

KENDRIYA VIDYALAYA SANGATHAN, ZIET CHANDIGARH

PERIODIC TEST 2023-24 CLASS XII PHYSICS

PRACTICE PAPER 1(ELECTROSTATICS & ELECTRICITY)

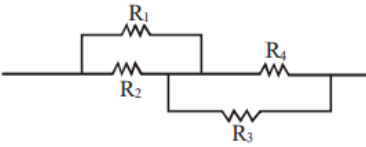
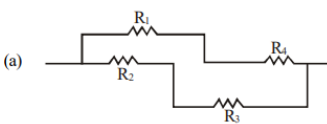
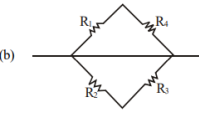
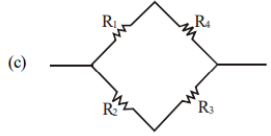
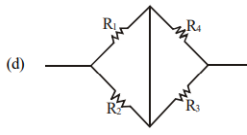
TIME: - 90 min

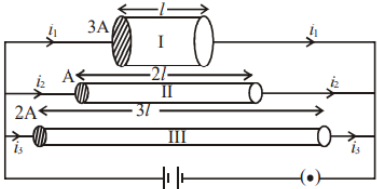
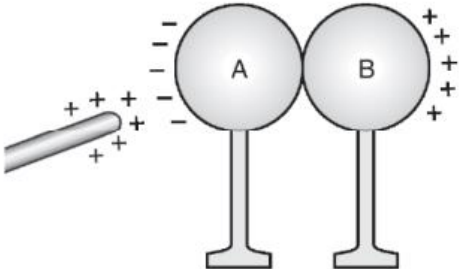
MM 40

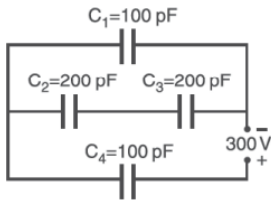
NOTE- All questions are compulsory

SECTION A contains 10 MCQs of 1 mark each, **SECTION B** contains 3 questions of 2 marks each

SECTION C contains 5 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	<p>A body is positively charged, it implies that</p> <p>(a) there is only positive charge in the body.</p> <p>(b) there is positive as well as negative charge in the body but the positive charge is more than negative charge</p> <p>(c) there is equal positive and negative charge in the body but the positive charge lies in the outer regions</p> <p>(d) negative charge is displaced from its position</p>	1
2	<p>Which of the following statement is true?</p> <p>(a) Electrostatic force is a conservative force.</p> <p>(b) Potential at a point is the work done per unit charge in bringing a charge from any point to infinity.</p> <p>(c) Electrostatic force is non-conservative</p> <p>(d) Potential is the product of charge and work</p>	1
3	<p>Four charges are arranged at the comers of a square ABCD, as shown. The force on the charge kept at the centre O is</p> <p>(a) zero</p> <p>(b) along the diagonal AC</p> <p>(c) along the diagonal BD</p> <p>(d) perpendicular to side AB</p>	1
4	<p>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</p> <p>(a) capacitance will increase.</p> <p>(b) energy stored will decrease.</p> <p>(c) electric field will increase.</p> <p>(d) voltage will decrease.</p>	1
5	<p>Choose the correct circuit diagram which is equivalent to the circuit diagram given in the figure.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;"> <div style="text-align: center; margin: 10px;"> <p>(a)</p>  </div> <div style="text-align: center; margin: 10px;"> <p>(b)</p>  </div> <div style="text-align: center; margin: 10px;"> <p>(c)</p>  </div> <div style="text-align: center; margin: 10px;"> <p>(d)</p>  </div> </div> </div>	1

