22232

3 Hours / 70 Marks Seat No.

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 :** **5 × 2 = 10**

(a) Define :

(i) Passive satellite

(ii) Active satellite

(b) List the RF components in earth station.

(c) Draw the constructional diagram of optical fiber.

(d) Define :

(i) Critical angle

(ii) Numerical aperture

(e) List any four types of optical switch.

(f) Specify the function of altitude control system.

(g) Justify : In satellite communication uplink frequency is higher than down link frequency.

2. **Attempt any THREE of the following :** **3 × 4 = 12**

(a) Explain the operation of LASER diode.

(b) Describe scattering loss and dispersion loss related to optical fiber.

(c) Explain the effect of eclipse on motion of satellite.

(d) Justify : Station keeping is used for maintaining the satellite in correct position.

3. **Attempt any THREE of the following :** **3 × 4 = 12**

(a) Draw the block diagram of OTDR and give the function of each block.

(b) Explain the need of WDM in optical network.

(c) Describe the working of satellite transponder single conversion 'C' Band.

(d) Describe the effect of non-spherical nature of earth on the orbital inclination of geosynchronous satellite.

4. **Attempt any THREE of the following :** **3 × 4 = 12**

(a) State the advantages & disadvantages of optical fiber communication.

(b) Explain V-groove splicing with neat sketch.

(c) Draw the equivalent circuit of parametric amplifier and give its working.

(d) Describe the working of optical switch.

(e) With neat ray diagram explain Total Internal Refraction (T.I.R.)

5. **Attempt any TWO of the following :** **6 × 2 = 12**

(a) State two (2) distinguishing features of

(i) IEEE 802.3i

(ii) IEEE 802.3j

(iii) IEEE 802.3z

   (b)   Explain in detail the classification of optical fiber on basis of

        (i)   Mode of light propagation

        (ii)   Index profile

   (c)   State the frequencies for following applications :

        (i)   Broadcast services

        (ii)   G.P.S.

        (iii)   Maritime mobile

        (iv)   Telephone network

        (v)   D.T.H. services

        (vi)   Search and rescue services

6.   **Attempt any TWO of the following :**   **6 × 2 = 12**

   (a)   Draw the block diagram of G.P.S. system and explain transmitter and receiver.

   (b)   A silica optical fiber with core diameter large enough having refractive index of 1.5 and cladding refractive index of 1.47. Calculate :

        (i)   Critical angle

        (ii)   Numerical aperture

        (iii)   Acceptance angle in air for fiber

   (c)   Explain SONET/SDH architecture with neat diagram.

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