<u>SAMPLE QUESTION PAPER-2</u>
CLASS- XII
SUB: PHYSICS

TIME:-3 HOURS   ***MAX.MARKS:- 70***
General Instructions:

1   **All questions are compulsory. There are 37 questions in all.**
2   **This question paper has five sections: Section A, Section B, Section C, Section D and Section E.**
3   **Section A contains 20 questions of 1 marks each, Section B contains 7 questions of 2 marks each, Section C contains 7 questions of 3 marks each, Section D contains three questions of 5 marks each.**
4   **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
$m_e = 9.31 \times 10^{-31}$ kg
$\mu_o = 4\pi \times 10^{-7}$ TmA^{-1}
$1/4\pi\varepsilon_o = 9 \times 10^9$ N m^{2}C^{-2}
Avogadro number $N_A = 6.023 \times 10^{23}$ mol^{-1}
Mass of proton = 1.673×10^{-27} kg
Mass of the neutron   = 1.675×10^{-27} kg
Boltzmann constant, k = 1.38×10^{-23} J K^{-1}

SECTION-A

1. In which orientation, a dipole placed in a uniform electric field is in
    a. Stable
    b. Unstable equilibrium   1
2. Why electric lines of forces do not form closed loop?   1
3. Calculate resistance color coding of carbon resistors in Green, Red and Blue
4. How does resistivity vary with change in dimensions?
5. Sketch two Magnetic field lines for a uniform Magnetic field.
6. What is angle of dip at equator?
7. Name the type of magnetic material with –ve permeability ?
8. Name the physical quantity which has its unit Henry. Is it a scalar or vector quantity?
9. What is radial magnetic field?
10. Define intensity of radiation on the basis of photon picture of light. Write its SI unit**.**   .
11. Show on a plot the nature of variation of photoelectric current with the intensity of   radiation incident on a photosensitive surface
12. Define resolving power of telescope?
13. Draw a ray diagram of a reflecting type telescope?
14. Write two important limitations of a refracting telescope over a reflecting type telescope?

15. Define the term 'coherent sources' which are required to produce interference pattern in Young's double slit experiment?
16. 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** ?
17. Draw a plot of potential energy of a pair of nucleons as a function of their separation?
18. What happens to the width of depletion layer of a p-n junction when it is
     (i) forward biased?
     (ii) reverse biased?
19. Write two properties of Nuclear Forces?
20. A deuteron and an a-particle are accelerated with the same accelerating potential. Which one of the two has greater value of de-Broglie wavelength, associated with it and less kinetic energy? Explain.

SECTION- B
21. Two charges 5×10^{-8} C and -3×10^{-8} C are located 16 cm apart. At what point on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero.
22. Derive an expression for the electric field at a point on the equatorial position of an electric dipole.
23. Write Vector form of Biot- Savart law
24. What is its importance in a moving coil galvanometer? How is a radial magnetic field realized in moving coil?
25. State Faraday's laws of electromagnetic induction?
26. What are eddy currents? Describe the applications of eddy currents?
27. Define electron volt Express it into joule?

SECTION - C
28. Explain the phenomenon of mutual induction and define mutual inductance. Write the unit and dimensions of mutual inductance
29. Derive an expression for electric field due to a dipole at any point on its axial line.

Or
   Derive an expression for electric field due to a dipole at any point on its equatorial line.
30. Derive an expression for conductivity in terms of mobility.
31. State Lenz' Law and show that it is in accordance with the law of conservation of energy.
32. Describe the various methods of producing induced emf. Derive an expression   for the instantaneous emf induced in a coil rotated in a magnetic field?
33. Deduce the phase relationship between current and voltage in an AC circuit containing capacitor only.

34. Write any five electromagnetic waves in the order of decreasing frequency and write any two properties and uses of each?

SECTION – D

35. (A) Find the expression for the capacitance of a parallel plate capacitor of area A and plate separation d if a dielectric slab of thickness t is introduced between the plates of the capacitor.

(B) The given graph shows the variation of charge q versus potential difference V for two capacitors C_1 and C_2. The two capacitors have same plate separation but area of plates of C_2 is twice of the area of plate of C_1. Identify the lines of graph for C_1 and C_2.
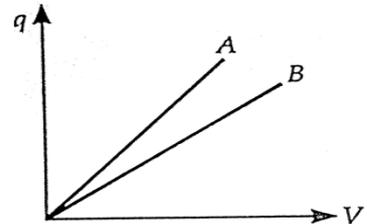
OR

i. 27 drops of same size are charged at 220 volt each, they combine to form a single drop, what is the resultant capacitance?

ii. A 20μμF capacitor is charged by 30 volt and connected across a 60μF capacitor,
a) What is the common potential, b) what is the loss of potential energy

36. A) Explain the principle of a potentiometer. Describe how will you determine (a) the ratio of emfs of two primary cells using potentiometer. (b) The internal resistance of a primary cell using potentiometer.

OR

State and explain the principle of Wheat Stone's principle. Deduce it using Kirchhoff's laws

37. Draw a ray diagram to show the image formation in refracting type astronomical telescope in the near point adjustment (when image is formed at LDDV i.e. D=25cm). Derive an expression for its magnifying power. Why the diameter of objective of telescope should be large.

OR

Draw a ray diagram to show the image formation a compound microscope. Explain briefly the working. Derive an expression for its magnifying power. Why the diameter of objective of microscope should be small.

Marking Scheme

Marking Scheme

1	(i) Θ =0^0 (ii)) Θ=90^0	½ ½
2	Because mono-charge exist	1
3	Correct Ans	1
4	No change	1
5	Correct field Lines	1
6	Zero	**1**
7	Diamagnetic	1
8	Mutual Inductance, Scalar	1
9	Correct Definition	1
10	Correct Definition	1
11	Correct Plot	1
12	Correct definition	1
13	Correct diagram	1
14	Correct Statement	1
15	Correct Limitations	1
16	Decreases	1
17	Correct Plot	1
18	Decreases and Increases	1
19	Deutron	1
20	Correct Ans	1
21	(A) Correct calculation and correct definition	2
22	Correct expression.	2
23	Correct explanation	2
24	Correct explanation	2
25	Correct explanation and reason	2
26	Correct applications and unit	1+1
27	1ev= 1.6X10^{-6} J	1+1
28	Correct explanation and units	2+1
29	Correct expression with diagram	2+1
30	Correct expression	2+1
31	Correct expression with explanation	2+1
32	Correct expression with explanation	2+1
33	Correct Relation.	2+1
34	Correct order of frequency and wavelength	3
35	Correct expression and identification of A and B in graph OR Correct calculation and units	3+2 2.5+2.5
36	Correct Principle and ratio of emfs , and Correct expression for internal resistance **OR** Correct principle and expression with consideration	1+1 +3 2.5+2.5
37	Correct ray diagram, Correct expression and Correct explanation **OR** Correct ray diagram , working and , Correct explanation	1+2+2 1+1.5 +2.5