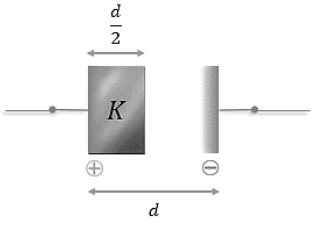
Q.1 Half of the space between the plates of parallel plate capacitor is filled with a medium of dielectric constant **K** parallel to the plates. If initially the capacitance is**C**, then the new capacitance will be

(A) $\frac{2KC}{K+1}$ **(B)** $\frac{(K+1)C}{2}$ **(C)** $\frac{KC}{K+1}$ **(D)** KC



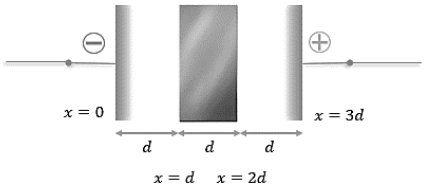
Q.2 A dielectric slab of thickness **d** is inserted in a parallel plate capacitor whose negative plate is at $\mathbf{x = 0}$ and positive plate is at$\mathbf{x = 3d}$. The slab is equidistant from the plates. The capacitor is given some charge. As one goes from **0** to**3d**:

(A) The magnitude of the electric field remains the same

(B) The direction of the electric field changes continuously

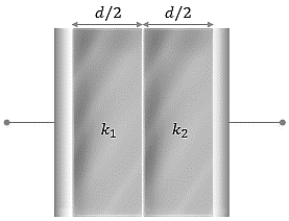
(C) The electric potential increases continuously

(D) The electric potential increases at first, then decreases and again increases



Q.3 A parallel plate capacitor has the space between its plates filled by two slabs of thickness **d/2** each with dielectric constants $\mathbf{k_1}$ and $\mathbf{k_1}$. Given that **d** is the plate separation of the capacitor, the effective capacitance is

(A) $\frac{\epsilon_0 A(k_1+k_2)}{2d}$ **(B)** $\frac{2\epsilon_0 A}{d}\frac{k_1k_2}{k_1+k_2}$ **(C)** $\frac{\epsilon_0 A}{d}\frac{k_1k_2}{k_1-k_2}$ **(D)** $\frac{\epsilon_0 A(k_1-k_2)}{d}$

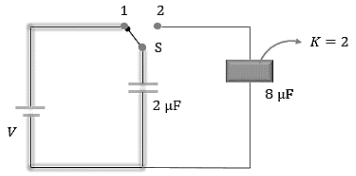


Q.4 A dialectic of dielectric constant **K** completely fills the gap between the plates of a parallel plate capacitor whose capacitance is equal to $\mathbf{C_0}$, when dielectric is absent. Find the mechanical work that must be done against electric forces for extracting the dielectric out of the capacitor, if voltage of the capacitor (**V**) is maintained constant.

(A) $\frac{1}{2}\left(\frac{1}{K}-1\right)C_0V^2$ **(B)** $\frac{1}{2}(K-1)C_0V^2$ **(C)** $\frac{K}{2}C_0V^2$ **(D)** $\frac{(2K-1)C_0V^2}{2}$

Q.5 A **2 μF** capacitor is charged as shown in figure. The percentage of its stored energy dissipated after switch **S** is turned to position **2** is: (**8 μF** is the capacitance of air-filled parallel plate capacitor)

(A)0% **(B)**20% **(C)**75% **(D)**89%



Q.6 When a slab of dielectric medium is placed between the plates of a parallel plate capacitor which is connected with a battery, then the charge on plates in comparison with earlier charge:

(A) Is less **(B)** is same

(C) is more **(D)** depends on the dielectric constant

Q.7 A parallel plate capacitor of capacitance **90 pF** is connected to a battery of emf **20 V**. If a dielectric material of dielectric constant $\mathbf{K} = \frac{5}{3}$ is inserted between the plates, the magnitude of induced charge will be:

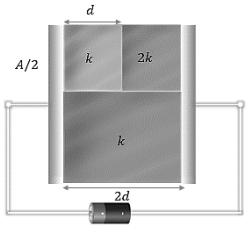
(A) 0.9 nC **(B)** 1.2 nC **(C)** 0.3 nC **(D)** 2.4 nC

Q.8 A parallel plate capacitor of plate area **5 cm²** and plate separation **20 mm** is charged to a potential difference of **10 V** and then the battery is disconnected. A slab of dielectric constant **5** is then inserted between the plates to fill the space between the plates completely. What is the work done on the system in the process?

(A) 8.85×10^{-12} J **(B)** -8.85×10^{12} J **(C)** 8.85×10^{12} J **(D)** -8.85×10^{-12} J

Q.9 The capacitance of a parallel plate capacitor having plate area A and separation **2d** with dielectrics inserted as shown in figure is

(A) $\frac{3k\epsilon_0 A}{2d}$ **(B)** $\frac{5k\epsilon_0 A}{12d}$ **(C)** $\frac{7k\epsilon_0 A}{12d}$ **(D)** $\frac{k\epsilon_0 A}{d}$



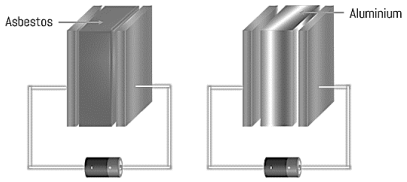
Q.10 If in one case an asbestos sheet of thickness $\mathbf{t}(< d)$ is introduced between the plates of a parallel plate capacitor and in other case an aluminium slab of same thickness is introduced, then

(A) Capacitance is more when the medium is asbestos as compared to aluminum.

(B) Capacitance is the same for both the media.

(C) Capacitance is more when the medium is aluminium as compared to asbestos.

(D) Insufficient information



ANSWER KEY

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