

Roll No.....

Total No. of Questions : 09]

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Paper ID [EC404]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem.- 7th & 8th)

.OPTICAL FIBER COMMUNICATIONS (EC-404)

Time : 03 Hours

Maximum Marks : 60

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

Section - A

Q1)

(10 × 2 = 20)

- a) Why optical fiber communication is preferred?
- b) Briefly explain the refractive index profile for graded index fibers.
- c) What do you understand by chirp signal?
- d) What is the concept of four wave mixing? Explain.
- e) Explain briefly the characteristics of optical materials.
- f) Define Receiver sensitivity.
- g) Define non linearity of optical fibers.
- h) What do you understand by splicing?
- i) What is meant by model noise? Explain in brief.
- j) Define Maxwell's equations.

Section - B

(4 × 5 = 20)

- Q2)** Calculate the numerical aperture of a step index fiber having $n_1 = 1.48$ and $n_2 = 1.46$. What is the maximum entrance angle $\theta_{0,\max}$ for this fiber if the outer medium is air with $n = 1.00$.
- Q3)** Describe the principle and characteristics of dispersion shifted fibers.
- Q4)** Describe the working and features of tunable semiconductor lasers.
- Q5)** An optical transmission system is constrained to have 500 GHz channel spacing. How many wavelength channels can be utilized in the 1536-to-1556nm spectral band?
- Q6)** What is meant by code division multiplexing? How is it related to wavelength division multiplexing.

Section - C

(2 × 10 = 20)

- Q7)** Design the encoder logic for an NRZ-to-optical Manchester converter. Also compare different types of digital formats.
- Q8)** Describe the various types of LED structures with suitable diagrams in detail and also compare them.
- Q9)** Write short notes on the following:-
- Source-Fiber Coupling.
 - Dispersive Pulse Broadening

