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AZIMABAD, BALASORE



WEEKLY TEST

CLASS: XII

SUBJECT: PHYSICS

FM: 20

TIME: 40 MIN

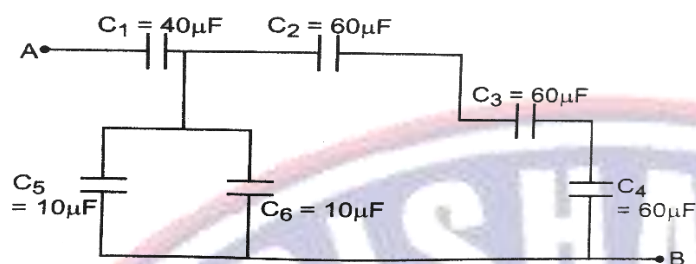
(1 MARK)

1. A point charge $+Q$ is placed at point O as shown in the figure. Is the potential difference $V_A - V_B$
a. +ve b. -ve c. 0 d. none
2. A point P lies at a distance x from the mid-point of an electric dipole on its axis. The electric potential at point P is proportional to
a. $1/x^2$ b. $1/x$ c. $1/x^3$ d. none
3. A $+3.0 \text{ nC}$ charge Q is initially at rest at a distance of $r_1 = 10 \text{ cm}$ from a $+5 \text{ nC}$ charge q fixed at the origin. The charge Q is moved away from q to a new position at $r_2 = 15 \text{ cm}$. In this process work done by the field is
a. 1.29×10^{-5} b. 3.6×10^5 c. -4.5×10^{-7} d. 4.5×10^{-7}
4. A capacitor plates are charged by a battery with ' V ' volts. After charging battery is disconnected and a dielectric slab with dielectric constant ' K ' is inserted between its plates, the capacitance of the capacitor will become
a. 0 b. C/K c. K/C d. CK
5. An electric dipole consisting of charges $+q$ and $-q$ separated by a distance L is placed in air. Potential on its perpendicular bisector is proportional to
a. $1/x^2$ b. $1/x$ c. $1/x^3$ d. none
6. What happened to capacitance of a parallel plate capacitor when a dielectric of thickness t and constant k is fully filled inside it. Explain with expression. **(2 MARKS)**

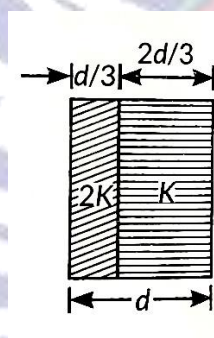
OR

What is equipotential surface? Draw equipotential surface for dipole. What will be the work done in moving a charge on equipotential surface.

7. Obtain the equivalent capacitance of the network shown in figure. For a 300 V supply across A and B, determine the charge drawn from battery. **(2MARKS)**



8. Two slabs of dielectric constants $2K$ and K fill the space between the plates of a parallel plate capacitor of plate area A and plate separation d as shown in figure. Find an expression for capacitance of the system.



(3 MARKS)

9. Deduce the capacitance of a parallel plate capacitor having area of cross section A and separation d with air inside it. (3 MARKS)

OR

Derive the expression for potential due to a point charge placed in air at a distance r .

10. (5 MARKS)

- Deduce the capacitance of a parallel plate capacitor with a dielectric of constant k and thickness d is placed inside it
- In a parallel plate capacitor with air between the plates, each plate has an area of $8 \times 10^{-5} \text{ m}^2$ and the separation between the plates is $17.7 \times 10^{-4} \text{ m}$. Calculate the capacitance of the capacitor. ($\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{Nm}^2$)

OR

- Two charges $+q$ and $-q$ are separated at $2l$ form a dipole placed in air. Find the expression for electric potential on its axis at distance x from the centre of the dipole.
- Potential of a field is given as $V = 2x^2z + 5xy \text{ V}$. find the expression for electric field at $(1,1,3)$