

Total No. of Questions : 8]

SEAT No. :

P3113

[Total No. of Pages : 3

[5670]-213

B.E. (E & Tc) (Semester - II)

BROAD BAND COMMUNICATION SYSTEM

(2012 Pattern)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates :

- 1) Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6, Q.7 OR Q.8
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) All questions carry equal marks.
- 5) Use of logarithmic tables slide rule, Mollier charts, and electronic pocket calculator and steam tables are allowed.
- 6) Assume suitable data, if necessary.

- Q1)** a) Describe three types of optical fibers. For each type give typical core and cladding diameters. Sketch their refractive index profile. [6]
- b) Describe the system design considerations involved in establishing point to point optical fiber link. [6]
- c) Explain working principle of FBG and explain its usage as WDM Demultiplexer. [8]

OR

- Q2)** a) With neat block diagram, explain features of key elements of optical transmission link. Explain advantages & disadvantages of optical fiber communication system. [6]
- b) Analog optical fiber link has following rise time components: [6]
- Source (LED) 8ns;
- Fiber cable: intermodal 5ns/km;
- Intra modal : 1ns/km
- Detector (PIN): 6ns
- The desired link length without repeaters is 8 Km without repeaters.
- Estimate maximum bit rate that may be achieved on the link by using NRZ and RZ formats.
- c) With the help of block schematic, explain WDM architecture. [8]

P.T.O.

**Q3) a)** Explain the concept of look angle determination. Which are the various look angles for satellite earth station? [8]

b) The difference between the farthest and the closest points in a satellite's elliptical orbit from surface of the earth is 30000 Km and the sum of the distances is 50000 Km. If the mean radius of the earth is 6378 Km, determine the orbit eccentricity. [8]

OR

**Q4) a)** What are orbital effects in communication system performance? Explain the same. [8]

b) What does LEO, MEO and GEO orbits mean by? State specific applications of each. [8]

**Q5) a)** What is the need of satellite communication? Explain with diagram basic structure of satellite communication. [8]

b) Explain the transponder arrangement and frequency plan (uplink and downlink) for any satellite. Also draw block diagram of single conversion transponder for 6/4 GHz band. [8]

OR

**Q6) a)** With the help of block diagram, explain typical tracking, telemetry, command and monitoring system. [8]

b) What are different types of antennas used in satellite systems? Explain importance and application of each antenna. [8]

**Q7) a)** Derive the link equation for satellite communication from concept of EIRP. [9]

b) In relation to satellite communication, define noise temperature and derive the equation for carrier to noise ratio at the output of demodulator. [9]

OR

**Q8) a)** What do you understand by link budget of satellite communication link? What are various losses in uplink and downlink analysis? [9]

- b) AC- Band earth station has an antenna with a transmit gain of 54 dB.[9]

The transmitter output power is set to 100 W at frequency of 6.100 GHz. The signal is received by a satellite at distance of 37500 Km by an antenna with a gain of 26 dB. The signal is then routed to a transponder with a noise temperature of 500K, Band width of 36 MHz and gain of 110dB.

- i) Calculate the path loss at 6.1 GHz.
- ii) Calculate the power at the output port at the satellite antenna in dBW.
- iii) Calculate the noise power at the transponder input, in dBW, in a Bandwidth of 36 MHz.
- iv) Calculate C/N ratio in transponder.

