

17656

15162

3 Hours / 100 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

1. (A) Attempt any THREE :

12

- (a) Define the terms w.r.t. waveguide :
  - (i) Cut-off frequency
  - (ii) Cut-off wavelength
- (b) Draw labelled sketched diagram of Reflex Klystron. Give any two applications.
- (c) Draw block diagram of Radar System and explain it.
- (d) Define following term w.r.t. to satellite :
  - (i) Footprint
  - (ii) Station keeping

**P.T.O.**

**(B) Attempt any ONE :****6**

- (a) Describe TE and TM modes in rectangular waveguide.
- (b) Sketch the construction of Gunn diode and give its operation.

**2. Attempt any FOUR :****16**

- (a) Differentiate between waveguide and two-wire transmission line.
- (b) Describe, how bunching is formed in Magnetron – with neat diagram.
- (c) Describe working of MTI radar with neat block diagram and waveforms.
- (d) State reason for differences in uplink and downlink frequency in satellite communications.
- (e) List advantages and disadvantages of fibre optic cable as compare to conventional cable. (2 points each).
- (f) Describe absorption loss and scattering loss occur in optical fibre.

**3. Attempt any FOUR :****16**

- (a) State the advantages and applications of circular waveguide (2 points each).
- (b) With neat sketch describe the operation of PIN diode.
- (c) Define Radar Beacons; give its typical usage.
- (d) Explain advantages of satellite communication (4 points).
- (e) Draw block diagram of Fiber Optic Communication System and describe the function of each block.

4. (A) Attempt any THREE : 12

- (a) Draw field pattern of circular waveguide.
- (b) Draw the construction of Tunnel diode and give its working as microwave component.
- (c) Describe a scope, PPI display method with its diagram.
- (d) Draw block diagram of satellite subsystem and explain working of any one subsystem.

(B) Attempt any ONE : 6

- (a) Explain horizontal, vertical, helical and spiral antenna scanning in radar system.
- (b) Draw frequency spectrum for optical communication with band name and its range.

5. Attempt any FOUR : 16

- (a) Describe working of directional coupler with neat diagram.
- (b) Describe working of two cavity Klystron Amplifier.
- (c) Differentiate between LED and LASER.
- (d) Describe working of communication subsystem of satellite.
- (e) Define with respect to fibre optic cable (a) numerical aperture (b) acceptance angle.
- (f) Describe fusion splicing, Vgroove splice and elastic tube splice with respect to fibre optic cable.

**6. Attempt any FOUR :****16**

- (a) Distinguish microwave circulator and isolator with following parameters :
    - (i) Function
    - (ii) Construction
    - (iii) Application
    - (iv) Number of ports
  - (b) Describe scattering and dispersion losses in optical fibre.
  - (c) Distinguish between splicing and connectors of fibre optic cable.
  - (d) How power is generated in satellite ? Describe how it is distributed to other subsystem of satellite.
  - (e) Describe working and principle of avalanche photodiode with a neat sketch.
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