Total No. of Questions : 6]

SEAT No. : [ ]

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Oct./BE/Insem.-546

B.E. (E & TC)

RADIATION & MICROWAVE TECHNIQUES

(2015 Course) (Semester - I) (404183)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates:

1) ***Answer Q. No. 1 or 2, Q. No. 3 or 4, and Q. No. 5 or 6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Define the antenna polarization and explain linear, circular, elliptical polarization with relevant expressions and illustrative diagrams. **[6]**

b) An antenna has loss resistance 10 ohms, power gain of 20 and directivity 22. Calculate its radiation resistance. **[4]**

OR

Q2) a) Define & explain following Antenna parameters **[6]**

i) Directivity

ii) Effective Area

iii) Gain

b) A wave radiated from transmitting antenna with 10dB gain and 100W radiating power at 10MHz. It is received by an antenna with gain of 15dB located at 20Km distance, calculate the received power. **[4]**

Q3) 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. **[6]**

b) Write a short note on Yagi-Uda antenna. **[4]**

OR

P.T.O.

Q4) a) Prove that radiation resistance of Hertzian dipole is $R_{rad} = 80\pi^2 \left(\frac{1}{\lambda}\right)$. **[6]**

b) An electric field strength of 100 A/m is to be measured at a distance of $\theta = \pi / 2$, 500 Km from a half wave dipole antenna operating in air at 50 MHz. Calculate current fed to antenna and power radiated. **[4]**

Q5) a) Why waveguides are required at microwave frequencies? Explain following parameters of waveguide. **[6]**

i) Cutoff frequency

ii) Guide wavelength

iii) Dominant mode

b) Explain rectangular cavity resonator. Find resonating frequency of cubical cavity of dimensions 2 cms. **[4]**

OR

Q6) a) For an air filled rectangular wave guide of dimensions a = 2 cms and b = 1 cms. Calculate cutoff wavelength for TE_{10} and TM_{11} mode. Also calculate guide wavelength at 10GHz. **[6]**

b) State different types of stripline and distinguish between stripline and microstripline. **[4]**