ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

WORK SHEET 9

Subject : PHYSICS

CLASS : XII

Date : 15.5.20

Chapter : Electrostatics

Topic : Parallel plate capacitor, series & parallel combination, spherical capacitor when outer shell is earthed.

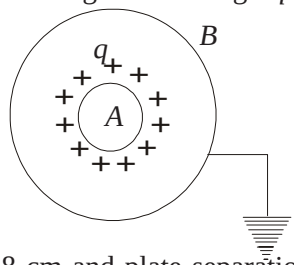
Multiple Choice Question : **1 x 15 = 15**

1. Dimensionl formula of capacitance is
   (a) $[M^{-1} L^{-2} T^4 A^2]$ (b) $[M L^{-2} T^4 A^2]$ (c) $[M^{-1} L^2 T^{-4} A^2]$ (d) $[M L^{-2} T^{-4} A^2]$

2. Each plate of a parallel plate capacitor has charge Q_0 (in magnitude), when connected to a battery. What will be the magnitude of charge on each plate of this capacitor if dielectric of dielectric constant 6 is introduced between the plates of the capacitor?
   (a) $\frac{Q_0}{6}$ (b) $6\ Q_0$ (c) Q_0 (d) $12\ Q_0$

3. If the distance between two plates of a parallel plate capacitor is doubled, its capacitance.
   (a) increases 2 times (b) decreases 2 times (c) increases 4 times (d) decreases 4 times

4. *A* and *B* are two concentric metallic hollow spheres. If *A* is given a charge *q* while *B* is earthed, then
   (a) charge density of *A* and *B* are same
   (b) field inside and outside *A* is zero
   (c) field between *A* and *B* is not zero.
   (d) field inside and outside *B* is zero

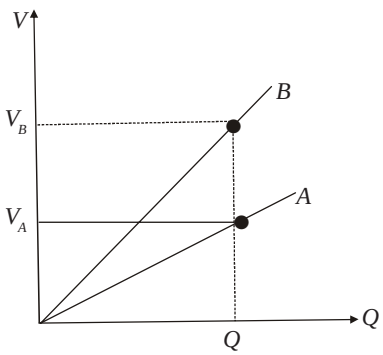


5. A parallel-plate capacitor has circular plates of radius 8 cm and plate separation 1 mm. What will be the charge on the plates if a potential difference of 100*V* is applied?
   (a) $1.78 \times 10^{-8}\ C$ (b) $1.78 \times 10^{-5}\ C$ (c) $4.3 \times 10^{4}\ C$ (d) $2 \times 10^{-9}\ C$

6. What is the value of capacitance if the very thin metallic plate is introduced between two parallel plates of area *A* and separated at distance *d?*
   (a) $\varepsilon_0 A / d$ (b) $\frac{2\varepsilon_0 A}{d}$ (c) $\frac{4\varepsilon_0 A}{d}$ (d) $\frac{\varepsilon_0 A}{2d}$

7. The plates of a parallel plate capacitor are not exactly parallel. The surface charge density
   (a) is lower at the closer end. (b) will not uniform
   (c) each plate will have the same potential at every point (d) Both (b) and (c).

8. The graph shows the variation of voltage *V* across the plates of two capacitors *A* and *B* *versus* increase of charge *Q* stored in them. Which of the capacitors has higher capacitance?
   (a) Capacitor *A*
   (b) Capacitor *B*
   (c) Both (a) and (b)
   (d) None of these



9. A parallel plate air capacitor has a capacitance $18\,\mu$F. If the distance between the plates is tripled and a dielectric medium is introduced, the capacitance becomes $72\,\mu$F. The dielectric constant of the medium is

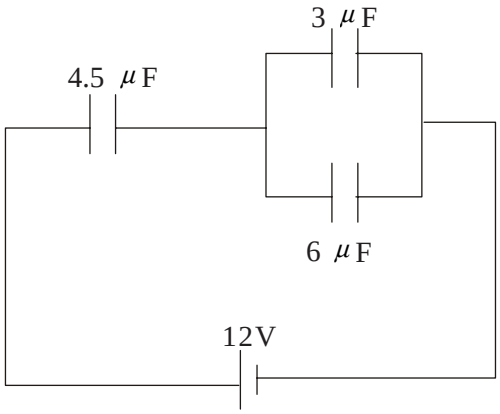
(a) 4 (b) 9 (c) 12 (d) 2

10. Three capacitors each of capacity $4\,\mu$F are to the connected in such a way that the effective capacitance is $6\,\mu$F. This can be done by

(a) connecting two in series and one in parallel (b) connecting two in parallel and one in series

(c) connecting all of them in series (d) connecting all of them in parallel

11. In the circuit shown in the figure, the potential difference across the 4.5 μF capacitor is



(a) $\frac{8}{3}V$

(b) 4 *V*

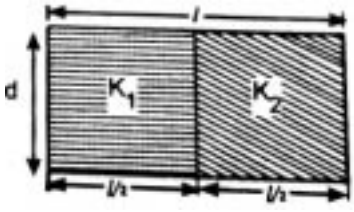
(c) 6 *V*

(d) 8 *V*

12. Three capacitors each of capacitance 9 *pF* are connected in series. What is the potential difference across each capacitor, if the combination is connected to a 120*V* supply?

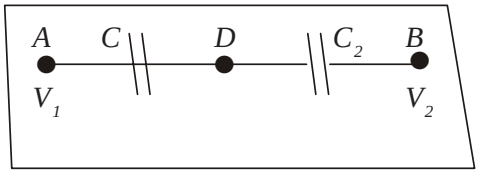
(a) 40*V* (b) 60*V* (c) 80*V* (d) 50*V*

13. A parallel plate capacitor is filled with two dielectrics as shown in the Fig. Its capacity has ratio with capacity without dielectris as



(a) $K_1 + K_2$ (b) $\frac{K_1+K_2}{2}$ (c) $\frac{K_1K_2}{K_1+K_2}$ (d) $2(K_1 + K_2)$

14. Two condensers C_1 and C_2 in a circuit are joined as shown in the Fig. The potential of point *A* is V_1 and that of *B* is V_2. The potential of point *D* will be



(a) $\frac{1}{2}(V_1+V_2)$ (b) $\frac{C_1V_2+C_2V_1}{C_1+C_2}$ (c) $\frac{C_1V_1+C_2V_2}{C_1+C_2}$ (d) $\frac{C_2V_1-C_1V_2}{C_1+C_2}$

15. A800 μF capacitor is charged at the steady rate of $50\,\mu Cs^{-1}$. How long will it take to raise its potential to 10*V*?

(a) 160*s* (b) 50*s* (c) 10*s* (d) 500*s*