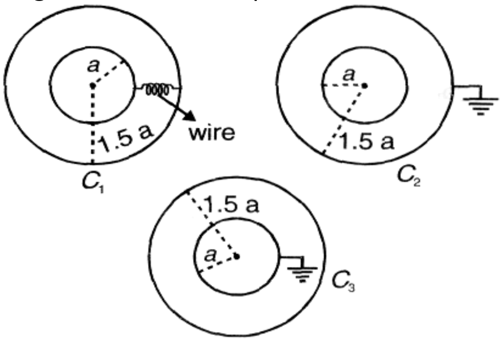
DPP – 1 (Capacitor)

Video Solution on Website :- https://physicsaholics.com/home/courseDetails/103

Video Solution on YouTube:- https://youtu.be/uPzt1E0GvLY

Written Solution on Website:- https://physicsaholics.com/note/notesDetalis/63

Q 1. Capacitance of following combination of spheres are C_1, C_2 & C_3

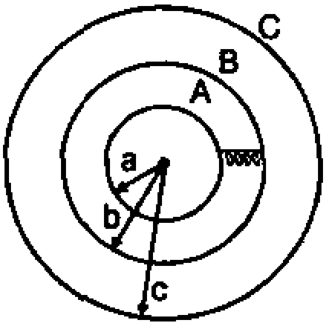


(a) $C_2 > C_1$ (b) $C_1 > C_3$
(c) $C_1 > C_2$ (d) $C_3 > C_2$

Q 2. Capacity of a spherical capacitor is C_1 when inner sphere is charged and outer sphere is earthed and C_2 when inner sphere is earthed and outer sphere is charged. Then $\frac{C_1}{C_2}$ is : (a = radius of inner sphere, b = radius of outer sphere)

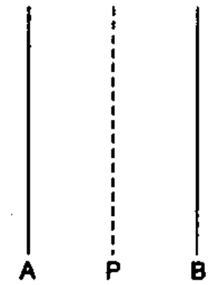
(a) 1 (b) $\frac{a}{b}$ (c) $\frac{b}{a}$ (d) $\frac{a+b}{a-b}$

Q 3. Three conducting spheres A, B and C are as shown in figure. The radii of the spheres are a, b and c respectively. A and B are connected by a conducting wire. The capacity of the system is between A and C is:



(a) $4\pi\varepsilon_0(a + b + c)$ (b) $4\pi\varepsilon_0\left(\frac{bc}{c-b}\right)$
(c) $4\pi\varepsilon_0\left(\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right)$ (d) $4\pi\varepsilon_0\left(\frac{abc}{ab+bc+ca}\right)$

Q 4. An air capacitor consists of two parallel plates A and B as shown in the figure. Plate A is given a charge Q and plate B is given a charge 3Q. P is the median plane of the capacitor. If C_o is the capacitance of the capacitor, then:



(a) $V_P - V_A = \frac{Q}{4C_0}$ (b) $V_P - V_A = \frac{Q}{2C_0}$

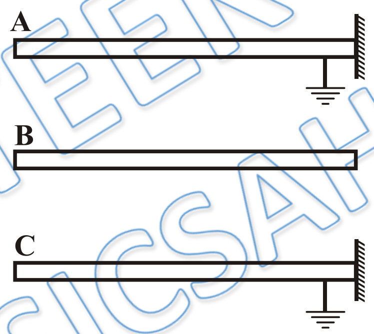
(c) $V_P - V_A = \frac{Q}{C_0}$ (d) $V_P - V_A = -\frac{Q}{4C_0}$

Q 5. A capacitor of capacitance C is charged to a potential difference V from a cell and then disconnected from it. A charge +Q is now given to its positive plate. The potential difference across the capacitor is now

(a) V (b) V + $\frac{Q}{C}$

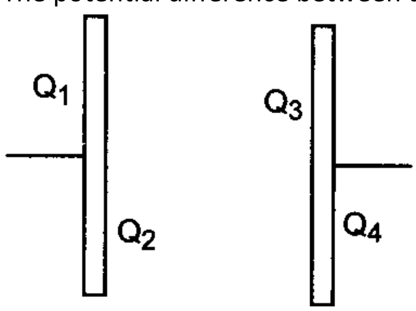
(c) V + $\frac{Q}{2C}$ (d) V - $\frac{Q}{C}$, if V < CV

Q 6. A, B and C are three large, parallel conducting plates, placed horizontally. A and C are rigidly fixed and earthed. B is given some charge. Under electrostatic and gravitational forces, B may be



(a) in equilibrium midway between A and C
(b) in equilibrium if it is closer to A than to C
(c) in equilibrium if it is closer to C than to A
(d) B can never be in stable equilibrium

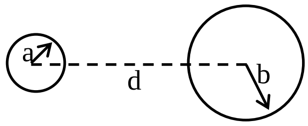
Q 7. In an isolated parallel-plate capacitor of capacitance C, the four surfaces have charges Q_1, Q_2, Q_3 and Q_4, as shown. The potential difference between the plates is



(a) $\frac{Q_1+Q_2}{C}$ (b) $\left|\frac{Q_2}{C}\right|$

(c) $\left|\frac{Q_3}{C}\right|$ (d) $\frac{1}{C}$ [(Q_1+Q_2)-(Q_3-Q_4)]

Q 8. Two metallic spheres of radii a and b are separated by a distance d as shown in figure. the capacity of the system is (assuming d is very large in comparison to a and b) –



(a) 4πϵ0/(1/a + 1/b – 2/d)
(b) 2π ϵ0/(1/a – 1/b + 1/d)
(c) 4π ϵ0/(1/a + 1/b – 1/d)
(d) 4π ϵ0(a + b)

Q 9. Two thin long parallel conductor cylindrical wires of radius a have distance b between their axes. Their capacitance per unit length is

(a) $\frac{\pi\epsilon_0}{ln\left(\frac{b}{a}\right)}$ (b) $\frac{2\pi\epsilon_0}{ln\left(\frac{b}{a}\right)}$
(c) $\frac{4\pi\epsilon_0}{ln\left(\frac{b}{a}\right)}$ (d) $\frac{ab\pi\epsilon_0}{b-a}$

Q 10. If charge on positive plate of parallel plate capacitor is Q and electric field between plates is E, electrostatic force on positive plate will be
(a) QE
(b) QE/2
(c) QE/4
(d) QE/8

Q 11. Keeping potential difference between plates constant if we increase distance between parallel plate capacitor to two times ,electrostatic force between plates will become
(a)2 times of initial value
(b) 4 times of initial value
(c) 1/4 times of initial value
(d) ½ times of initial value

Answer Key

Q.1 a, d	Q.2 b	Q.3 b	Q.4 b	Q.5 c
Q.6 b, d	Q.7 b, c	Q.8 a	Q.9 a	Q.10 b
Q.11 c				