

Total No. of Questions : 4]

SEAT No. :

PE-230

[Total No. of Pages : 2

[6580]-593

B.E. (E&TC) (Insem.)

**RADIATION AND MICROWAVE THEORY
(2019 Pattern) (Semester - VII) (404181)**

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4.
- 2) Figures to the right side indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.

- Q1)** a) Justify the importance of polarization in wireless communication. Explain various types of polarization types. [7]
- b) Explain various radiation patterns of an antenna in detail. [4]
- c) In a satellite communication system, the satellite is to be placed at 36000 km above the earth and communicated at 4 GHz using transmitting antenna with gain 20 dB and receiving antenna with gain 40 dB. Evaluate the free space transmission loss and the power received when the transmitted power is 200 Watt assuming the free space condition. [4]

OR

- Q2)** a) An antenna has a radiation resistance of 8 ohm and loss resistance of 8 ohm with power gain of 12dB. Determine antenna efficiency and its directivity. [5]
- b) Compare far field and near field region for an antenna. [4]
- c) Explain in details radiation mechanisms of an antenna. [6]
- Q3)** a) Justify any three advantages of microwave engineering. [6]
- b) Design an air filled rectangular waveguide with dimension $a > b$ to operate in TE dominant mode at $f = 10$ GHz. Assume $b = 1.85$ cm. [3]
- c) For a rectangular waveguide with dimensions 4×2 cms, determine the guide wavelength, phase velocity and phase constant at a freespace wavelength of 6 cm for the dominant mode [6]

OR

P.T.O.

- Q4)** a) Explain the strip line structural details, types and applications. [5]
- b) An air filled rectangular wave guide of inside dimensions 7×3.5 cm operates in the dominant TE mode. Determine cut-off frequency, phase velocity in a guide and guided wavelength at frequency of 3.5 GHz. [6]
- c) Give the comparison between waveguides and co-axial cables. [4]

