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3 Hours / 70 Marks

Seat No.

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15 minutes extra for each hour

- 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.

Marks

1. **Attempt any FIVE of the following :** **10**
 - (a) State two advantages and two disadvantages of fiber optics cable.
 - (b) Define : (i) Critical Angle (ii) Acceptance Angle.
 - (c) List the types of optical splitters.
 - (d) State the specification of 802.3j (any 4).
 - (e) State reason for difference in uplink and downlink frequency in satellite communication.
 - (f) Define following terms w.r.t. satellite :
 - (i) footprint (ii) Elevation Angle.
 - (g) Define EIRP.
 - (h) List the different applications of satellite communication.

2. **Attempt any THREE of the following :** **12**
 - (a) Explain inter modal & intra modal dispersion in optical fibre with neat diagram.
 - (b) State the types of optical amplifier. Explain any one.
 - (c) Differentiate between LED and LASER (any eight points).
 - (d) Explain : Ethernet standards of optical network in detail.

- 3. Attempt any THREE of the following : 12**
- (a) Define geostationary orbit and geostationary satellite and state advantages of geostationary orbit/satellite.
 - (b) Define optical switch. State its types.
 - (c) With neat sketch describe the operation of PIN photodiode.
 - (d) Draw block diagram of OTDR and explain its working.
- 4. Attempt any THREE of the following : 12**
- (a) Describe absorption and coupling losses in optical fiber.
 - (b) Write uplink and downlink frequency for C-band, X-band, K_n -band and K_a -band.
 - (c) A fiber has a core diameter of 2 μm and its core R.T. is 1.43. The refractive index of cladding is 1.415. Determine : (i) numerical aperture (ii) critical angle (iii) Acceptance angle (iv) Relative refractive index difference.
 - (d) List different types of losses occurring in a satellite link and explain any one in detail.
 - (e) Draw the block diagram of telemetry tracking and command subsystem and state its principle of operation.
- 5. Attempt any TWO of the following : 12**
- (a) Draw block diagram of fiber optic communication system and list out optical sources and detectors suitable for fiber optic communication.
 - (b) State different types of splicing technique. State in which technique electric arc is used for splicing the fibre & explain the method in detail with neat diagram.
 - (c) Explain SONET architecture with neat diagram.
- 6. Attempt any TWO of the following : 12**
- (a) Draw the block diagram and explain the operation of GPS transmitter and GPS receiver.
 - (b) Describe the effect of non-spherical nature of earth on the orbital inclination of geosynchronous satellite.
 - (c) Explain working principle of VSAT and state its application.
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