DPP – 01

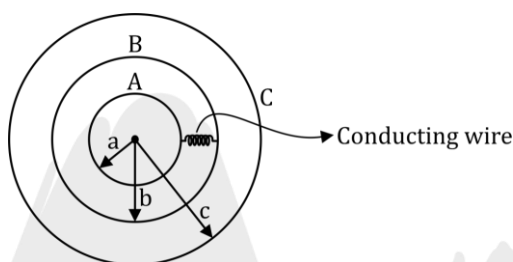**Q.1** Capacity of an isolated sphere is increased 20 times when it is enclosed by an earthed concentric sphere. ratio of their radii is $\frac{k}{19}$, find value of k is

Q.2 Conducting spheres A, B & C are shown in figure, The capacity of system is $4\pi\varepsilon_0\left[\frac{\beta bc + \alpha ab + \gamma ac}{c-b}\right]$,

find value of $\alpha + \beta + \gamma =$

Q.3 A radio active source in the form of a metal sphere of diameter 10^{-3} m emits β-particle at a constant rate of 6.25×10^{10} particles per second. If the source is electrically insulated, It take $\alpha \times 10^{-6}$ second for its potential to rise 1 volt. assuming that 80% of emitted β-particles escape from the surface.

Q.4 One plate of a Capacitor is connected with a spring as shown in figure, Area of both the plates is A. In steady state separation b/w the plates is 0.8d (spring was unstretched and the distance between the plates was d when the capacitor was uncharged). The force constant of the spring is $\frac{\alpha\varepsilon_0 A\varepsilon^2}{d^3}$ then find value of α
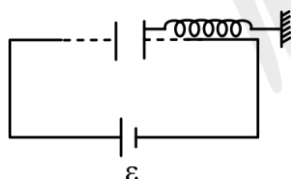
Q.5 A cylindrical Capacitor has two-co-axial cylinders shown in figure. find C of the system
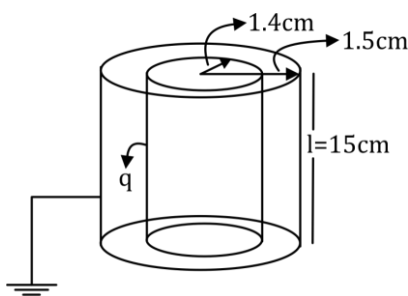
given $\to$ [q = 3.5μc]

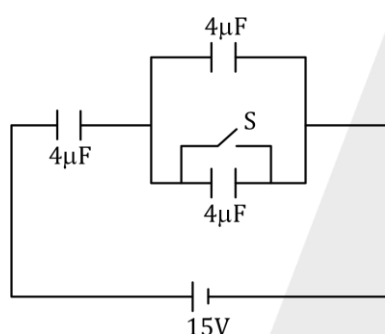(A) 1.21×10^{-8} F   (B) 2×10^{-8} F   (C) 1.21×10^{-6} F   (D) N. O. T

Q.6 A test charge experience force F when placed in between plate capacitor. If one plate is removed then the force on this test charge will be.

(A) 0   (B) $\frac{F}{2}$ (C) F   (D) 2F

Q.7 The energy density in a parallel plate capacitor is given as 1.8×10^{-9} J/m^3. The value of the electric field in the region b/w the place is ($\varepsilon_0 = 9 \times 10^{-12}$SI unit)

(A) 2 N/C   (B) 66 N/C   (C) 20 N/C   (D) 200N/C

Q.8

Consider the ckt shown in figure. After switch s is closed. Find amount of charge will flow through the switch?

(A) 20μC   (B) 40μC   (C) 60μC   (D) zero

Passage (9-10)

In the given figure, two capacitors of Capacitance C(μF) each and ideal Cell of emf ε Volts. Initially both the Capacitors are uncharged, the key is pushed to position 1 and then to position 2.this operation is repeat infinite times
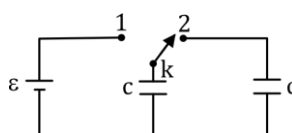
Q.9 The magnitude of net charge (in μC) that across the cell is

(A) CE   (B) 1.5 CE   (C) 2CE   (D) zero

Q.10 The net heat produced in the circuit (in μJ) is

(A) $0.5\ c\varepsilon^2$ (B) $1.5\ c\varepsilon^2$ (C) $2c\varepsilon^2$ (D) $c\varepsilon^2$

ANSWER KEY

1. (20)   **2.** $\alpha + \beta + \gamma = 1$ **3.** $\alpha = 6.95$ **4.** $\alpha = 2.5$ **5.** (A)

6. (B)   **7.** (C)   **8.** (C)   **9.** (C)   **10.** (D)

Home Work

Ex. 1	Q. 1,2,5,
Ex. 2	Q 2,3,10
Ex.3	Q.12,13
Ex.4	Q.
Ex.5	Q. 1