[Total No. of Questions - 9] [Total No. of P.. ..ed Pages - 2]
(2066)

16122(J) June-16

B. Tech 6th Semester Examination

Microwave and Radar Engineering (NS)

EC-325

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question from each of the Sections A, B, C and D and all the subparts of questions in section E.

SECTION - A

1. (a) Derive the wave equations from Maxwell's equations. (10)

   (b) Discuss in detail Lorentz Reciprocity theorem. (10)

2. Explain in detail different stub matching methods. Also enumerate their advantages and disadvantages. (20)

SECTION - B

3. With the help of diagrams, explain various microwave T-junctions. Also derive S-matrix for each of the T-junctions. (20)

4. Explain in detail the construction, equivalent circuit, operation and applications of PIN diode. (20)

SECTION - C

5. Analyze mathematically the operation of following microwave tubes:
   (a) Travelling Wave Tube
   (b) Reflex Klystron (10+10=20)

[P.T.O.]

6. Define the following terms: VSWR, Q-factor, Insertion loss and Noise factor. Discuss in brief one method for measurement of each of these parameters. (20)

SECTION - D

7. (a) With the help of block diagram, explain the operation of Radar. Also discuss its various applications. (10)

   (b) Discuss free space radar range equation. Derive expression for minimum received signal and maximum unambiguous range. (10)

8. Write detailed notes on the following:

   (a) Pulse Doppler Radar

   (b) MTI Radar (10+10=20)

SECTION - E
(Compulsory Question)

9. (a) Write wave equation for TE and TM wave.

   (b) What is the use of matched termination in microwave set-up?

   (c) Show the concept of measurement of VSWR.

   (d) What are the uses of directional coupler?

   (e) State Doppler effect in Radar.

   (f) What is the difference between Klystron amplifier and oscillator?

   (g) Define Q-factor.

   (h) What is the main principle of MTI radar?

   (i) Draw the structure of IMPATT diode.

   (j) Write S-matrix for circulator. (2×10=20)