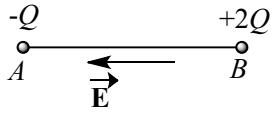
DPP
DAILY PRACTICE PROBLEMS

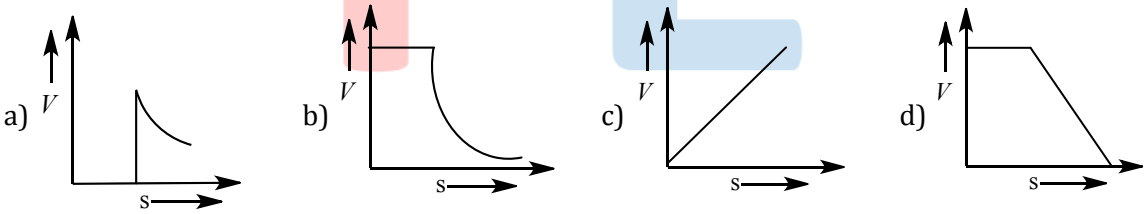
Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 7**

Topic :-ELECTROSTATIC POTENTIAL AND CAPACITANCE

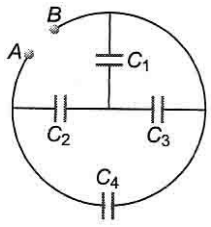
1. Three capacitors of capacitances 4 μF, 6 μF and 12 μF are connected first in series and then in parallel. What is the ratio of equivalent capacitance in the two cases?
   a) 2 : 3 b) 1 : 11 c) 11 : 1 d) 1 : 3
2. Charges $+2Q$ and $-Q$ are placed as shown is figure. The point at which electric filed intensity is zero will be



   a) Somewhere between $-Q$ and $+2Q$ b) Somewhere on the left of $-Q$
   c) Somewhere on the right of $+2Q$ d) Somewhere on the right bisector of line joining $-Q$ and $+2Q$.
3. In the case of a charged metallic sphere, potential (V) changes with respect to distance(S) from the centre as

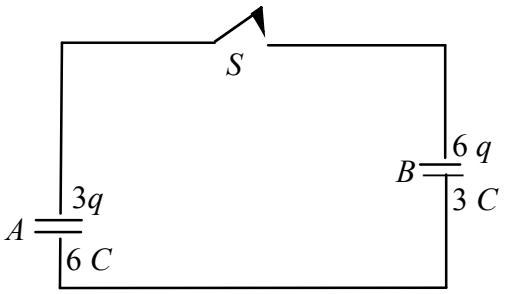


4. Charges$2q$, $-q$ and $-q$ lie at the vertices of an equilateral triangle. The value of E and V at the centroid of the triangle will be
   a) $E \neq 0$ and $V \neq 0$ b) $E = 0$ and $V = 0$ c) $E \neq 0$ and $V = 0$ d) $E = 0$ and $V \neq 0$
5. In the arrangement of capacitors shown in figure, each capacitor is of 9 μF, Then the equivalent capacitance between in points A and B is



   a) 9 μF b) 18 μF c) 4.5 μF d) 15 Mf

6. In given circuit when switch S has been closed then charge on capacitor A and B respectively are



a) $3q$,$6q$ b) $6q$,$3q$ c) 4.5 q , 4.5 q d) $5q$,$4q$

7. A parallel plate capacitor has the space between its plates filled by two slabs of thickness $\frac{d}{2}$ each and dielectric constant K_1andK_2. d Is the plate separation of the capacitor. The capacity of the capacitor is

a) $\frac{2\varepsilon_0 d}{A}\left(\frac{K_1+K_2}{K_1 K_2}\right)$ b) $\frac{2\varepsilon_0 A}{d}\left(\frac{K_1 K_2}{K_1+K_2}\right)$ c) $\frac{2\varepsilon_0 A}{A}(K_1+K_2)$ d) $\frac{2\varepsilon_0 A}{d}\left(\frac{K_1+K_2}{K_1 K_2}\right)$

8. The electric potential inside a conducting sphere

a) Increases from centre to surface b) Decreases from centre to surface
c) Remains constant from centre to surface d) Is zero at every point inside

