

No. of Printed Pages : 4 181054/171054/121054
Roll No. /031054B

Eltx. Engg., Power Eltx.
Subject:- Optical Fiber Communication

Time : 3Hrs. M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

- Q.1 The optical fiber communication is achieved in the frequency range from:
a) 10 MHz to 100 MHz b) 1GHz to 10 Ghz
c) 10 Ghz to 100GHz d) 10^4 to 10^7 Ghz
- Q.2 Critical angle (θ_c), which is given by:
a) $\theta_c = \arcsin(n_2/n_1)$ b) $\theta_c = \arcsin(n_1/n_2)$
c) $\theta_c = \arcsin(n_1 \times n_2)$ d) $\theta_c = \arcsin(n_1/2n_2)$
- Q.3 Fiber optic transmission systems (FOTS) are based on the principle of:
a) Reflection
b) Total internal reflection
c) Diffraction
d) Scattering
- Q.4 According to Numerical Aperture (NA), which is true:
a) $NA = n \sin \theta_{\max}$ b) $NA = n \sin \theta_{\min}$
c) $NA = n \cos \theta_{\max}$ d) $NA = n \cos \theta_{\min}$

- Q.5 For step index, single mode fiber, which is true:
a) $n_1 > n_2$ b) $n_1 = n_2$
c) $n_1 < n_2$ d) $n_1 \neq n_2$
- Q.6 The unit of dispersion is :
a) Picoseconds/km/nm b) picoseconds
c) kilometer d) nanometer
- Q.7 LED stands for _____
a) Light emission diode b) Light emitted diode
c) Low emitting diode d) Light encounter diode
- Q.8 The formula to calculate the number of modes in a fiber is given by :
a) $N_m = 0.5 (\pi D \times NA / \lambda)^2$
b) $N_m = 0.5 (\pi D \times NA / \lambda)$
c) $N_m = 0.5 (\pi D^2 \times NA / \lambda)$
d) $N_m = (\pi D \times NA / \lambda)^2$
- Q.9 EDFA stands for _____
a) Erbium doped fiber amplifier
b) Erbium dipped fiber amplifier
c) Extra doped fiber amplifier
d) Erbium doped fiber application
- Q.10 Losses are optical is caused by:
a) Graded index structure
b) Imperfect transparency in the glass
c) Its extremely small area of cross-section
d) Stepped index structure

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SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

- Q.11 Which form of energy is used at the input of optical fiber?
- Q.12 In which biasing method, a LED is designed to work?
- Q.13 How we can define refractive index?
- Q.14 What do you understand by the term “Meridional rays”?
- Q.15 What is acceptance angle?
- Q.16 What are the advantages of single mode fiber?
- Q.17 What is the value of V-number for multimode fiber?
- Q.18 Name any three indoor type cables used in optical fiber communication.
- Q.19 What do you mean by absorption in optical fiber.
- Q.20 By which methods, we can reduce the bending losses in optical fiber?

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

- Q.21 What are step index and graded index fibers?
- Q.22 Define critical angle, Snell’s law.
- Q.23 Draw and explain the block diagram of optical receiver circuit.
- Q.24 Distinguish between single mode and multimode optical fibre communication.
- Q.25 Discuss the basic construction details of an optical fibre cable.

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- Q.26 List the advantages and disadvantages of optical fibre communication.
- Q.27 What is numerical aperture ? Discuss its significance in fiber optics.
- Q.28 Write a short note on injected laser diode.
- Q.29 What is splicing? Discuss any two techniques of splicing.
- Q.30 Discuss the working of RAMAN amplifier.
- Q.31 How Shot noise is different from Johnson noise?
- Q.32 What is bending loss? What are its types ?
- Q.33 Discuss the principle of stimulated emission.
- Q.34 What are the key performance characteristics of LED?
- Q.35 What are the characteristics of SOA?

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

- Q.36 Explain Scattering losses in detail. How many types of Scattering losses are there? How we can reduce scattering losses?
- Q.37 Draw and explain FPA and EDFA.
- Q.38 Write a short note on any two:-
 - a) V-number
 - b) Spontaneous Emission
 - c) Total Internal Reflection

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