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SUB:-PHYSICS CLASS XII 2022-23

REVISION PAPER UNIT- II –ELECTROSTATIC-POTENTIAL AND CAPACITANCE

Note: Q. No. 1-4 is of 01 mark each, Q. 5-6 is of 02 marks each, Q.No.7 is of 03 marks, Q. No. 8 is a case study based and is of 04 marks, Q. No. 11 is of 5 marks.

SN	Question	Marks
1	A positively charged particle is released from rest in a uniform electric field. The electric potential energy of the charge (a) remains a constant because the electric field is uniform. (b) increases because the charge moves along the electric field. (c) decreases because the charge moves along the electric field. (d) decreases because the charge moves opposite to the electric field.	1
2	**Assertion:** When two conductors charged to different potentials are connected to each other, the negative charge always flows from lower potential to higher potential. **Reason:** In the charging process, there is always a flow of electrons only. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect d- Assertion is incorrect but the reason is correct.	1
3	A capacitor is charged by a battery. The battery is removed and another identical uncharged capacitor is connected in parallel. The total electrostatic energy of resulting system (a) increases by a factor of 4. (b) decreases by a factor of 2. (c) remains the same. (d) increases by a factor of 2.	1
4	A parallel plate air capacitor is charged to a potential difference of V volts. After disconnecting the charging battery, the distance between the plates of the capacitor is increased using an insulating handle. As a result, the potential difference between the plates (a) increases (b) decreases (c) does not change (d) becomes zero	1
5	Can electrostatic potential at a point be zero, while electric field at that point is not zero?	2
6	If a dielectric slab is introduced between the plates of a parallel plate capacitor after the battery is disconnected. How do the following quantities change? (i) Charge (ii) Potential difference (iii) Capacitance (iv) Energy.	2
7	Define an equipotential surface. Draw equipotential surfaces. (i) in the case of a single point charge and (ii) in a constant electric field in Z-direction. Why the equipotential surfaces about a single charge are not equidistant? (iii) Can electric field exist tangential to an equipotential surface? Give reason.	3

	Case study-based questions (questions no 8- 11) Capacitor and Capacitance A capacitor contains two oppositely charged metallic conductors at a finite separation. It is a device by which capacity of storing charge may be varied simply by changing separation and/or medium between the conductors. The capacitance of a capacitor is defined as the ratio of magnitude of charge (Q) on either plate and potential difference (V) across the plate, i.e., C = $\frac{Q}{V}$ The unit of capacitance is coulomb/volt or farad (F) 8. What is a capacitor? 1 9. What is main purpose of using a capacitor? 1 10. Can we increase the capacitance by increasing potential applied across it? 2 **OR** 10. What will be the effect on capacitance by inserting a dielectric in between the plates? 2	4
11	(a) 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. 3 (b) Find the ratio of the potential differences that must be applied across the parallel and series combination of two capacitors C_1 and C_2 with their capacitances in the ratio 1:2 so that the energy stored in the two cases becomes the same 2	5