6	<p>In a current carrying conductor the net charge is</p> <p>(a) 1.6×10^{-19} coulomb (b) 6.25×10^{-18} coulomb</p> <p>(c) zero (d) infinite</p>	1
7	<p>The electric resistance of a certain wire of iron is R. If its length and radius are both doubled, then</p> <p>(a) the resistance and the specific resistance, will both remain unchanged</p> <p>(b) the resistance will be doubled and the specific resistance will be halved</p> <p>(c) the resistance will be halved and the specific resistance will remain unchanged</p> <p>(d) the resistance will be halved and the specific resistance will be doubled</p>	1
8	<p>The figure shows three conductors I, II and III of same material, different lengths l, $2l$ and $3l$ and of different areas of cross-section $3A$, A and $2A$ respectively. Arrange them in the increasing order of current drawn from battery.</p>  <p>(a) $i_1 < i_2 < i_3$ (b) $i_3 < i_2 < i_1$</p> <p>(c) $i_2 < i_1 < i_3$ (d) $i_2 < i_3 < i_1$</p>	1
9	<p>Answer:(1) Both are correct and reason is correct explanation of assertion.</p> <p>Answer: (2) Both are correct but reason is not the correct explanation of assertion.</p> <p>Answer:(3) Reason is wrong.</p> <p>Answer:(4) Both are wrong.</p> <p>A: If dipole moment of water molecules were zero, then microwave cooking would not be possible.</p> <p>R: In a microwave oven the water molecules vibrate due to oscillating electric field in microwave and heat the food.</p>	1
10	<p>Answer:(1) Both are correct and reason is correct explanation of assertion.</p> <p>Answer: (2) Both are correct but reason is not the correct explanation of assertion.</p> <p>Answer:(3) Reason is wrong.</p> <p>Answer:(4) Both are wrong.</p> <p>A: When a steady current flows through a conductor of non-uniform cross-section, the current density, electric field and drift velocity do not remain constant.</p> <p>R: For a constant current the current density, electric field and drift velocity are inversely proportional to cross sectional area.</p>	1
SECTION B		
11	<p>A glass rod rubbed with silk is brought close to two uncharged metallic spheres in contact with each other inducing charges on them as shown in Fig. Describe what happens, when</p> <p>(i) the spheres are slightly separated,</p> <p>(ii) the glass rod is subsequently removed and finally</p> <p>(iii) the spheres are separated far apart.</p> 	2
12	<p>A charged particle is free to move in an electric field. Will it always move along an electric line of force?</p>	2

13	In the network of capacitors shown in Fig, find (i) equivalent capacitance and (ii) total charge.		2
SECTION C			
14	Discuss the temperature dependence of resistivity of a conductor.		3
15	Derive an expression for the torque experienced by an electric dipole placed in a uniform electric field. What is the net force acting on this electric dipole?		3
16	State Gauss' theorem in electrostatics. Using this law, derive an expression for the electric field due to a uniformly charged infinite plane sheet.		3
17	Find the ratio of the potential differences that must be applied across the (i) parallel & (ii) series combination of two identical capacitors so that the energy stored in the two cases becomes the same.		3
18	A potential difference V is applied across a conductor of length L and diameter D. How are the electric field E and the resistance R of conductor affected, when in turn (a) V is halved (b) L is halved and (c) D is doubled? Justify your answer in each case.		3
SECTION D			
19	For electrostatics, the concept of electric field is convenient, but not really necessary. Electric field is an elegant way of characterizing the electrical environment of a system of charges. Electric field at a point in the space around a system of charges tells you the force a unit positive test charge would experience if placed at that point (without disturbing the system). Electric field is a characteristic of the system of charges and is independent of the test charge that you place at a point to determine the field. The term field in physics generally refers to a quantity that is defined at every point in space and may vary from point to point. Electric field is a vector field, since force is a vector quantity. (1) Which of the following statement is correct? The electric field at a point is 1 (a) always continuous. (b) continuous if there is a charge at that point. (c) discontinuous only if there is a negative charge at that point. (d) discontinuous if there is a charge at that point. (2) The force per unit charge is known as 1 (a) electric flux (b) electric field (c) electric potential (d) electric current (3) What is the direction of electric field applied between two parallel plates to keep an electron in equilibrium. Explain. 2 OR (3) Find the magnitude of electric field intensity E is such that, an electron placed in it would experience an electrical force equal to its weight. 2		4
SECTION E			
20	(a) What is the principle of a Wheatstone bridge? (b) Apply Kirchhoff's laws to obtain the condition for balancing of a Wheatstone bridge.	2+3	5