obtain sustained interference of light. In Young's double slit experiment, using light of wavelength 400 nm, interference fringes of width 'X' are obtained.
80. Two narrow slits are illuminated by a single monochromatic source. Name the pattern obtained on the screen. One of the slits is now completely covered. What is the name of the pattern now obtained on the screen? Draw intensity pattern obtained in the two cases. Also write two differences between the patterns obtained in the above two cases.
81. In Young's double-slit experiment a monochromatic light of wavelength λ, is used. The intensity of light at a point on the screen where path difference is λ is estimated as K units. What is the intensity of light at a point where path difference is $\lambda/3$?
82. A beam of light consisting of two wavelengths,650 nm and 520 nm, is used to obtain interference fringes in a Young's double-slit experiment.(a)Find the distance of the third bright fringe on the screen from the central maximum for wavelength 650 nm.(b)What is the least distance from the central maximum where the bright fringes due to both the wavelengths coincide?
83. In a double-slit experiment the angular width of a fringe is found to be0.2° on a screen placed 1 m away. The wavelength of light used is 600 nm. What will be the angular width of the fringe if the entire experimental apparatus is immersed in water? Take refractive index of water to be 4/3.
84. A narrow monochromatic beam of light of intensity I is incident a glass plate. Another identical glass plate is kept close to the first one and parallel to it. Each plate reflects 25% of the incident light and transmits the reaming. Calculate the ratio of minimum and maximum intensity in the interference pattern formed by the two beams obtained after reflection from each plate.
85. What are coherent sources? Why are coherent sources required to produce interference of light? Give an example of interference of light in everyday life. In Young's double slit experiment, the two slits are 0.03 cm apart and the screen is placed at a distance of 1.5 m away from the slits. The distance between the central bright fringe and fourth bright fringe is 1 cm. Calculate the wavelength of light used.
86. What is interference of light? Write two essential conditions for sustained interference pattern to be produced on the screen. Draw a graph showing the variation of intensity versus the position on the screen in Young's experiment when (a) both the slits are opened and (b) one of the slit is closed. What is the effect on the interference pattern in Young's double slit experiment when: (i) Screen is moved closer to the plane of slits? (ii)Separation between two slits is increased. Explain your answer in each case.
88. Instead of using two slits as in Young's experiment, if two separate but identical sodium lamps are used, what is the effect on interference pattern?
89. What is the effect on interference fringes when yellow light is replaced by blue light in Young's double slit experiment?
90. How does the fringe width in interference vary with the intensity of incident light?

91. What about the consistency of the principle of conservation of energy in interference and in diffraction?

92. What is the maximum intensity of light in Young's double slit experiment if the intensity of light emerging from each slit is Io?

98. In Young's apparatus is immersed in a liquid of μ= 1.33. What will happen to the fringe width of the interference pattern?

99. Discuss the effect of moving the source slit closer the double slits on the interference fringes.

100. How does the fringe width of interference fringes change, when the whole apparatus of Young's experiment is kept in a liquid of refractive index 1.3?

101. How does the angular separation of interference fringes change, in Young's experiment, if the distance between the slits is increased?

102. Two slits in Young's interference experiment have widths in the ratio 1:9. Calculate the ratio of intensity at the maxima and minima in the interference pattern.

103. In Young's double slit experiment the distance between the slits in 0.2mm and the screen is at 2m from the slits. Find the distance of the third maxima from the central maximum if the wavelength is 5000Å.

104. Calculate the resolving power of a microscope with cone angle of light falling on the objective equal to 600. Take λ= 600 nm and μ for air =1. Assume that light of wavelength 6000Å is coming from a star .What is the limit of resolution of telescope whose objective has a diameter of 100 inch?

105. The intensity at the central maxima in Young's double slit experimental set-up is I_0. Show that the intensity at a point where the path difference is $\lambda/3$ is $I_0/4$.

