

Total No. of Questions : 6]

SEAT No. :

P5810

[Total No. of Pages : 2

BE/Insem./Oct.-548
B.E. (E & TC) (Semester - I)

RADIATION AND MICROWAVE TECHNIQUES
(2015 Pattern)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or 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) A free space microwave link consisting transmitter and receivers each of 30dB gain operates at 10 GHz. The distance between transmitter and receiver is 20 km. The transmitter radiates 15 W power. Calculate the power received by the receiver and the path loss of the link in dB. [6]
- b) Define antenna. Explain the radiation mechanism in antenna. [4]

OR

- Q2)** a) Explain the following terms related to antenna. [6]
- i) Half power beamwidth
 - ii) Gain
 - iii) Bandwidth
- b) An antenna has a radiation resistance of 73Ω and a loss resistance of 7Ω . If the power gain is 20, calculate the directivity and efficiency of the antenna. [4]

- Q3)** a) Derive the expression of array factor for N element uniform linear array. [6]
- b) Give the comparison between Broadside array and End Fire array. [4]

OR

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- Q4)** a) Explain in short the Pattern Multiplication method. [6]
- b) Find the phase difference required to steer a beam zenith to -40° for a 5 element array with 0.4λ internal element spacing. [4]

- Q5)** a) What are microwaves? Explain advantages and applications of Microwaves. [6]
- b) Determine the cut-off wavelength for the dominant mode in a rectangular waveguide of breadth 10 cm. For a 2.5GHz signal propagated in this waveguide in the dominant mode; calculate the guide wavelength, the group and the phase velocities? [4]

OR

- Q6)** a) With a neat diagram explain the working of a rectangular cavity resonator. Obtain the expression for resonant frequency of oscillation. [6]
- b) Write a short note on stripline. [4]

