## UNIT- V

## SATELLITE, OPTICAL FIBER – POWER LINE, SCADA

## PART – A

1. List the channels and their data rate used in optical fiber systems. (**BT-1)**
2. Name the types of optical fiber mode structure. (**BT-1)**
3. For an earth station transmitter with an antenna output power of 40 dBW (10,000 W), a back off loss of 3 dB, a total branching and feeder loss of 3 dB and a transmit antenna gain of 40 dB, evaluate the EIRP. (**BT-6)**
4. Define numerical aperture. (**BT-1)**
5. Explain about SCADA. (**BT-4)**
6. Describe the essential components of a satellite system. (**BT-1)**
7. Summarize about near-far problem. (**BT-2)**
8. Explain the advantages of optical communication. (**BT-2)**
9. Describe about the types of optical fiber available. (**BT-2)**
10. Illustrate the primary advantages of optical fiber systems. (**BT-3)**
11. Examine whether single mode propagation is impossible with graded index fiber. (**BT-3)**
12. Define Apogee, perige and geocenter. (**BT-1)**
13. Explain Snell's law. (**BT-4)**
14. Classify the satellite orbital patterns**.** (**BT-4)**
15. Evaluate the carrier to noise density ratio for a receiver with -7dBW input carrier power, an equivalent noise temperature of 180 degree K and a bandwidth of 20MHz. (**BT-6)**
16. List the merits and demerits of geosynchronous satellite. (**BT-1)**
17. Explain the communication satellites along with their band of frequency allocation. (**BT-5)**
18. Describe the aperture actuators used in satellite. (**BT-2)**

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19. Mention the uplink and downlink frequency range for satellite communication. (**BT-3)**
20. Give the advantages of fiber optic system . (**BT-2)**

## PART – B

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| **1** | Describe briefly and compare the three types of optical fiber configurations.**(BT-1)** | | **(16)** |
| **2** | Discuss in detail about the frequency reuse concept of cellular network. Support your answer with the required diagram. **(BT-2)** | | **(16)** |
| **3** | Discuss broadly on the multiple access techniques used in satellite communication. **(BT-2)** | | **(16)** |
| **4** | Describe the following.<br>(i) Optical detectors and their types.<br>(ii) Satellite types.<br>(iii) Digital filters used in satellite systems.<br>(iv) Optical link **(BT-1)** | | **(16)** |
| **5** | **(i)** An X band transponder of a geo synchronous satellite at a height of 35760 km from the surface of the earth and operating at 7.6 GHz has its antenna oriented towards earth station antenna. The input power and directive gain of the transponder antenna are 18 W and 36dB respectively. Assuming no losses occurring in the down link determine<br>(1) Power received by earth station antenna of aperture diameter and efficiency given as 3 meters and 62% respectively.<br>(2) EIRP of the transponder antenna | | **(6)** |
| | **(ii)** Write notes on SCADA and Intelsat. **(BT-6)** | | **(10)** |
| **6** | **(i)** What are the modes of operation suggested in optical fibres? How are optical fibres classified according to this? Discuss elaborately.**(BT-1)** | | **(10)** |
| | **(ii)** State the advantages of Fiber optic communication. **(BT-1)** | | **(6)** |
| **7** | **(i)** Explain with the block diagram of an earth station. **(BT-4)** | | **(8)** |
| | **(ii)** Explain in detail about the aperture actuators used in satellites **(BT-4)** | | **(8)** |
| **8** | **(i)** Illustrate Kepler's law and how they relate to satellite communication. **(BT-3)** | | **(8)** |
| | **(ii)** Illustrate the significance of satellite link budgets s and how they are calculated. **(BT-3)** | | **(8)** |

**9 (i)** Draw the block diagram of a satellite uplink model and explain its operation. **(BT-4)** **(8)**

**(ii)** Discuss power line carrier communication with suitable example and diagram. **(8)** **(BT-2)**

**10 (i)** Explain the concept of satellite communication system and its application**(BT-5)** **(8)**

**(ii)** Explain in detail about the operation of any one fiber optic source and detector. **(8)** **(BT-5)**