Total No. of Questions : 8]

SEAT No. :

P3728

[Total No. of Pages : 2

[5461] - 563
B.E. [E & Tc] (Semester - I)
RADIATION & MICROWAVE TECHNIQUES
(2015 Pattern)

Time :2 ½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data; if necessary.***
5) ***Use of calculators is allowed.***

Q1) a) Define the antenna polarization and explain linear, circular, elliptical polarization with relevant expressions and illustrative diagrams. **[8]**

b) Explain the construction and principle of operation for Yagi Uda antenna. **[6]**

c) For an air filled rectangular wave guide of dimensions a = 2cms and b=lcms. Calculate cutoff wavelength for TE_{10} and TM_{11} mode. Also calculate guide wavelength at 10GHz. **[6]**

OR

Q2) a) For an array of four isotropic sources along z axis separated by a distance of $\lambda/2$ and a progressive phase shift of $\alpha = 0$, find null direction, maxima direction, direction of side lobe maxima and HPBW. **[8]**

b) Define & explain following Antenna parameters **[6]**

i) Directivity
ii) Effective Area
iii) Gain

c) Why waveguides are required at microwave frequencies? Explain following parameters of waveguide. **[6]**

i) Cutoff frequency
ii) Guide wavelength

Q3) a) Explain the properties of E plane Tee with the help of neat diagram.Also derive its Scattering matrix. **[8]**

b) Explain faraday's rotation principle. Explain in brief the working principle of an isolator. **[8]**

OR

P.T.O.

Q4) a) Define with expressions the following parameters of directional coupler. **[6]**

i) Coupling factor

ii) Directivity

iii) Insertion loss

b) A signal of power 32mw is fed into one of the collinear ports of a loss less H plane Tee. Determine the power in the remaining ports when other ports are terminated by means of matched load. **[6]**

c) Explain the operation of circulator using two magic tees. **[4]**

Q5) a) What are linear beam tubes? Explain construction, operation & advantage of TWT amplifier? **[8]**

b) Explain Gunn effect with the help of two valley model. Also explain V-I characteristics and applications of Gunn diode. **[8]**

OR

Q6) a) With the help of construction & applegate diagram explain working of Reflex Klystron? **[8]**

b) Explain working principle of Tunnel diode. **[8]**

Q7) a) Explain Microwave Satellite Communication System. Also differentiate between Satellite and Terrestrial Communication System. **[10]**

b) Explain measurement techniques for VSWR. **[8]**

OR

Q8) a) Explain with neat block diagram power measurement of microwave generator using; **[10]**

i) Bolometer

ii) Calorimeter.

b) Explain attenuation measurement using power ration measurement technique. What is the drawback of power ration measurement technique for attenuation measurement? Explain attenuation measurement using RF substitution method. **[8]**