106..Draw a ray diagram to illustrate image formation by a Newtonian type reflecting telescope? Hence state two advantages of it over refracting type telescopes?

107. The magnifying power of an astronomical telescope in the normal adjustment position is

100. The distance between the objective and the eye piece is 101cm. calculate the focal length of the objective and the eye piece.[3]

108. In a telescope the focal length of the objective and the eye piece are 60cm and 5cm respectively. What is? (1) Its magnification power (2) Tube length

109. A reflecting type telescope has a concave reflector of radius of curvature 120cm. calculate the focal length of eye piece to secure a magnification of 20?[3]

110. Four double convex lens with following specification are available.

Lens	**Focal length**	**Aperture**	**Lens**	**Focal length**	**Aperture**
A	100 cm	10 cm	C	10 cm	2 cm
B	100cm	5 cm	D	5cm	2 cm

Which of the given four lenses should be selected as objective and eyepiece to construct an astronomical telescope and why? What will be the magnifying power and length of the tube of this telescope? [3]

111. An object is seen with the help of a simple microscope, firstly in red light and then is blue light. Will the magnification be same in both the cases? Why? [3]

112. A converging lens of focal length 6.25cm is used as a magnifying glass if near point of the observer is 25cm from the eye and the lens is held close to the eye. Calculate (1) Distance of object from the lens. (2) Angular magnification and (3) Angular magnification when final image is formed at infinity. [3]

113. Two lenses having focal length f1 and f2 are placed co axially at a distance x from each other. What is the focal length of the combination?

114. Can a microscope function as a telescope by inverting it?

115. Draw ray diagram to show the working of a compound microscope. Deduce an expression for magnifying power when the final image is formed at the near point. A compound microscope with an objective of 1.0cm focal length and an eye-piece of 2.0cm focal length has a tube of length of 20cm. Calculate the magnifying power of the microscope , if the final image is formed at the near point of the eye.

116. Draw a ray diagram to show the working of an astronomical telescope .Deduce an expression for magnifying power when the final image is formed at the near point. The magnifying power of an astronomical telescope in the normal adjustment is 20. If the length of the telescope is 105cm in this adjustment, find the focal lengths of the two lenses
117. Which phenomenon confirms the transverse nature of light?
    i. Does the value of polarising angle depend on the colour of light .
118. By what percentage the intensity of light decreases when an ordinary unpolarised (like from sodium lamp) light is passed through a polaroid sheet ?
119. State and prove Brewster Law.
120. Represent polarised light and unpolarised light.
121. Discuss the intensity of transmitted light when a polarized sheet is rotated between two crossed polarized?
122. Name a device for producing polarised light. Draw agraph showing the dependence transmitted light on the angle between polariser and analyser.
123. To polaroids A and B are kept in cross position how should a 3rd Polaroid C be placed between them so that intensity of polorasized light transmitted by B reduces to 1/8 of unpolarized light?
124. What does a Polaroid consist of? Show using a simple Polaroid that light waves are transverse in nature. Intensity of light coming out of a Polaroid does not change irrespective of the orientation of the pass axis of the Polaroid. Explain why.
125. State Malus' law. Draw a graph showing the dependence of intensity of transmitted light on the angle between polarizer and analyser.

COMMUNICATION

1. Mention the functions of the transponder?
2. What should be the length of dipole antenna for a carrier wave of 5×10^8 Hz?
3. A device X can convert one form of energy into another. Another device Y can be regarded as a combination of a transmitter and a receiver. Name the devices X and Y.
4. Write the expression for band width in FM.
5. What is attenuation?
6. What is the role of band pass filter in modulation circuit?
7. State the facts by which the range of transmission of signals by a TV tower can be increased?
8. Why moon cannot be used as a communication satellite?
9. Why sky waves are not used for the transmission of TV signals?
10. Why ground wave propagation is not suitable for high frequency?
11. Why is ground wave propagation restricted to frequency up to 1500 kHz?