9. The charges$Q$, +q and +q are placed at the vertices of an equilateral triangle of side l. If the net electrostatic potential energy of the system is zero, then Q is equal to

a) $-\frac{q}{2}$ b) $-q$ c) $\frac{+q}{2}$ d) Zero

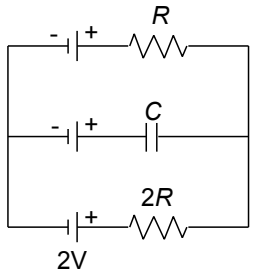
10. Two positive point charges of 12μC and 5μC are placed 10 cm apart in air. The work needed to bring them 4 cm closer is

a) 2.4 J b) 3.6 J c) 1.6 J d) 6.0 J

11. Two identical capacitors each of capacitance 5μF are charged to potentials 2kV and 1kV respectively. Their –ve ends are connected together. When the +ve ends are also connected together, the loss of energy of the system is

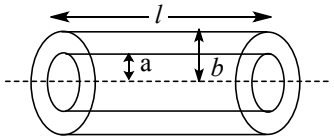
a) 160 J b) Zero c) 5 J d) 1.25 J

12. In the given circuit of figure with steady current, the potential drop across the capacitor must be



a) V b) $\frac{V}{2}$ c) $\frac{V}{3}$ d) $\frac{2V}{3}$

13. The magnitude of electric field $\vec{E}$ in the annual region of a charged cylindrical capacitor



a) Is same throughout

b) Is higher near the outer cylinder than near the inner cylinder

c) Varies as $\frac{1}{r}$, where r is the distance from the axis

d) Varies as $\frac{1}{r^2}$, where r is the distance from the axis

14. A technician has only two capacitors. By using these singly, in series or in parallel he can obtain capacitances of 3 μF, 4 μF, 12 μF and 16 μF. The capacitances of these capacitors are

a) 6 μF and 10 μF b) 4 μF and 12 μF c) 7 μF and 9 μF d) 4 μF and 16 μF

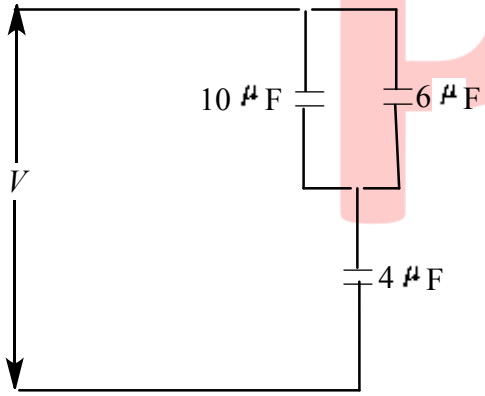
15. Three charges 1μC,2μC, 3μC are kept at vertices of an equilateral triangle of side 1m. If they are brought nearer, so that they now form an equilateral triangle of side 0.5m, then work done is

a) 11J b) 1.1J c) 0.01J d) 0.11J

16. A ball of mass 1 carrying a charge 10^{-8} Cmoves from a point A at potential 600 V to a point B at zero potential. The change in its KE is

a) -6×10^{-6} erg b) -6×10^{-6} J c) 6×10^{-6} J d) 6×10^{-6} erg

17. The equivalent capacitance of the combination of the capacitors is



a) 3.20 μF b) 7.80 μF c) 3.90 μF d) 2.16 μF

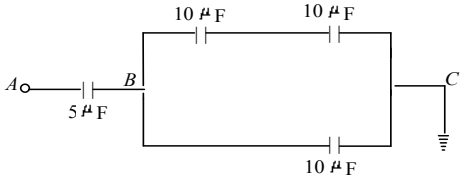
18. A simple pendulum has a length l and the mass of the bob is m. The bob is given a change q coulomb. The pendulum is suspended between the vertical plates of a charged parallel plate capacitor. If E is the electric field strength between the plates, the time period of the pendulum is given by

a) $2\pi\frac{l}{g}$ b) $2\pi\sqrt{\frac{l}{\sqrt{g+\frac{qE}{m}}}}$ c) $2\pi\sqrt{\frac{1}{\sqrt{g-\frac{qE}{m}}}}$ d) $2\pi\sqrt{\frac{l}{\sqrt{g^2+\left(\frac{qE}{m}\right)^2}}}$

19. Three concentric conducting spherical shells carry charges as follows : $+Q$ on the inner shell, $-2Q$ on the middle shell and $-5\ Q$ on the outer shell. The charge in the inner surface of the outer shell is

a) Zero b) $+Q$ c) $-2\ Q$ d) $-3\ Q$

20. As shown in figure, if the point C is earthed and the point A is given a potential of 2000 V, then the potential at point B will be



a) 400 V b) 500 V c) 1000 V d) 1300 V