

Total No. of Questions : 8]

SEAT No. :

P3957

[5561]-652

[Total No. of Pages : 2

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 60Ω and 75Ω 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]