ATOM

1. What was the drawback of Rutherford model of atom?
2. Write two important inferences drawn from Giger-Marsden's α-particle scattering experiment?
3. Alpha-particle are incident on a thin gold foil. For what angle of deviation will the number of deflected α-particles be minimum?
4. The radius of the inner most electron orbit of a hydrogen atom 0.53Ä. what are the radii of the n=2 and n=3 orbits.
5. The ground state energy of hydrogen atom is -13.6eV .what are the kitenic and potential energies of the electron in this state?

6. Derive mvr=nh/2π using de Broglie equation.
7. Draw graph of number of scattered particles to scattering angle in Rutherford's experiment.
8. In the ground state of hydrogen atom orbital radius is 5.3×10^{-11}m. The atom is excited such that atomic radius become 21.2×10^{-11}m. What is principal quantum no of the excited state of the atom?
9. What is the distance of the closest approach? How does its measurement lead to nuclear size?

NUCLEI

1. The binding energy per nucleon of the two nuclei A and B are 4 MeV and 8.2 MeV. Which of the two nuclei is more stable?
2. What is the ratio of nuclear densities of the two nuclei having mass numbers in the ratio 1:4?
3. Write two characteristic features of nuclear force which distinguish it from Coulomb's force?
4. Define the term activity of a radio nucleus .Write its S.I Unit.

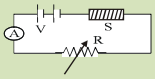
Using the relation $R = R_0(A)^{1/3}$ where R_0 is a constant and A is the mass number of a nucleus, show that nuclear matter density is nearly constant.

5. Draw the graph showing the variation of binding energy per nucleon with the mass number. What are the main inferences from the graph? Explain with the help of this plot the release of energy in the processes of nuclear fission and fusion.
6. State the laws of radioactive decay. Derive an expression for the number of atoms present at any instant of time in any radioactive sample.
7. Define the term half life period and decay constant. Derive the relation between these terms.
8. Write symbolically the nuclear positive β+ decay process of $^{6}C_{11}$. The decay product X is an isotope or isobar of $^{6}C_{11}$. Given the mass values m ($^{6}C_{11}$) = 11.011434 amu and m(X) = 009305 amu and 1 amu = 931.5 MeV. Estimate the Q-value in this process.

SEMICONDUCTOR AND DEVICES

1. Give the ratio of the number of holes and the number of conduction electrons in an intrinsic semiconductor.
2. What is meant by the terms, doping of an intrinsic semiconductor? How does it affect the conductivity of a semiconductor?
3. The probability of promotion of electron from valence band to conduction band increases with temperature.
4. Explain the difference in the temperature variation of resistivity of metals and intrinsic semiconductors.

5.How does the conductivity of a semiconductor vary with temperature?
6.The diagram shows a piece of pure semiconductor, S in series with a variable resistor R, and a source of constant voltage V. Would you increase or decrease the value of R to keep the reading of ammeter (A) constant, when semiconductor S is heated ? Give reason



7. Explain, with the help of graph, the variation of conductivity with temperature for a metallic conductor.

8.What is an 'energy gap' in a semiconductor?
9. How does the forbidden energy gap of an intrinsic semiconductor vary with increase in temperature?
10. On the basis of the energy band diagrams, distinguish between
(i) a metal, (ii) an insulator and (iii) a semiconductor.
11. Distinguish between intrinsic and extrinsic semi- conductors.
12. A semiconductor like Si or Ge doped with impurities like boron or indium is called a ..... semiconductor.
13. Explain the formation of energy bands in a solid.
14. Pure Si at 300 K has equal electron (n_e) and hole (n_h) concentration of $1.5\times10^{16}/m^3$. Doping by indium increases n_h to $4.5\times10^{22}/m^3$. Calculate n_e in the doped silicon.

