

(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.