Model Question Paper

Electrostatistics - Part III

12th Standard

Physics

Reg.No. : ☐☐☐☐☐☐

I.Answer all the Questions.

II.Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 80

Section-A

5 x 1 = 5

1) The unit of permittivity is

(a) $C^2 N^{-1} m^{-2}$ (b) $Nm^2 C^{-2}$ (c) Hm^{-1} (d) $NC^{-2} m^{-2}$

2) The number of electric lines of force originating from a charge of 1 C is

(a) 1.129×10^{11} (b) 1.6×10^{-19} (c) 6.25×10^{18} (d) 8.85×10^{12}

3) The electric field outside the plates of two oppositely charged plane sheets of charge density σ is

(a) $\frac{+\sigma}{2\varepsilon o}$ (b) $\frac{-\sigma}{2\varepsilon o}$ (c) $\frac{\sigma}{\varepsilon o}$ (d) zero

4) The capacitance of a parallel plate capacitor increases from $5 \mu f$ to $60 \mu f$ when a dielectric is filled between the plates. The dielectrc constant of the dielectric is

(a) 65   (b) 55   (c) 12   (d) 10

5) A hollow metal ball carrying an electric charge produces no electric field at points

(a) outside the sphere   (b) on its surface   (c) inside the sphere   (d) at a distance more than twice

Section-B

5 x 3 = 15

6) What is an equipotential surface?

7) Define electric flux. Give its unit.

8) What is a capacitor? Define its capacitance.

9) A parallel plate capacitor is connected to a battery. If the dielectric slab of thickness equal to half the plate separation is inserted between the plates what happens to (i) capacitance of the capacitor (ii) electric field between the plates (iii) potential difference between the plates.

10) a) What is meant by dielectric polarisation?

(OR)

b) Why is it safer to be inside a car than standing under a tree during lightning?

Section-C

4 x 5 = 20

11) Define electric field at a point. Give its unit and obtain an expression for the electric field at a point due to a point charge.

12) Derive an expression for the torque acting on the electric dipole when placed in a uniform electric field.

13) Define electric potential at a point. Is it a scalar or a vector quantity? Obtain an expression for electric potential due to a point charge?

14) What is electrostatic potential energy of a system of two point charges? Deduce an expression for it.

Section-D

2 x 10 = 20

15) Deduce an expression each for the equivalent capacitance of capacitors connected in series and in parallel.

16) State the principle and explain the construction and working of Van de Graaff generator.

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