LAKSHYA (JEE)

Electrostatic Potential and Capacitance

DPP-10

1. A condenser is charged by connecting to a battery and then the battery is disconnected. If a dielectric slab is introduced between the plates

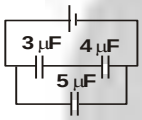
(A) potential decreases

(B) capacity decreases

(C) potential increases

(D) charge increases

2. In the circuit, if the potential difference across 4 μF condenser is 6 V, the potential difference between 5 μF condenser is



(A) 7.5 V (B) 14 V

(C) 10.5 V (D) 4.5 V

3. The capacity of a parallel plate condenser is 10 μF, without dielectric. If dielectric of dielectric constant 2 is used to fill half thickness between the plates, the capacitances is

(A) 10 μF (B) 20 μF

(C) 15 μF (D) 13.33 μF

4. A positively charged oil drop of charge 8×10^{-15} C remains stationary in the electric field between two horizontal plates separated by a distance of 2 cm and having potential difference 6 V. The mass of the oil drop is (g = 10 ms^{-1}

(A) 24×10^{-14} kg (B) 24×10^{-16} kg

(C) 12×10^{-14} kg (D) 6×10^{-14} kg

5. A capacitor 4 μF charged to 50 V is connected to another capacitor 2 μF charged to 100 V. The total energy of the combination is

(A) $\frac{4}{3}\times10^{-2}$ J (B) $\frac{3}{2}\times10^{-2}$ J

(C) 3×10^{-2} J (D) $\frac{8}{3}\times10^{-2}$ J

6. A parallel plate capacitor with a dielectric slab (k = 1) filling the space between the plates is charged to potential 250 V and isolated. The slab is drawn out and another dielectric of equal thickness but of k = 4 is introduced between the plates. The ratio of the energy stored in the capacitor, second case to first case, is

(A) 4 : 3 (B) 1 : 4

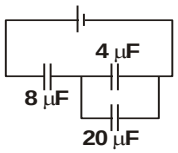
(C) 9 : 16 (D) 16 : 9

7. Two identical condensers P and Q are connected in series with a battery. The space between the plates of P is completely filled with dielectric medium of dielectric constant 8 and a copper plate of thickness d/2 is introduced between the plates of Q. If d is the distance of separation of the plates, then the ratio of potentials of P and Q is

(A) 1 : 4 (B) 4 : 1

(C) 3 : 8 (D) 1 : 6

8. In the circuit, if the energy of 8 μF condenser is E, the energy of 4 μF condenser is



(A) E/2 (B) 2E

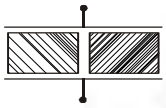
(C) E/18 (D) 5E/18

9. If the electric field intensity between the plates of a parallel plate condenser is E, the electric energy stored per unit volume of the medium is

(A) $\frac{1}{2}\varepsilon_o E^2$ (B) $\frac{1}{2}E\varepsilon_o^2$

(C) $\varepsilon_o E^2$ (D) $2\varepsilon_o E^2$

10. The capacity of a parallel plate condenser with air medium is 5μF. If the space between the plates is completely filled with two dielectric slabs of same area but of dielectric constants 3 and 5 as shown in the figure, the capacity of the condenser becomes



(A) 40 μF (B) 20 μF

(C) 10 μF (D) 15 μF

ANSWERS

1. (A)
2. (B)
3. (D)
4. (A)
5. (A)
6. (B)
7. (A)
8. (C)
9. (A)
10. (B)

Note - If you have any query/issue

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