

Ch—02 Electrostatic Potential and Capacitance

Daily Practice Problem 05

Q1. An isolated sphere has a capacitance 50 pF. (i) Calculate its radius. (ii) How much charge should be placed on it to raise its potential to 10^4 V?

Q4. Find the capacitance of a conducting sphere of radius 10 cm situated in air. How much charge is required to raise it to a potential of 1000 volt?

Q2. Twenty-seven spherical drops of radius 3 mm and carrying 10^{-12} C of charge are combined to form a single drop. Find the capacitance and the potential of the bigger drop.

Q5. Assuming the earth to be a spherical conductor of radius 6400 km, calculate its capacitance.

Q3. Eight identical spherical drops, each carrying a charge 1 nC are at a potential of 900 V each. All these drops combine together to form a single large drop. Calculate the potential of this large drop. (Assume no wastage of any kind and take the capacitance of a sphere of radius r as proportional to r).

Q6. N drops of mercury of equal radii and possessing equal charges combine to form a big drop. Compare the charge, capacitance and potential of bigger drop with the corresponding quantities of individual drops.

ANSWERS

1. (i) $R = 45$ cm. (ii) $q = 0.5 \mu\text{C}$.

4. 11 pF, 1.1×10^{-8} C

2. $C = 10^{-12}$ F ; $V = 27$ V.

5. $711 \mu\text{F}$

3. $V' = 3600$ V.

6. N , $N^{1/3}$ $N^{2/3}$

