Hall Ticket No:

Question Paper Code :

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
M.E/M.Tech I-Semester Regular Examinations, November 2015
OPTICAL FIBER COMMUNICATIONS
(Communication Systems)

Date: **Time: 3 hours**   **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT-I

1. a) Explain the Differential PSK(DPSK) and differential Quadrature PSK(DPSK)

    Modulation schemes in optical communication systems. (8)

    b) In a coherent optical communication set up, it is desired to have an intermediate

    frequency of 175 GHz. If the wavelength of the laser used as the carrier oscillator is

    1300 nm, determine the required local laser wavelength. (4)

(or)

2. a) Evaluate the Bit Error Rate(BER) of coherent optical binary ASK modulation scheme. (6)
    b) Evaluate the Bit Error Rate(BER) of coherent optical binary ASK modulation scheme.(6)

UNIT-II

3. a) An optical amplifier can amplify a 1-µW signal to the 1-mW level. What is the
       output power when a 1-mW signal is incident on the same amplifier? Assume
       that the saturation power is 10 mW. (4)

    b) Explain the concept of noise figure for an optical amplifier. Why does the SNR
       of the amplified signal degrade by 3 dB even for an ideal amplifier? (8)

(or)

4. a) Explain why semiconductor optical amplifiers impose a chirp on the pulse during
       amplification. (4)
    b) Explain the gain mechanism in EDFAs. Discuss how EDFAs can be used to provide gain
       in the L band. (8)

UNIT-III

5. a) The C and L spectral bands cover a wavelength range from 1.53 to 1.61 μm. How many channels can be transmitted through Wavelength Division Multiplexing(WDM) when the channel spacing is 25 GHz? What is the effective bit rate–distance product when a WDM signal covering the two bands using 10-Gb/s channels is transmitted over 2000 km. (6)

    b) Describe any one encoding technique used in Code Division Multiplexing. (6)

(or)

6. What are the various issues to be considered in the design of WDM light wave system? (12)

UNIT-IV

7. a) Explain the concept of light trails solution for optical Storage Area Network(SAN). (6)

    b) Describe the concept of wavelength routed networks. (6)

    (or)

8. a) Compare the various network configurations used in SONET? (6)

    b) Describe the frame structure of SDH. (2)

    c) What is optical Ethernet? Explain how it is replacing SONET standard. (4)

UNIT-V

9. a) A 10-Gb/s soliton system is operating at 1.55μm using fibers with D=2 ps/(kmnm). The effective core area of the fiber is 50 μm^2. Calculate the peak power and the pulse energy required for fundamental solitons of 30-ps width (FWHM). Use $n2$ = 2.6×10–20 m^2/W. (6)

    b) Explain how soliton collisions limit the number of channels in a WDM soliton system. (6)

(or)

10. a) Explain the phenomenon of four-wave mixing in a WDM system. (6)

    b)What are the design issues in high speed soliton systems? (6)

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