

TE- ELEX- Sem VI - R-19 - C-Scheme

Time: 3 hours

Max. Marks: 80

N.B.: (1) Question No. 1 is Compulsory.

(2) Attempt any **three** questions out of the remaining **five**.

(3) Each question carries 20 marks and sub-question carry equal marks.

(4) Assume suitable data if required.



Question No. 1 is Compulsory. [Any Four]

1. (a) Explain the radiation resistance, directivity, Beam-width and directive gain of the antenna. (5)
- (b) Derive Poisson's and Laplace equations. (5)
- (c) Define Gauss's law and explain its significance. (5)
- (d) Explain EMC requirements for electronic systems. (5)
- (e) Explain the significance of convection and conduction current. (5)
2. (a) A point charge $Q_1 = 1 \text{ nC}$ is located in free space at $P_1 x = 0, y = 0$, while $Q_2 = -2 \text{ nC}$ is at P_2 is situated on y axis 1 m away from origin ($x = 2, y = 0$). Find total Electric field intensity E at point P on x axis 2 m away from origin ($x = 2, y = 0$). (10)
- (b) Derive an expression for reflection and transmission coefficient for normal incidence in case of reflection from perfect dielectric (10)
3. (a) State Poynting theorem and derive an expression for the Poynting vector. Explain the power terms mentioned in the derivation. (10)
- (b) Derive Maxwell's equation for static fields in differential and integral form. (10)
4. (a) Describe a reflection by perfect conductor.. (10)
- (b) Write a note on Smith chart and explain the steps involved to calculate SWR from the Smith Chart. (10)
5. (a) Write short note on parabolic reflector antenna. Describe feeding techniques of parabolic reflector array. (10)
- (b) Derive boundary conditions of E and H fields for two different media. (10)
6. (a) Explain in detail sources and characteristics of EMI. What are EMI control techniques? (10)
- (b) Write Short Notes on: (i) Explain different types of polarization in detail. (10)
- (ii) Characteristic impedance of transmission line. (10)

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