

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0304

Roll No.

--	--	--	--	--	--	--	--	--	--

B. Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION
2010-11**OPTICAL FIBER COMMUNICATION**

Time : 3 Hours

Total Marks : 100

Note : Attempt all questions. Each question carries equal marks.

1. Attempt any **four** : (5×4=20)
 - (a) Differentiate between skew rays and meridional rays. Explain the nature of light.
 - (b) Deduce the condition for total internal reflection of light in a fiber.
 - (c) 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 for this fiber if the outer medium is air with $n = 1$?
 - (d) What are optical transmission windows in optical communication? Explain with the help of graphical representation.
 - (e) Write the advantages of optical communication. Also explain the fiber structure.
 - (f) Write the Numerical Aperture profile for step index and graded index fiber.
2. Attempt any **two** : (10×2=20)
 - (a) What is Attenuation? How it limits the performance of optical communication? Discuss the mechanism by which attenuation is caused in optical signal propagation along fiber.
 - (b) What is signal distortion? How it limits the performance of optical communication? Discuss and derive the expression for mechanisms by which distortion is caused in optical fiber communication.

- (c) Explain pulse broadening in optical fibers. Discuss modal birefringence present in optical fiber. Calculate dispersion parameter.

3. Attempt any **two** : **(10×2=20)**

- (a) Discuss the requirements of optical sources to be used in optical communication. Explain direct and indirect band gap semiconductors.
- (b) What are the advantages and disadvantages of LED ? Draw and explain the double heterojunction layer structure of LED.
- (c) What are the advantages and disadvantages of LASER diode ? Explain the principle of working of laser diode. What are the pumping techniques of laser diode ? Give the construction and working FP cavity laser diode. How DCB is better than FP laser ?

4. Attempt any **two** : **(10×2=20)**

- (a) Explain the requirement of optical detector to be used for the purpose of optical communication. What are the parameters by which performance of optical detector can be judged ?
- (b) Describe the working and principle of pin photodiode. How its efficiency can be increased ?
- (c) Explain the analyses are carried out to calculate the overall performance of a fiber link. Do power link budget analysis for any digital communication link.

5. Write short notes on any **four** : **(5×4=20)**

- (a) RAPD photodetector
- (b) Line codes
- (c) Detection principle of coherent optical fiber system
- (d) Noise sources in optical fiber communication
- (e) Regenerative repeater
- (f) Intensity Modulation.

