DPP
DAILY PRACTICE PROBLEMS

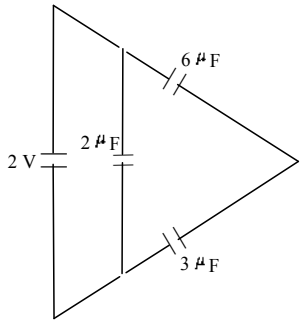
Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 4**

Topic :-ELECTROSTATIC POTENTIAL AND CAPACITANCE

1. If the potential of a capacitor having capacity 6μF is increased from 10 V to 20 V, then increase in its energy is

   a) 12×10^{-6} J b) 9×10^{-4} J c) 4.5×10^{-6} J d) 2.25×10^{-6} J

2. The total energy stored in the condenser system shown in the figure will be



   a) 2 μJ b) 4 μJ c) 8 μJ d) 16 μJ

3. Two free protons are separated by a distance of 1 Å. If one proton is kept at least and the other is released, the kinetic energy of second proton when at infinite sparation is

   a) 23.0×10^{-19} J b) 11.5×10^{-19} J c) 2.3×10^{-19} J d) Zero

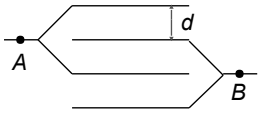
4. The work done in bringing a unit positive charge from infinity distance to a point at distance X from a positive charge Q is W. Then, the potential ϕat the point is

   a) $\frac{WQ}{X}$ b) W c) $\frac{W}{Q}$ d) WQ

5. An electric field is given by $\vec{E} = (y\hat{i} + x\hat{j})$m NC^{-1}. The work done in moving a 1 C charge from $\vec{r}_A = (2\hat{i} + 2\hat{j})$m to $\vec{r}_B = (4\hat{i} + 2\hat{j})$m is

   a) +8 J b) +4 J c) Zero d) − 4 J

6. The equivalent capacity between points A and B in figure will be, while capacitance of each capacitor is 3 μF.



   a) 2 μF b) 4 μF c) 7 μF d) 9 μF

7. 27 identical drops of mercury are charged simultaneously to the same potential of 10 V each. Assuming drops to be spherical, if all the charged drops are made to combine to form one large drop, then the potential of larger drop would be
   a) 45 V b) 135 c) 270 V d) 90 V

8. A soap bubble is charged to a potential of 16V. Its radius is, then doubled. The potential of the bubble now will be
   a) 16V b) 8V c) 4V d) 2V

9. A 10 μF capacitor is charges to 500 V and its plates are joined together through a resistance of 10 Ω. The heat produced in the resistance is
   a) 500 J b) 125 J c) 250 J d) 1.25 J

10. Work done in carrying a charge Q' once round the circle of radius r with a charge Q at the centre is
    a) $\frac{1}{4\pi\epsilon_0}\frac{Q}{r}$ b) $\frac{1}{4\pi\varepsilon_0}\frac{QQ'}{r}$ c) Zero d) $\frac{QQ'}{2r}$

11. An automobile spring extends 0.2 m for 5000 N load. The ratio of potential energy stored in this spring when it has been compressed by 0.2 m to the potential energy stored in a 10μF capacitor at a potential difference of 10000 V will be
    a) 1/4 b) 1 c) 1/2 d) 2

12. A parallel plate capacitor of capacitance 100 pF is to be constructed by using paper sheets of 1 mm thickness as dielectric. If the dielectric constant of paper is 4, the number of circular metal foils of diameter 2 cm each required for the purpose is
    a) 40 b) 20 c) 30 d) 10

13. Two capacitor of capacity 6μF and 12μF in series are connected by potential of 150 V. the potential of capacitor of capacity 12μF will be
    a) 25 V b) 50 V c) 100 V d) 150 V

14. A parallel plate capacitor or capacity C_0 is charged to a potential V_0.
    I. The energy stored in the capacitor when the battery is disconnected and the plate separation is doubled is E_1.
    II. The energy stored in the capacitor when the charging battery is kept connected and the separation between the capacitor plates is doubled is E_2.Then $\frac{E_1}{E_2}$ value is
    a) $\frac{4}{1}$ b) $\frac{3}{2}$ c) 2 d) $\frac{1}{2}$

15. The potential at a point Pwhich is forming a corner of a square of side 93mm with charges, $Q_1 = 33$ nC,$Q_2 = -51$ nC, $Q_3 = 47$nC located at the other three corners is nearly
    a) 16kV b) 4kV c) 400V d) 160V

16. If the plates of a parallel plate capacitor are not equal in area, then quantity of charge
    a) On the plates will be same but nature of charge will differ
    b) On the plates as well as nature of charge will be different
    c) On the plates will be different but nature of charge will be same

d) As well as nature of charge will be same

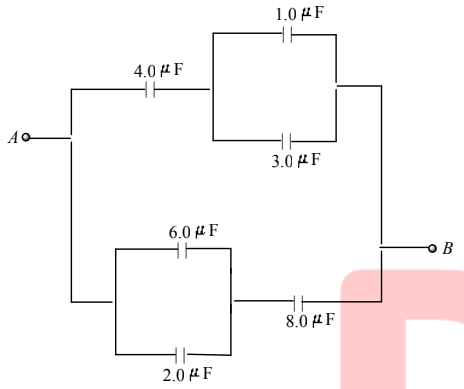
17. Two capacitors of capacitance 2 μF and 4μF respectively are connected in series. The combination is connected across a potential difference of 10 V. The ratio of energies stored by capacitors will be

a) $1:\sqrt{2}$ b) 2 : 1 c) 1 : 4 d) 4 : 1

18. A 20μF capacitor is connected to 45 V battery through a circuit whose resistance is 2000Ω. What is the final charge on the capacitor?

a) 9×10^{-4}C b) 9.154×10^{-4}C c) 9.8×10^{-4}C d) None of these

19. The equivalent capacitance between points *A* and *B* for the combination of capacitors shown in figure, where all capacitances are in microfarad is



a) 6.0 μF b) 4.0 μF c) 2.0 μF d) 3.0 μF

20. An air filled parallel plate capacitor has a capacity of 2pF. The separation of the plates is doubled and the interspace between the plates is filled with wax. If the capacity is increased to 6 pF, the dielectric constant of wax is

a) 2 b) 3 c) 4 d) 6