18. A semiconductor has equal electron and hole concentration 6×10^8 m^{-3}. On doping with a certain impurity, electron concentration increases to 8×10^{12} m^{-3}. Identify the type of semiconductor after doping.

20. What type of a semiconductor results when trivalent impurities are added to a germanium crystal? Give reasons for your answer.

21. What are holes'?

22. Explain how an n-type semiconductor is obtained.

23. What type of impurities do you add to a silicon crystal to obtain *n*-type and *p*-type semiconductors?

24. What types of charged carries are there in an n-type semiconductor?

25. How do you account for the conductivity of a semiconductor?

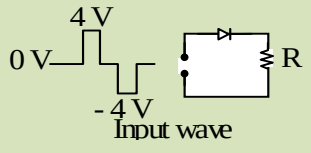
26 How does the energy gap in an intrinsic semiconductor vary, when doped with a pentavalent impurity?

27. Deduce an expression for the conductivity of a *p*-type semiconductor.

28.. Is the ratio of number of holes and number of conduction electrons in a *p*-type semiconductor more than, less than or equal to 1?

32. In a semiconductor, the concentration of electrons is 8×10^{13} cm^{-3} and that of holes is 5×10^{12} cm^{-3}. Is it a *p*-type or *n*-type semiconductor ?

36. What is an ideal diode? Draw the output waveform across R, for the input waveform given below?



\

39. Explain the terms depletion region and potential barrier for *pn* junction. .

41. Explain what happens to the depletion layer formed near the *pn*junction, when the junction is(i) forward biased and (ii) reverse biased.

42. Explain how the depletion layer and barrier potential are formed in a *pn* junction diode.

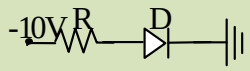
43. How does the width of the depletion region of a *pn* junction vary, if the reverse bias applied to it increases? **1**

44. A *pn* junction diode conducts when it is . . . . . biased.

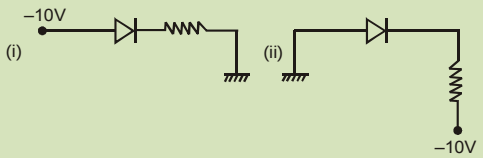
45. Show diagrammatically a forward biased and reversed biased *pn* junction.

46. Which biasing will make the resistance of a *pn* junction high?

47. In the given diagram, is the diode D forward or reversed biased ?



49. Explain, with the help of a circuit diagram, how the thickness of depletion layer in a *p-n* junction diode changes when it is forward biased. In the following circuits which one of the two diodes is forward biased and which is reverse biased?



53. Explain briefly, with the help of circuit diagram, how V-I characteristics of a p-n junction diode are obtained in (i) forward bias and (ii) reverse bias. Draw the shape of curves obtained.

54. When the voltage drop across a *pn* junction diode is increased from 0.70 V to 0.71 V, the change in the diode current is 10 mA. What is the dynamic resistance of the diode?

55. Explain the use of *pn* diode as rectifier.

56. Draw the circuit diagram for use of *pn* junction as a half-wave rectifier.

57. Draw the circuit diagram of a full wave rectifier and explain its working. Draw the input and output waveforms.

58. What is a *pn* junction diode? Define the term dynamic resistance for the junction diode.

59. What do you mean by rectification?

60. What is light emitting diode (LED)? Draw a circuit diagram and explain its action.

61. With the help of a diagram, show the biasing of a light emitting diode (LED). Give its two advantages over conventional incandescent lamps.

62. What is a Zener diode? How is it symbolically represented? With the help of a circuit diagram, explain the use of Zener diode as a voltage stabilizer

63. Draw the voltage-current characteristic of a Zener diode.

64. Draw a circuit diagram to show how a photodiode is biased. Draw its characteristic curves for two different illumination intensities.

65. Why are photodiodes used preferably in reverse bias condition? A photodiode is fabricated from a semiconductor with band gap of 2.8 eV. Can it detect a wavelength of 6000 nm? Justify.

