

22535

**11920**

**3 Hours / 70 Marks**

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

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

**10**

- (a) State the frequency range for following bands :
  - (i) C Band
  - (ii) X Band
  - (iii) K Band
  - (iv)  $K_u$  Band
- (b) State different types of waveguides.
- (c) State the name of Tee Joint used as Duplexer and Mixer.
- (d) Draw neat sketch of bends.
- (e) List any two applications of PIN diode.
- (f) List the two advantages and two disadvantages of CW RADAR.
- (g) Give the applications of RADAR.

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

**12**

- (a) Compare waveguide and two wire transmission line (4 points).
- (b) State the working principle of circulator with neat sketch and state its two applications.
- (c) Draw equivalent circuit and VI characteristics of Tunnel diode.
- (d) Describe with relevant sketch the working principle of the 'A' type of display used in RADAR system.

- 3. Attempt any THREE of the following :** **12**
- (a) Sketch the field pattern of  $TE_{10}$  and  $TE_{11}$  modes of rectangular waveguide.
  - (b) Draw the block diagram of pulsed RADAR system. Explain its operation with applications.
  - (c) Explain with relevant sketch the scanning methods used for RADAR.
  - (d) Describe the working principle of TWT and state its two applications.
- 4. Attempt any THREE of the following :** **12**
- (a) Describe the operation with construction diagram. IMPATT Diode. State its two applications.
  - (b) Explain the working principle of Horn Antenna with neat sketch.
  - (c) Draw the block diagram of MTI RADAR. Explain its operation.
  - (d) Describe the working principle of magnetron with the help of constructional diagram.
  - (e) Explain Doppler effect and draw block diagram of CW Doppler RADAR.
- 5. Attempt any TWO of the following :** **12**
- (a) Draw the construction of GUNN diode and describe the applications of it.
  - (b) Determine Cut Off wavelength for the dominant mode in rectangular waveguide of breadth 10 cm for 2.5 GHz signal propagates in this waveguide in the dominant mode. Calculate Cut Off wavelength and group velocity.
  - (c) Explain working principle of two hole directional coupler and state its applications.
- 6. Attempt any TWO of the following :** **12**
- (a) Describe the bunching process of two cavity klystron with help of Apple gate diagram and state its two applications.
  - (b) Calculate the maximum range of guided missile tracking RADAR operate at 5 GHz with a 1 M Watt peak power output. If the antenna diameter is 3 m and the receiver has a bandwidth of 2 MHz with 10 dB noise figure. The target cross-section is  $2 \text{ m}^2$ .
  - (c) Explain blind speed of RADAR. Write step by step procedure to calculate blind speed.
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