(32)

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APR / MAY 2012

ELECTRONICS AND COMMUNICATION ENGINEERING

VII SEMESTER

EC 473 - OPTICAL COMMUNICATION AND NETWORKING
(REGULATIONS 2004)

Time: 3hour **Max Marks: 100**

Answer ALL Questions
Part A - (2 x 10 = 20 Marks)

1. What do you understand by "order" of a mode?
2. What are the important properties of material to be considered for optical fiber?
3. Estimate the modal pulse spread for a single mode Step Index fiber with $n_1 = 1.5$ and $\Delta = 0.01$. Compare the values with waveguide and material dispersion factors if $\sigma_\lambda / \lambda = 4\%$ and L = 1 Km.
4. Define Beat Length.
5. In a Fabry Perot AlGaAs Laser, operating at 900 nm, has 500 μm length and a refractive index of 4.3. Calculate the frequency and wavelength spacing.
6. What are the factors responsible for the limitation of the modulation bandwidth of a laser diode?
7. What are the benefits of Trans impedance amplifiers?
8. Determine the receiver sensitivity for a 1550 nm ASK heterodyne receiver with $\eta = 0.8$ and bandwidth of 1 GHz.
9. What is the need for WDM?
10. Mention the principle of Fiber amplifier.

Part – B (5 x 16 = 80 Marks)

11. (i) Discuss any two techniques of fiber preform fabrication. (10)
    (ii) Explain fiber drawing process with a neat diagram. (6)

12.(a)(i) Derive the expression for material and waveguide dispersion in Single mode fibers. (10)
    (ii) Explain the design optimization techniques in single mode fibers. (6)

(OR)

(b) Explain any two dispersion compensation schemes.

13.a. Explain the operation of a Double Hetrostructure laser diode with relevant diagrams and hence derive the necessary condition for threshold.

(OR)

b. (i) Discuss the spectral behavior of laser diodes under CW and modulation conditions. (8)

(ii) Brief about any two schemes of longitudinal mode control in laser diodes. (8)

14.a. Enumerate the different types of preamplifiers for optical receiver design. Also compare their relative merits and demerits.

(OR)

b.Discuss in detail about the rise time budget design of an optical link with an example.

15.(a) (i)Explain the architecture of Synchronous optical network (10)

(ii) Write a detailed note on layered network architecture. (8)

(OR)

b.(i) Explain the principle and construction of an Erbium doped fiber amplifier.(10)

(ii)Compare the features of semiconductor and Doped fiber amplifiers. (6)