66. Name the three parts of a transistor.

67. Can two separate *p-n* junction diodes be used to form a transistor?

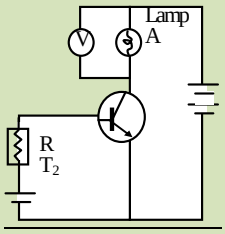
69. What is the change in the collector current in a transistor of a.c. current gain 150, for a 100 μA change in its base current?

70. What is the *n-p-n* transistor? How does it differ from *p-n-p* transistor? Given their symbols. Explain transistor action.

71. Write the function of base region of a transistor. Why this region is made thin and slightly doped?

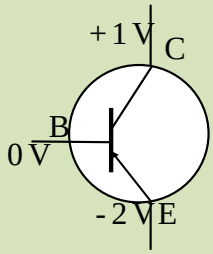
72. How does the collector current change in a junction transistor, if the base region has larger width**?**

73. In the circuit given below, a voltmeter V is connected across lamp L. What changes would occur at lamp L and the voltmeter V, if the resistor R is reduced in value?

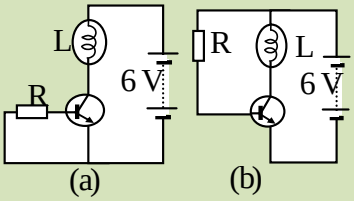


74. Show the biasing of a *pnp* transistor and explain the transistor action.

75. In the figure given below is (i) the emitter, and (ii) the collector forward or reverse biased? With the help of a circuit diagram, explain the action of a *n-p-n* transistor.



76. In only one of the circuits given below the lamp L lights. Which circuit is it? Give reason for your answer.



78. What is the function of an emitter, base and collector in a transistor?

79. Explain, with the help of a circuit diagram the use of *n-p-n* transistor as an amplifier in common-emitter configuration.

80. Drawing a labelled circuit diagram, explain how *n-p-n* transistor can be used as an amplifier in common base configuration.

81. State two reasons why a common-emitter amplifier is preferred to a common base amplifier.

82. For an *n-p-n* transistor in the common-emitter configuration, draw a labelled circuit diagram of an arrangement for measuring the collector current as a function of collector-emitter voltage for at least two different values of base current. Draw the shape of the curves obtained. Define the terms : (i) 'output resistance' and (ii) 'current amplification factor'.

83. Derive an expression for common *npn* transistor voltage gain.

84. Define transconductance of a transistor.

85. The input resistance of a common-emitter amplifier is 2 kilo-ohm and a.c current gain is 20. If the load resistor used is 5 kilo-ohm, calculate (i) the voltage gain of the amplifier, and (ii) the trans-conductance of the transistor used.

86. In a transistor, the base current is changed by 20 μA. This results in a change of 0.02 V in base to emitter voltage and a change of 2 mA in the collector current. (a) Find (i) the current gain '$\beta_{a.c.}$' and (ii) trans-conductance 'g_m'. (b) If this transistor is used as an amplifier with the load resistance 5 kΩ, calculate the voltage gain of the amplifier.

87. The input resistance of a silicon transistor is 665 μΩ. Its base current is changed by 15μA which results in change of collector current by 2 mA. This transistor is used as a common emitter amplifier with a load resistance of 5 kΩ. Calculate (i) current gain (ii) trans-conductance,and (iii) voltage gain of the amplifier.

88. In a transistor, the base current is changed by 10 mA. This results in a change of 0.01 V in base to emitter voltage and a change of 1 mA in the collector current.

Find (i) the current gain and (ii) transconductance .

If this transistor is used as an amplifier with the load resistance 5 kμ, calculate the voltage gain of amplifier.

90. (a) What is the phase difference between input and output voltages of a common emitter transistor amplifier?

