

Total No. of Questions : 6]
P493

SEAT No. :
[Total No. of Pages : 2

TE/Insem/APR - 20
T.E. (E & TC)
Antenna & Wave Propagation
(2012 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Answer any one Question out of Q.1 & Q.2, Q.3 & Q.4 and Q.5 & Q.6.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicate full marks.*
- 4) Use of calculator is allowed.*
- 5) Assume suitable data if necessary.*

Q1) a) What is polarization? Explain polarized wave. **[4]**

- b) A uniform plane wave of 200 MHz travelling in free space impinges normally on a large block of material having permittivity 4, permeability 9 & conductivity is zero. Find reflection coefficient & transmission coefficient at the interface for Electric field. **[6]**

OR

Q2) a) What is loss tangent, how media is classified as lossless dielectric, lossy dielectric and good conductor based on loss tangent. Why it important. **[4]**

- b) A plane electromagnetic wave having frequency of 10 MHz has an average pointing vector of 1 W/m². The medium is lossless with relative permeability 2 and relative permittivity 3. Find **[6]**

- i) Velocity of propagation
- ii) Wave length
- iii) Impedance of the medium
- iv) RMS electric field E.

P.T.O.

- Q3)** a) What do you mean by Fading? List the major causes? How it can be minimized? [4]
- b) Two planes 15 km apart are in radio communication. The transmitting plane delivers 500 W. Its antenna gain being 10 in the direction of other plane power observed is 2 microwatts by the receiving antenna of the second plane. Find the effective area. [6]

OR

- Q4)** a) What is MUF & Critical Frequency? Why this frequency varies with respective layers. [4]
- b) A communication link is to be established between two station using half wavelength antenna for maximum directive gain. Transmitter power is 1 kW, distance between transmitter & receiver is 100 km. What is the maximum power received by receiver in dBW. Frequency of operation is 100 MHz. [6]
- Q5)** a) Explain the term Gain, Directivity & Radiation intensity. What is the relation between effective aperture of any antenna & directivity? [4]
- b) Derive vector potential F for an magnetic current source M. [6]

OR

- Q6)** a) What is field region? Define far field region. Why antenna fundamentals are measured in far field. [4]
- b) What is isotropic radiator? A hypothetical isotropic antenna is radiating in free space. At a distance of 100 m from the antenna, the total electric field (E_θ) is measured to be 5 V/m. Find the [6]
- i) Power density (W_{rad})
- ii) Power radiated (P_{rad})

