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

P.T.O.

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]**