22647

23242

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any FIVE of the following : **5 × 2 = 10**

(a) Draw frequency spectrum of optical fiber communication.

(b) State reason for difference in satellite uplink and downlink frequency.

(c) Define :

(i) Satellite Footprint

(ii) Path Loss

(d) Compare synchronous and non-synchronous satellites on any four points.

(e) Write any four applications of optical splitters.

(f) An optical fiber has core diameter of 2 μm and refractive index of core 1.45 and that of cladding is 1.43. Determine numerical aperture.

(g) Define critical angle and acceptance angle.

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

(a) State and explain Snell's law with neat diagram and mathematical expression.

(b) Explain Raman optical amplifier with neat block diagram.

(c) For an optical fiber with refractive index of core 1.40 and that of cladding 1.35. Determine (i) Critical angle (ii) Numerical aperture (iii) Acceptance angle (iv) Relative refractive index difference.

(d) State specifications of 802.3y.

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

(a) Justify optical fiber communication is more advantageous.

(b) Explain optical switch with neat sketch. State any four features of optical switch.

(c) Explain wavelength division multiplexing.

(d) Define look angle, elevation angle, apogee height and perigee height.

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

(a) Explain working of avalanche photodiode with neat sketch.

(b) Explain working of OTDR with neat sketch.

(c) Draw block diagram of telemetry tracking and command sub system.

(d) Define latitude, longitude, look angle and elevation angle.

(e) Compare mechanical splice and fusion splice on any four points.

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

(a) Draw block diagram of optical fiber communication system and explain function of each block.

(b) Explain SONET architecture with neat sketch.

(c) Explain V-SAT with neat diagram.

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

(a) Draw block diagram of GPS transmitter and receiver.

(b) State function of following in satellite :

(i) Propulsion control

(ii) Altitude control

(iii) Low noise amplifier

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