(b)Explain briefly the effect of increasing load resistance, R_L in case of above amplifier

91. In a common-emitter mode of transistor, d.c. current gain is 20, the emitter current is 7 mA. Calculate (i) base current and (ii) collector current.

92. The current gain for common emitter amplifier is 59. If the emitter current is 6.0 mA, find (i) base current and (ii) collector current.

93. The current gain of a transistor in a common base arrangement is 0.95.

Find the voltage gain and power gain, if the load resistance of output circuit is 400 kμ and input resistance is 200 μ.

95. Draw the input and output wave forms of the signal in a common-emitter amplifier using an *n-p-n* transistor. Write the expression for its voltage gain.

96. Why is common base amplifier preferred over common emitter amplifier?

97. Prove that in common emitter transistor amplifier, the output voltage is 180° out of phase with the input voltage.

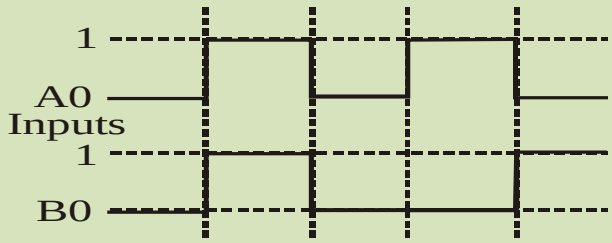
98. Explainthrough a labelled circuit diagram, the use of a transistor as an oscillator.

99. Draw the logic symbol of 'OR' gate.

100. Write the truth table of OR gate.

101. Explain, with the help of a circuit diagram, how is 'OR' gate realised in practice.

103. Draw the output wave form for input wave forms A and B for OR gate and AND gate



105. Draw the logic symbol of an AND gate.

106. Write the truth table of an AND gate.

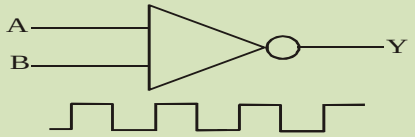
107. Name the logic gate shown in the diagram and give its truth table.

108. Explain, with the help of a circuit diagram, how 'AND' gate is realised in practice.

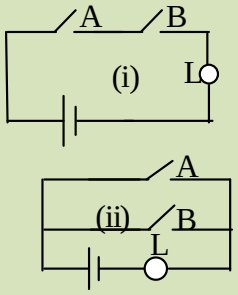
109.Describe a digital circuit having one output and one input. How can it be realised?

110.In the figure below, circuit symbol of a logic gate and input wave form is shown.

a. Name the logic gate, (ii) write its truth table and (iii) give the output wave form.

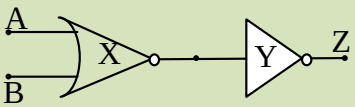
99. 

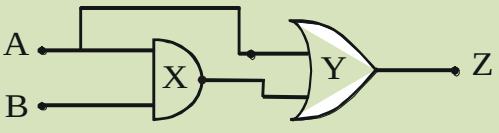
111. In the circuits shown in fig. (a), a switch which is open represents the logic state 0 and the switch, which is closed, represents the logic state 1. The lamp L is lit when output is logic state 1. What types of gate are represented by the circuits in (i) and (ii)?



a.

112. Identify the logic gates marked X, Y in figure (c). Write down the output at Z, when A = 1, B = 1 and A = 0, B = 0.



(c) 

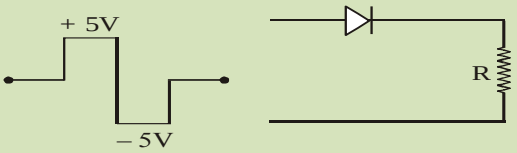
113. For the digital circuit given in fig. (f), write the truth table showing the outputs $Y_1 : Y_2$

a. for all possible inputs at A and B.

114. Explain the function of base region of a transistor. Why is this region made thin and lightly doped?

115. Draw a circuit diagram to study the input and output characteristics of *n-p-n* transistor in a common emitter (CE) configuration. Show these characteristics graphically. Explain how current amplification factor of the transistor is calculated using output characteristics.

