

Total No. of Questions : 12]

SEAT No. :

P833

[4659]-92

[Total No. of Pages : 3

B.E. (E & TC)

d - MICROWAVE COMMUNICATION AND RADAR

(Elective - I) (2008 Pattern) (Semester - I)

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *In Section - I : Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6. In Section - II: Attempt Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q.12.*
- 2) *Answers to the two sections should be written in separate books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 6) *Assume suitable data, if necessary.*

SECTION - I

- Q1) a)** What are waveguides? Explain the following terms as applied to the waveguides: **[10]**
- i) Cut off wavelength.
 - ii) Guide wavelength.
 - iii) Phase velocity and Group Velocity.
 - iv) Characteristics wave impedance.
- b) Design a rectangular waveguide to propagate 10GHz signal under dominant mode. **[4]**
- c) What is re-entrant Cavity? Explain where it is used. **[4]**

OR

- Q2) a)** Discuss the Power losses and Power transmitted in rectangular waveguide. **[8]**
- b) Differentiate between TE and TM modes in rectangular waveguides. **[4]**
- c) With the help of diagram, explain the need of coupling probes and loops. **[6]**

P.T.O.

- Q3)** a) With the help of diagram, explain the operation of two-hole directional coupler. State its uses. [8]
- b) Write short notes on: [8]
- i) Microwave attenuator.
- ii) S-matrix and its properties.

OR

- Q4)** a) Explain the working of E-plane and H-plane tees. [6]
- b) Explain working of microwave isolator and give its applications. [4]
- c) What is a slotted line used for? Briefly describe the steps to be followed for measuring VSWR of a given device using a slotted line. [6]

- Q5)** a) Explain the frequency limitation of the conventional tubes. How can it be overcome with microwave tubes. [8]
- b) Explain the principle of working of a Reflex Klystron. Where it is used? [8]

OR

- Q6)** a) What is magnetron? List the different types of magnetron. Explain how oscillations sustained in magnetron. [8]
- b) Compare TWT and Klystron. [4]
- c) A helical TWT has diameters of 2mm with 50 turns per cm. Calculate: [4]
- i) Axial Phase Velocity.
- ii) The anode voltage at which the TWT can be operated for useful gain.

SECTION - II

- Q7)** a) Explain various modes of Operation of Gunn diode. Explain LSA mode and give limitation of this mode. [10]
- b) Explain power frequency limitations of a microwave bijunction transistor. [8]

OR

- Q8)** a) What is Varactor diode? Give its construction, working principle and explain any one application. [10]
- b) Describe how Tunnel diode can be used as an amplifier and oscillator.[8]

- Q9)** a) What is Network Analyser? Differentiate between a scalar and a vector network analyser. Which parameters can usually be measured effectively with a vector analyser. [8]
- b) Compare Power ratio and RF substitution methods of measuring attenuation provided by a microwave component. [8]

OR

- Q10)**a) Explain any two methods of measuring impedance of a terminating load in a microwave system. [8]
- b) Describe a technique of measuring the phase shift provided by network.[8]

- Q11)**a) What is a pulse radar? What are the effects of transmitting a long pulse? Explain all the stages of a pulse radar. [8]
- b) Explain A-scope and PPI displays with reference to radars. What are their limitations. [8]

OR

- Q12)**a) Explain the action of [10]
- i) CW doppler radar.
- ii) FMCW doppler radar.
- Discuss their applications and limitations.
- b) Explain the principle and working of an MTI radar. [6]

