[5561]-261

B.E. (E & Tc)

BROAD BAND COMMUNICATION SYSTEM

(2012 Course) (Semester-II) (404190)

Time : 2½ Hours]   *[Max. Marks : 70*

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) Explain various attenuation mechanisms in official fiber. **[6]**

b) Describe the system design considerations involved in establishing point to point optical fiber link. **[6]**

c) A 2×2 bi conical tapered fiber coupler with 40/60 splitting ratio has insertion losses of 2.7 dB for 60% channel and 4.7 dB for 40% channel.**[8]**

i) If input power is 200uW, find output levels P_1 & P_2

ii) Find excess loss of coupler.

iii) Verify that splitting ratio is 40/60.

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) 10ns;
Fiber cable : intermodal 9ns/km;
Intra modal : 2ns/km;
Detector (APD) : 3ns
The desired link length without repeaters is 5km and the required optical Bandwidth is 6MHz. Determine whether the above combination of components give an adequate response.

P.T.O.

c) Explain the following with their applications. **[8]**
    i) Fiber bragg grating
    ii) Diffraction grating

Q3) a) State and explain Kepler's three laws of planetary motion. Explain the forces associated with it. **[8]**

b) Calculate look angle to geo stationary satellite if earth station latitude and longitude are 42^0 N and 0^0. The sub satellite point is 56^0 W. **[8]**

OR

Q4) a) What is the mechanism of launching a satellite? Briefly explain each step of launch sequence. **[8]**

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

Q5) a) With the help of neat sketch, explain typical satellite antenna coverage zone. **[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) Write the short note on power systems used in satellite. **[8]**

Q7) a) Explain basic transmission theory of satellite communication link design. What do you mean by 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) Discuss the importance of G/T ratio for earth station. How does it affect C/N ratio for satellite communication system? **[9]**

b) A satellite transponder is used for TV program distribution with objective of overall circuit C/N = 17 dB. If the downlink provides C/N of 20 dB. Determine the EIRP of TV up linking terminal assuming following data:

i) Uplinik Frequency = 6 GHz

ii) Transmission BW = 30 MHz

iii) Satellite receiver G/T = - 3.0 dB

iv) Slant range = 40,600 km

Assume negligible antenna misalignment losses and negligible inter modulation noise components. **[9]**

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