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## PERIODIC TEST 2023-24 - CLASS XII PHYSICS

## PRACTICE PAPER 2 (ELECTROSTATICS & ELECTRICITY)

TIME: - 90 min MM 40

## **NOTE- All questions are compulsory**

SECTION A contains 9 MCQs of 1 mark each, SECTION B contains 5 questions of 2 marks each SECTION C contains 4 questions of 3 marks each, SECTION D contains 1 case study-based question of 4 marks, SECTION E contains 1 long answer question of 5 marks.

S. No.	SECTION A	MARKS
1	Which of the following statements is false for a perfect conductor?  (a) The surface of the conductor is an equipotential surface.  (b) The electric field just outside the surface of a conductor is perpendicular to the surface.  (c) The charge carried by a conductor is always uniformly distributed over the surface of the conductor.  (d) None of these.	1
2	The dimensions of fall of potential per unit distance are given by:  (a) [MLT <sup>-3</sup> A <sup>-1</sup> ]  (b) [ML <sup>2</sup> T <sup>-2</sup> A <sup>-1</sup> ]  (c) [ML <sup>2</sup> T <sup>-2</sup> A <sup>-3</sup> ]  (d) [MLT <sup>-2</sup> A <sup>-2</sup> ]	1
3	Two charges of equal magnitudes kept at a distance r exert a force F on each other. If the charges are halved and distance between them is doubled, then the new force acting on each charge is  (a) $\frac{F}{8}$ (b) $\frac{F}{4}$ (c) $4F$ (d) $\frac{F}{16}$	1
4	A capacitor has some dielectric between its plates, and the capacitor is connected to a dc source. The battery is now disconnected and then the dielectric is removed, then (a) capacitance will increase.  (b) energy stored will decrease.  (c) electric field will increase.  (d) voltage will decrease.	1
5	When a current, is set up in a wire of radius r, the drift velocity is $v_d$ . If the same current is set up through a wire of radius 2 r, the drift velocity will be (a) $4\ v_d$ (b) $2\ v_d$ (c) $v_d/2$ (d) $v_d/4$	1

6	Four resistors R <sub>1</sub> , R <sub>2</sub> , R <sub>3</sub> and R <sub>4</sub> are connected in different ways. Which of the following combinations will draw the maximum current when connected to a battery?	1
	(a) $R_1$ $R_2$ $R_3$ $R_4$	
	R. R.	
	(b)	
	$R_3$	
	R. R.	
	(c)	
	TR.	
	$(d) \xrightarrow{R_1}$ $R_2$ $R_3$	
7	A metal wire is subjected to a constant potential difference. When the temperature of	1
-	the metal wire increases, the drift velocity of the electron in it	_
	(a) increases, thermal velocity of the electron increases	
	(b) decreases, thermal velocity of the electron increases	
	(c) increases, thermal velocity of the electron decreases	
	(d) decreases, thermal velocity of the electron decreases	
8	Answer:(a) Both are correct and reason is correct explanation of assertion. Answer: (b) Both are correct but reason is not the correct explanation of assertion. Answer:(c) Reason is wrong.	1
	Answer:(d) Both are wrong.	
	A: Electric field lines are continuous curves in free space. R: Electric field lines start from negative charge and terminate at positive charge.	
9	Answer:(a) Both are correct and reason is correct explanation of assertion.	1
	Answer: (b) Both are correct but reason is not the correct explanation of assertion.	
	Answer:(c) Reason is wrong.	
	Answer:(d) Both are wrong.	
	A: The drift velocity of electrons in a metallic wire will decrease, if the temperature of	
	the wire is increased.	
	R: On increasing temperature, conductivity of metallic wire decreases.	
	SECTION B	
10	Define temperature coefficient of a conductor.	2
11	Define equipotential surfaces.	2
12	An electron and a proton are kept in the same electric field. Will they experience same force and have same acceleration?	2
13	A point charge q is taken from a to c and then from c to b of a circle	2
	drawn with another point charge +q at the centre, then along which path more work will be done?	

14	The V-I graph for two resistors of same material & the same radii with lengths $l_1$ & $l_2$ are shown. If $l_1 > l_2$ state with reason which of	2
	these graphs represents V-I change for l <sub>1</sub> .	
	SECTION C	
15	Find the capacitance of a partially filled capacitor.	3
16	Three capacitors $C_1$ , $C_2$ & $C_3$ are connected to a battery of 6V as shown in fig. Find the charges on the three capacitors.	3
17	An electric dipole free to move is placed in a uniform electric filed. Explain along with diagram its motion when it is placed.  (a) parallel to the field  (b) perpendicular to the field.	3
18	A battery of emf 12 V and internal resistance $0.5 \Omega$ is to be charged by a battery charger which supplies 110 V dc. How much resistance must be connected in series with the battery to limit the charging current to 5 A? What will be the PD across the terminals of the battery during charging?	3
	SECTION D	
19	Emf of a cell is the maximum potential difference between two electrodes of the cell when no current is drawn from the cell. Internal resistance is the resistance offered by the electrolyte of a cell when the electric current flows through it. The internal resistance of a cell depends upon the following factors; (a) distance between the electrodes (b) nature and temperature of the electrolyte (c) nature of electrodes A (d) area of electrodes.  For a freshly prepared cell, the value of internal resistance is generally low and goes on increasing as the cell is put to more and more use. The potential difference between the two electrodes of a cell in a closed circuit is called terminal potential difference and its value is always less than the emf of the cell in a closed circuit. It can be written as $V=E$ — Ir.  1. The terminal potential difference of two electrodes of a cell is equal to emf of the cell when (a) $I \neq 0$ (b) $I = 0$ (c) both (a) and (b) (d) neither (a) nor (b)	4

	2. A cell of emf € and internal resistance r gives a current of 0.5 A with an extended	ernal			
	resistance of 12 $\Omega$ and a current of 0.25 A with an external resistance of 25 $\Omega$ . What				
	is the value of internal resistance of the cell?				
	(a) $5 \Omega$ (b) $12 \Omega$				
	(c) $7 \Omega$ (d) $3 \Omega$				
	3. An external resistance R is connected to a cell of internal resistance r, give t	he			
	condition when maximum current flows in the external resistance.	2			
	OR				
	3. IF external resistance connected to a cell has been increased to 5 times, the				
	potential difference across the terminals of the cell increases from 10 V to 30 V	7.			
	Then, what is the emf of the cell?	2			
	SECTION E				
20	(a) Why electric field lines never intersect each other?	2	5		
	(b) Find electric field at a point on equatorial line due to an ideal dipole.	3			