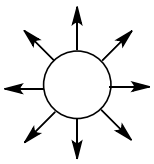
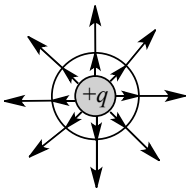
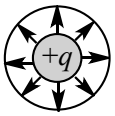
DPP
DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. :10**

Topic :-ELECTROSTATIC POTENTIAL AND CAPACITANCE

1. If a point charge q is placed at a point inside a hollow conducting sphere, then which of the following electric lines of force pattern is correct?

a)  b) 

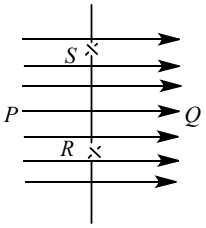
c) 

d) None of these

2. Two tree protons are separated by a distance of 1Å. If they are released, the kinetic energy of each proton when at infinite separation is
a) 11.5×10^{-19} J b) 23×10^{-19} J c) 46×10^{-19} J d) 5.6×10^{-12} J

3. When two conductors of charges and potentials C_1, V_1 and C_2, V_2 respectively are joined, the common potential will be
a) $\frac{C_1V_1 + C_2V_2}{V_1 + V_2}$ b) $\frac{C_1V_1^2 + C_2V_2^2}{V_1^2 + V_2^2}$ c) $C_1 + C_2$ d) $\frac{C_1V_1 + C_2V_2}{C_1 + C_2}$

4. The points resembling equal potentials are

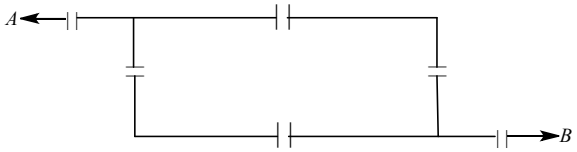


a) P and Q b) S and Q c) S and R d) P and R

5. The electric potential V at any point x, y, z (all the metre) in space is given by $V = 4x^2$ volt. The electric field at the point (1m, 0, 2m) in Vm^{-1} is
a) $-8\hat{i}$ b) $+8\hat{i}$ c) $-16\hat{i}$ d) $16\hat{k}$

6. An air capacitor is charged with an amount of charge q and dipped into an oil tank. If the oil is pumped out , the electric field between the plates of capacitor will
a) Increase b) Decrease c) Remain the same d) Become zero

7. A network of six identical capacitors, each of value C, is made as shown in the figure.



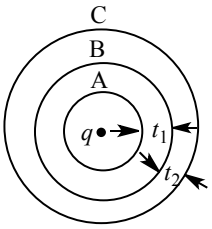
The equivalent capacitance between the points A and B is

a) $\frac{4C}{11}$ b) $\frac{3C}{4}$ c) $\frac{3C}{2}$ d) $3C$

8. In a region of space, the electric field is given by $\vec{E} = 8\hat{i} + 4\hat{j} + 3\hat{k}$. The electric flux through a surface of area of 100 units x-y plane is

a) 800 units b) 300 units c) 400 units d) 1500 units

9. Figure shows three spherical and equipotential surfaces A, B and C round a point charge q. The potential difference $V_A - V_B = V_B - V_C$. If t_1 and t_2 be the distance between them. Then



a) $t_1 = t_2$ b) $t_1 > t_2$ c) $t_1 < t_2$ d) $t_1 \leq t_2$

10. A dielectric slab is inserted between the plates of an isolated charged capacitor. Which of the following quantities remain unchanged?

a) The charge on the capacitor b) The stored energy in the capacitor
c) The potential difference between the plates d) The electric field in the capacitor

11. Three capacitors of capacitance C(μF) are connected in parallel to which a capacitor of capacitance C is connected in series. Effective capacitance is 3.75, then capacity of each capacitor is

a) 4 μF b) 5 μF c) 6 μF d) 8 μF

12. Two identical parallel plate capacitors are placed in series and connected to a constant voltage source of V volt. If one of the capacitor is completely immersed in a liquid of dielectric constant K, then the potential difference between the plates of the other capacitor will change to

a) $\frac{K}{K+1}V$ b) $\frac{K+1}{K}$ c) $\frac{2K}{K+1}V$ d) $\frac{K+1}{2K}V$

13. Across each of two capacitors 1 μF and 4 μF, a potential difference of 10 V is applied. Then positive plate of one is connected to the negative plate of the other, and negative plate of one is connected to the positive plate of the other. After contact

a) Charge on each is zero b) Charge on each is same but non-zero
c) Charge on each is different but non-zero d) None of the above

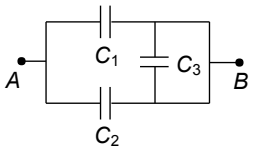
14. On increasing the plate separation of a charged capacitor, the energy

a) Increases b) Decreases c) Remains unchanged d) Becomes zero

15. A charge q is fixed. Another charge Q is brought near it and rotated in a circle of radius r around it. Work done during rotation is

a) Zero b) $\frac{Qq}{4\pi\varepsilon_0 r}$ c) $\frac{Qq}{2\pi\varepsilon_0 r}$ d) None of these

16. The equivalent capacitance of the combination of three capacitors, each of capacitance C shown in figure between points A and B is



a) $\frac{C}{2}$ b) $\frac{3C}{2}$ c) $\frac{1}{3C}$ d) 2C

17. A thin spherical conducting shell of radius R has a charge q. Another charge Q is placed at the centre of the shell. The electrostatic potential at a point P at a distance $R/2$ from the centre of the shell is

a) $\frac{2Q}{4\pi\varepsilon_0 R}$ b) $\frac{2Q}{4\pi\varepsilon_0 R} - \frac{2q}{4\pi\varepsilon_0 R}$ c) $\frac{2Q}{4\pi\varepsilon_0 R} + \frac{q}{4\pi\varepsilon_0 R}$ d) $\frac{(q+Q)}{4\pi\varepsilon_0}\frac{2}{R}$

18. In a charged capacitor the energy stored in

a) The positive charges b) The negative charges
c) The field between the plates d) None of the above

19. In a parallel plate capacitor , the capacity increases if

a) Area of the plate is decreased b) Distance between the plates increases
c) Area of the plate is increased d) Dielectric constant decrease

20. A spherical drop of mercury having a potential of 2.5V is obtained as a result of merging 125 droplets. The potential of a constituent droplets would be

a) 1.0V b) 0.5V c) 0.2V d) 0.1V