



- Q-4**      **Attempt all questions**      **(14)**
- (a) Briefly discuss skin effect and wave polarization.      **07**
- (b) Describe boundary conditions for Conducting materials      **07**
- Q-5**      **Attempt all questions**      **(14)**
- (a) Explain Faraday's law.      **07**
- (b) Describe Uniqueness theorem.      **07**
- Q-6**      **Attempt all questions**      **(14)**
- (a) Describe Coulomb's law for Electric Field Intensity      **07**
- (b) Describe Poynting's Theorem and Wave Power.      **07**
- Q-7**      **Attempt all questions**      **(14)**
- (a) The polarization within a region having relative permittivity of 2.7 has the uniform value  $\bar{P} = -0.2\bar{a}_x + 0.7\bar{a}_y + 0.3\bar{a}_z$   $\mu\text{C} / \text{m}^2$ . Find (i) Electric Field Intensity **E** (ii) Electric Field Density **D** (iii) the magnitude of the voltage gradient.      **07**
- (b) Find the magnitude of the current density in a conductor if (i) the electric field intensity is 0.09 V/m, the Volume charge density is  $-2 \times 10^{10} \text{ C/m}^3$  and the electron mobility is  $2.5 \times 10^{-3} \text{ m}^2/\text{V s}$ . (ii) There are  $5 \times 10^{28}$  conduction electrons /  $\text{m}^3$  and the electron drift velocity is 0.05 mm/s (c) **E** = 0.05 V/m and the resistivity is  $2 \times 10^{-8} \Omega \text{ m}$ .      **07**
- Q-8**      **Attempt all questions**      **(14)**
- (a) Evaluate the Stokes' theorem for the field  $\vec{H} = 6xy\vec{a}_x - 3y^2\vec{a}_y \frac{A}{m}$  and the rectangular path around the region,  $2 \leq x \leq 5, -1 \leq y \leq 1$  and  $z = 0$ . Let the positive direction of  $\vec{ds}$  be  $\vec{a}_z$ .      **07**
- (b) Describe Maxwell's equations in integral form.      **07**

