CUMULATIVE TEST

Chapter 2

Electrostatic potential and capacitance

Class-XII   Subject-Physics

Time allowed: 90 Minutes   **Maximum Marks: 25**

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1. **All questions are compulsory.**
2. **There are 12 questions in total. Questions 1 to 5 carry one mark each, 6 to 8 carry two marks each, and 9 to 11 carry three marks each and Question No.12 carry five marks.**

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1. What is the amount of work done in moving a 10 μC charge between two points 2cm apart on an equipotential surface of 10V?
2. In a parallel plate capacitor the capacitance increases from 4 μF to 80 μF on introducing a dielectric slab of thickness equal to plate separation. Calculate the dielectric constant of the medium.
3. An electric dipole of dipole moment 3×10^{-9} Cm is enclosed by a closed surface. What is the net electric flux coming out of surface?
4. The equivalent capacitance of two capacitors in series is 3uF and in parallel is 16uF.What is the values of individual capacitances two capacitors?
5. What is the value of electrostatic potential due to an electric dipole at any point on its equatorial line?
6. The two graphs given here shows the variation of electrostatic potential (V) with 1/r (r being the distance of the field from the point charges) for two charges q_1 and q_2. Which charge is having higher magnitude?
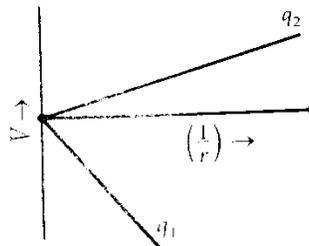
What is the sign of two charges?

7. Draw three equipotential surfaces corresponding to a field that uniformly increases in magnitude along Y- direction. How are these surfaces different from that of a constant electric field along the Y-direction?
8. Two point charges 8μC and -24μC are separated by a distance of 4cm.Find the point on the line joining them at which electric Potential is zero.
9. In the given network C_1 =200pF and C_2 = 100pF. Calculate (i) equivalent capacitance of the network
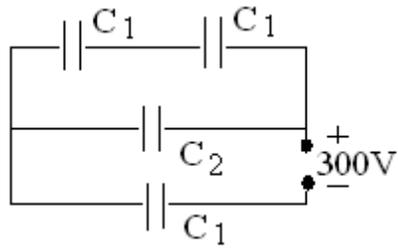
(ii) The charge on capacitor of capacitance C_1

10. Show that energy stored per unit volume of parallel plate capacitor is given by $\dfrac{1}{2}\varepsilon_o E^2$ where the symbols have their usual meanings.

11. An electric dipole consists of two opposite charges each of $4\mu C$ separated by 3cm. The dipole is placed in an external field of 10^3 NC^{-1}. Find (i) maximum torque on dipole and (ii) the work done in rotating the dipole through 120^0 starting from $\theta = 0^0$.

12. A parallel plate capacitor of plate area A and separation d is charged to a potential V. The battery is then disconnected and a dielectric slab of thickness d and dielectric constant K is inserted in the capacitor. What change if any, will take place in.

(a) Voltage across the capacitor.

(b) Electric field between the plates.

(c) Capacitance of the capacitor.

(d) Energy stored.

(e) Charge on the plates.

Justify your answer in each case.