

22535

22232

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Illustrate your answers with neat sketches wherever necessary.
  - (3) Figures to the right indicate full marks.
  - (4) Assume suitable data, if necessary.

**Marks**

**1. Attempt any FIVE of the following :**

**10**

- (a) Define the term w.r.t. waveguide
  - (i) cut-off frequency
  - (ii) cut-off wavelength
- (b) Sketch the field pattern of  $TE_{10}$  mode of rectangular wave guide.
- (c) Draw neat sketch of Bends & corners.
- (d) List application of Isolator and circulator. (any one application of each)
- (e) List any four applications of PIN diode.
- (f) Write RADAR range equation. State each term used in equation.
- (g) Define the term antenna scanning. State its types.

**2. Attempt any THREE of the following :**

**12**

- (a) Draw & explain TEM wave.
- (b) Explain the working principle of H-plane Tee with constructional sketch.
- (c) Sketch & label constructional diagram of TWT & state its working principle.
- (d) Draw the simple block diagram of basic simple RADAR.



- 3. Attempt any THREE of the following : 12**
- (a) Compare waveguide with transmission line. (any four points)
  - (b) State advantages & disadvantages of CW RADAR. (any 2 each)
  - (c) Explain different Antenna scanning methods with neat diagram.
  - (d) Describe with relevant sketch, the operation of IMPATT Diode.
- 4. Attempt any THREE of the following : 12**
- (a) Sketch the construction of Gunn diode and write its operation.
  - (b) Draw and explain working principle of two hole directional coupler.
  - (c) With suitable sketch, explain the bunching process in Magnetron.
  - (d) Explain with relevant sketch working principle of the FM CW RADAR.
  - (e) Describe with relevant sketch the working principle of A-Scope display method used in RADAR system.
- 5. Attempt any TWO of the following : 12**
- (a) Calculate the cut-off wavelength, guide wavelength, characteristic wave impedance of a wave guide whose internal diameter is 6 cm for a 14 GHz signal propagated in it in the  $TE_{11}$  mode.
  - (b) Distinguish between microwave circulator and isolator on the basis of
    - (i) Function
    - (ii) Construction
    - (iii) Application
    - (iv) Number of ports
  - (c) (i) Compare TWT and Klystron (any 4 points)  
(ii) Write any two applications of corners and twist section of waveguide
- 6. Attempt any TWO of the following : 12**
- (a) Explain with the help of neat diagram the working principle, construction of multi cavity klystron amplifier.
  - (b) Describe with neat sketch the RADAR used for automatic target detection.
  - (c) Derive the RADAR range equation and state the factor influencing maximum range.
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