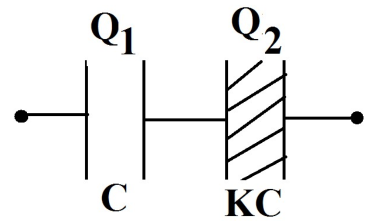
SHAHEEN GROUP OF INSTITUTIONS
Bidar (Head Office)

Class : NEET Repeaters Sub: Physics Worksheet–9 Date: 29-01-2019

Electric Potential and Capacitance–3

1. Two identical capacitors 1 and 2 are connected in series as shown. The capacitor 2 contains a dielectric of constant K. Q_1 and Q_2 are the charges stored in the capacitor. Now dielectric is removed, then Q_1' and Q_2' are the charges stored subsequently. Then



(A) $\frac{Q_1'}{Q_1} = \frac{(K+1)}{K}$ (B) $\frac{Q_2'}{Q_2} = \frac{(K+1)}{2}$

(C) $\frac{Q_2'}{Q_2} = \frac{(K+1)}{2K}$ (D) $\frac{Q_1'}{Q_1} = \frac{2}{K+1}$

2. A capacitor is connected to a battery. The force of attraction between the plates when the separation them is halved is

(A) remains the same (B) becomes twice
(C) becomes halved (D) becomes four times

3. A 900 pF capacitor connected to a 100 V battery is disconnected from the battery and connected to another 900 pF capacitor. The electrostatic energy stored by the system is

(A) 2.25 μJ (B) 3.25 μJ (C) 4.5 μJ (D) 6.25 μJ

4. Three capacitors each of capacitance 9 pF are connected in series, across a 120V supply. The total capacitance of the combination and the potential difference across each capacitor are respectively:

(A) 3 pF, 120 V (B) 3 pF, 40 V (C) 27 pF, 120 V (D) 27 pF, 40 V

5. Three capacitors of capacitances 2 pF, 3 pF and 4 pF are connected in parallel across a 100V supply. The total capacitance of combination and the charge on 3 pF capacitor are respectively :

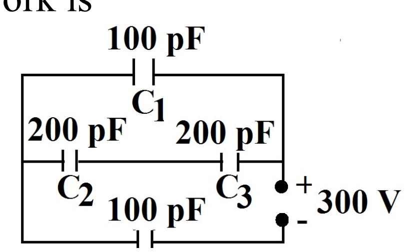
(A) $\frac{12}{13}$ pF, 3×10^{-10} C (B) 9 pF, 3×10^{-10} C

(C) 9 pF, 2×10^{-10} C (D) $\frac{13}{12}$ pF, 2×10^{-10} C

6. An electrical technician requires a capacitance of 2μF in a circuit across a potential difference of 1 kV. A large number of 1μf capacitors are available to him each of which can stand a potential difference of not more than 400 V. The minimum number of capacitors to accomplish this is

(A) 6 (B) 12 (C) 18 (D) 24

7. The equivalent capacitance of the following network is



(A) $\frac{50}{3}$ pF

(B) $\frac{100}{3}$ pF

(C) 50 pF

(D) $\frac{200}{}$ pF

8. In the above question the charge on the C_2 capacitor if the network is connected to a 300V supply is

(A) 10^{-8} C (B) 5×10^{-9} C (C) 2×10^{-9} C (D) 2×10^{-8} C

9. The plates of a parallel plate capacitor have an area of 90 cm^2 each and are separated by 2.5 mm. The capacitor is charged by connecting it to a 400V supply. The energy per unit volume U =

(A) 0.075 Jm^{-3} (B) 0.113 Jm^{-3} (C) 0.256 Jm^{-3} (D) 0.475 Jm^{-3}

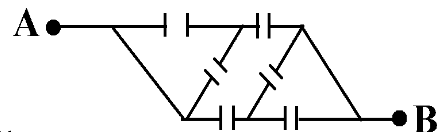
10. A 4 μF capacitor is charged by a supply of 200 V. It is then disconnected from the supply, and is connected to another uncharged 2 μF capacitor. The electrostatic energy of the first capacitor lost in the form of heat and electromagnetic radiation is

(A) 1.25×10^{-2} J (B) 2.67×10^{-2} J (C) 1.86×10^{-2} J (D) 3.28×10^{-2} J

11. Two capacitors C_1 and C_2 are charged to 120 V and 200 V respectively. When they are connected in parallel, it is found that potential on each one of them is zero. Therefore,

(A) $5C_1 = 3C_2$ (B) $3C_1 = 5C_2$ (C) $3C_1 + 5C_2 = 0$ (D) $9C_1 = 4C_2$

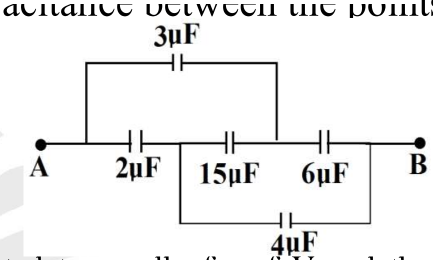
12. A network of six identical capacitors, each of value C, is made as shown in the figure. Equivalent capacitance between points A and B is



(A) C/4 (B) 3C/4

(C) 4C/3 (D) 3C

13. In the circuit shown in figure, the equivalent capacitance between the points A and B is



(A) $\frac{10}{3}$ μF (B) $\frac{15}{14}$ μF

(C) $\frac{2}{5}$ μF (D) $\frac{25}{9}$ μF

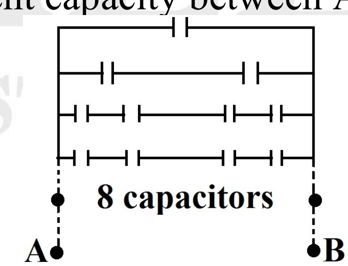
14. A parallel plate air capacitor of capacitance C_0 is connected to a cell of emf V and then disconnected from it. A dielectric slab of dielectric constant K, which can just fill the air gap of the capacitor, is now inserted in it. Which of the following is incorrect?

(A) The potential difference between the plates decreases K times.

(B) The energy stored in the capacitor decreases K times.

(C) The change in energy is $\frac{1}{2} C_0V^2(K-1)$ (D) The change in energy is $\frac{1}{2} C_0V^2\left(\frac{1}{K} - 1\right)$

15. Refer to the infinite network of capacitors shown in figure. The capacitance of each capacitor is 1 μF. The equivalent capacity between A and B is



(A) 1 μF

(B) 2 μF

(C) 0 μF

(D) ∞

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1-C	**2-D**	**3-A**	**4-B**	**5-B**	**6-C**	**7-D**	**8-A**	**9-B**	**10-B**	**11-B**	**12-C**	**13-A**	**14-D**	**15-B**