Q. P. Code : 27280

(3 Hours)

[Total Marks :80]

N.B. :(1) Question **No.1** is **compulsory**.
(2) Attempt any **three** from the remaining questions.
(3) Assume suitable data wherever required and state the assumptions.

Q-1) Answer in brief (any Four) 20

(a) Modern Communications could not exist without Fiber Optics. Explain and justify this statement.

(b) Draw block diagram of fiber-optic communications system and describe the function of each component.

(c) What is Splicing ? Explain different types of losses associated with splicing.

(d) Draw basic structure of fiber optic cable with all three elements and also explain significance of loose buffer and tight buffer.

(e) What are the Characteristics of Light Detector ? Explain any one.

Q-2)

(a) Explain in detail any one optical fiber fabrication method with neat diagram. 10

(b) When a light propagates through the optical fiber, attenuation of the signal (light pulse) takes place. List the important factors responsible for power loss in optical fiber. 10

Q-3)

(a) What is acceptance angle ? Why do we need to know what is this angle ? 10
The corerefractive index is 1.4513 and the cladding index is 1.4468. What is
(i) the critical propagation angle
(ii) the acceptance angle
(iii) the numerical aperture

(b) Explain intermodal and intramodal dispersion in optical fibers.
How does dispersion affects the transmission bandwidth of optical fiber. 10

Q-4)

(a) What is LASER ? How does spontaneous emission and stimulated emission occur ? Compare properties of both. 10

(b) Calculate intrinsic connection losses for two 62.5 / 125 graded index multimode fibers that is caused by :
(i) Diameter mismatch (62.5 +/- 3µm)
(ii) NA mismatch (0.275 +/- 0.015)
(iv) MFD mismatch (9.3 +/- 0.5 µm) 10

Q-5)

(a) What is the significance of Fiber measurements ?
Explain Optical Time Domain Reflectometer. 10

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(b) What is Fiber Bragg Grating ?
Explain with suitable diagram working of "Optical Fiber Bragg Grating". 10

Q-6)

(a) Explain any two types of Fiber Optic Sensors. 08

(b) What is the dispersion occurring in single mode fiber ? 06

(c) An Optical Fiber has a numerical aperture of 0.25 and cladding refractive index of 1.555.
Determine :
(i) The acceptance angle for the fiber in water of refractive index of 1.33.
(ii) The critical angle at the core cladding interface. 06

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