PHYSICS

ELECTRIC CHARGES AND FIELDS, ELECTRIC POTENTIAL AND CAPACITORS AND CURRENT ELECTRICITY

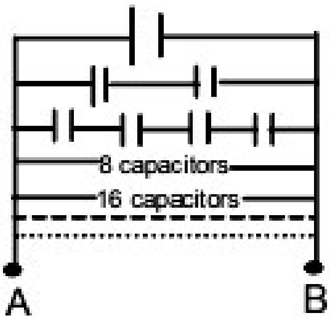
121. A battery charges a parallel plate capacitor of distance (4) so that an energy (U_0) is stored in the system. A slab of' dielectric constant (K) and thickness (4) is then introduced between the plates of the Capacitor. The new energy of the system is given by

(1) KU_0
(2) K^2U_0
(3) $\frac{U_0}{K}$
(4) $\frac{U_0}{K^2}$

122. An air capacitor, and a capacitor with a conducting slab (thickness one half the separation) has capacity C_1, C_2 respectively, then

(1) $C_1 > C_2$
(2) $C_1 = C_2 = 0$
(3) $C_2 > C_1$
(4) $C_1 = C_2$

123. An infinite number of identical capacitors each of capacitance 1 μF are connected as in adjoining figure. The equivalent capacitance between A and B is



(1) 1 μF
(2) 2 μF
(3) $\frac{1}{2}$μF
(4) ∞

124. In a region where E = 0, the potential (V) varies with distance r as

(1) $V \propto \frac{1}{r}$
(2) $V \propto r$
(3) $V \propto \frac{1}{r^2}$
(4) V = Constant independent of (r)

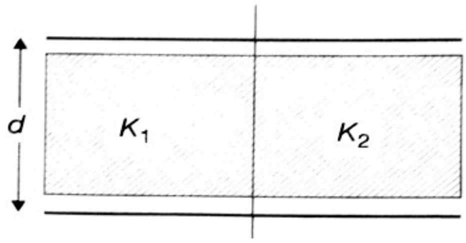
125. N drops of mercury of equal radii and possessing equal charges combine to form a big spherical drop. The capacitance of the bigger drop compared to each individual drop is

(1) N times
(2) $N^{\frac{2}{3}}$ times
(3) $N^{\frac{1}{3}}$ times
(4) $N^{\frac{5}{3}}$ times

126. The capacitance of a parallel plate condenser does not depend upon

(1) The distance between the plates
(2) Area of the plates
(3) Medium between the plates
(4) Material of the plates

127. The capacitance of a capacitor, filled with two dielectrics of same dimensions but of dielectric constants K_1 and K_2 respectively as shown will be



(1) $\frac{\varepsilon_0 A}{2d}(K_1 + K_2)$
(2) $\frac{\varepsilon_0 A}{d}(K_1 + K_2)$
(3) $\frac{\varepsilon_0 A}{2d}\left(\frac{K_1 K_2}{K_1 + K_2}\right)$
(4) $\frac{\varepsilon_0 A}{d}\left(\frac{K_1 K_2}{K_1 + K_2}\right)$

128. A parallel plate air capacitor has capacity 'C' distance of separation between the plates 'd' and potential difference 'V' is applied between the plates. The force of attraction between the plates of the capacitor is

(1) $\frac{C^2V^2}{2d^2}$ (2) $\frac{C^2V^2}{2d}$

(3) $\frac{CV^2}{2d}$ (4) $\frac{CV^2}{d}$

129. Assume that an electric field $\vec{E} = 30x^2\hat{i}$ exists in space. Then the potential difference $V_A - V_0$ where V_0 is the potential at the origin and V_A is the potential at x = 2 m, is

(1) –80 J (2) 80 J

(3) 120 J (4) –120 J

130. In an ammeter, 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G. the resistance of shunt will be

(1) $\frac{1}{499}G$ (2) $\frac{499}{500}G$

(3) $\frac{1}{500}G$ (4) $\frac{500}{499}G$