BT-7/DX

BROADBAND COMMUNICATION (2006-07)

Paper : IT-453

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting *one* question from each unit.

UNIT–I

1. (a) Describe the advantages of optical fibers over copper cable. Explain the propagation of light rays within a fiber. 8

    (b) Compare the single and multimode fibers. 6

    (c) Find the core radius necessary for single mode operation at 1332 nm of a step-index fiber with $n_1 = 1.480$ and $n_2 = 1.478$. What are the numerical aperture and maximum acceptance angle of this fiber ? 6

2. (a) Explain the following terms :

    (i) Material dispersion.

    (ii) Waveguide dispersion.

    (iii) Polarization-mode dispersion. 12

    (b) Compare and contrast the intrinsic and extrinsic absorption mechanisms in optical fibers. 8

UNIT–II

3. (a) Name various structures of Light emitting diodes. Explain the working principle of an edge-emitting double-heterojunction LED showing its structure. 10

    (b) Explain the following characteristics of a photo-diode using suitable diagrams :

    (i) Quantum efficiency.

    (ii) Responsivity.

    (iii) Speed of response.

    (iv) Bandwidth. 10

4. (a) Describe the classification of optical amplifiers and explain any *one* in detail. 10

    (b) Name the components of a high-speed DWDM optical transmitter. Compare DWDM with CWDM on the basis of their operational characteristics. 10

UNIT–III

5. (a) Describe in brief the evolution and principles of ISDN. 10

    (b) Explain the importance of ISDN standards by giving a brief account of I-series recommendations. 10

6. (a) Explain the functions required to be performed to achieve terminal adaptation for ISDN. 10

    (b) Enumerate the functions of the ISDN physical layer. Explain the framing and multiplexing of basic user-interface in detail. 10

UNIT–IV

7. (a) Explain the header error control operation at the receiver in ATM. Also give a flow chart to depict the consequence of errors in cell header. 10

    (b) Describe the SDH-based physical layer transmission structure for carrying the payload in ATM. 10

8. Explain the following :

    (a) ATM Adaptation Layer Type 3/4.

    (b) ATM services. 10+10