Total No. of Questions : 8]

SEAT No. :

P3957

[Total No. of Pages : 2

[5561]-652
B.E. (E&TC)
RADIATION AND MICROWAVE TECHNIQUES
(2015 Pattern) (404183) (Semester - I)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Define an antenna? Explain the radiation mechanism of antenna. **[6]**

b) Explain the following parameters of rectangular waveguide. **[6]**

i) Dominant mode. ii) Phase velocity.

iii) Guide wavelength.

c) For an array of four isotropic sources are placed along the Y-axis separated by a distance of $\lambda/2$ and progressive phase shift $\beta = 0$, find **[8]**

i) Null directions. ii) Directions of maxima.

iii) HPBW. iv) FNBW.

OR

Q2) a) Define following parameters of antenna **[6]**

i) Radiation Pattern.

ii) Half power beam width.

iii) Radiation efficiency.

b) Determine the cutoff wavelength for the dominant mode in a rectangular waveguide with breadth as 10 cm. When a 2.5 GHz signal propagated in this waveguide in the dominant mode; calculate the guide wavelength, group velocity and phase velocity. **[6]**

c) Derive the expression of half wave length dipole antenna for its radiation resistance, Directivity, Radiated power & radiation pattern. **[8]**

P.T.O.

Q3) a) Explain the construction and working of two hole directional with its parameters. **[8]**

b) What is the Faraday rotation? Explain the principle operation of a gyrator using relevant diagram with its S-matrix. **[8]**

OR

Q4) a) In an H-plane tee junction, 20 m W power is applied perfectly matched port 3. Calculate the power delivered to the load 60 Ω and 75 Ω connected to port 1 and port 2. **[8]**

b) Explain the construction and working of isolator with its application. **[8]**

Q5) a) Explain the construction and operation of single cavity klystron tube. **[8]**

b) Write short note on PIN diode and Schottky barrier diode. **[8]**

OR

Q6) a) What are the high frequency limitations of conventional tubes, explain in detail. **[8]**

b) Explain the construction and working of magnetron. Write its applications. **[8]**

Q7) a) Write a short note on : **[10]**

i) Microwave heating technique.

ii) Microwave moisture measurement.

b) Explain the phase shift measurement using double minimum method at microwave frequency. **[8]**

OR

Q8) a) Write short note : **[10]**

i) Radiation hazards and its protection.

ii) Microwave thickness measurement.

b) Explain the microwave attenuation measurement in detail. **[8]**

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