116. Draw and explain the output waveform across the load resistor *R*, if the input waveform is as shown in the given figure.



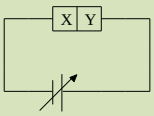
117. Explain how the width of depletion layer in a *p-n* junction diode changes when the junction is (i) forward biased (ii) reverse biased.

118. Draw a circuit diagram for use of *n-p-n* transistor as an amplifier in common emitter

119. configuration. The input resistance of a transistor is 1000 μΩ. On changing its base current by 10 μA, the collector current increases by 2 mA. If a load resistance of 5 kΩ is used in the circuit, calculate:

120. (i) the current gain (ii) voltage gain of the amplifier.

121 Two semiconductor materials X and Y shown in the given figure, are made by doping germanium crystal with indium and arsenic respectively. The two are joined end to end and connected to a battery as shown.

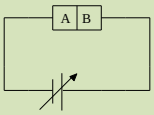


a. Will the junction be forward biased or reverse biased?

b. Sketch a V–I graph for this arrangement.

122 Two semiconductor materials A and B shown in the given figure, are made by doping

germanium crystal with arsenic and indium respectively. The two are joined end to end and connected to a battery as shown.



i. Will the junction be forward biased or reverse biased?
ii. Sketch a V–I graph for this arrangement.

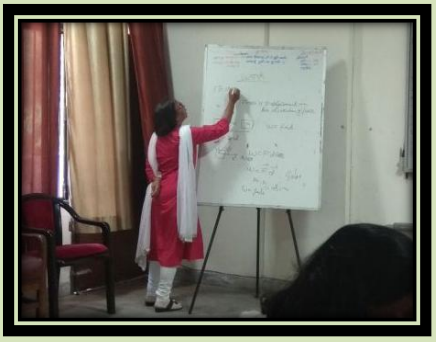
GROUP PHOTO

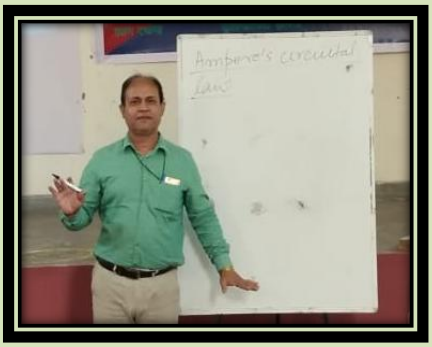
The Guiding Force

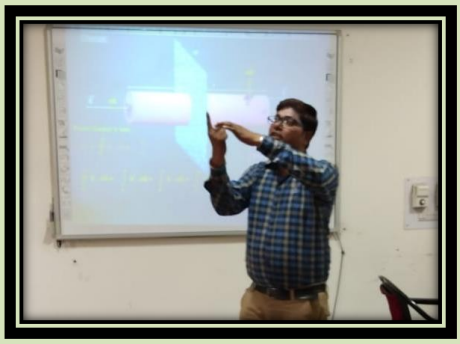
Speakers

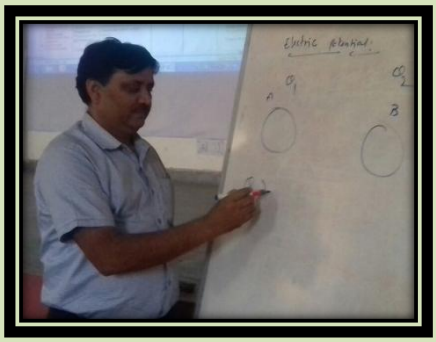
Morning Assembly

Demo Lessons









Excursions

Visits


WELCOME
SHOT ON REDMI NOTE 5 PRO
MI DUAL CAMERA


SHOT ON REDMI NOTE 5 PRO
MI DUAL CAMERA

Yoga