Total No. of Questions : 6] **SEAT No. :**

P493

[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 losseless 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/m^2. 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})

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