

BRAINWARE UNIVERSITY

Term End Examination 2023-2024
Programme – B.Tech.(ECE)-2020
Course Name – Fiber Optic Communications
Course Code - PEC-ECEL702A
(Semester VII)

LIBRARY
Brainware University
Barabati, Kolkata -700125

Time : 2:30 Hours

Full Marks : 60

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) The core of an optical fiber shows
- a) Higher refractive index than the cladding
 - b) Similar refractive index with the cladding
 - c) Lower refractive index than air
 - d) Lower refractive index than the cladding
- (ii) If a mirror is employed to reflect light, the reflected light angle is ____ as the incident angle
- a) Smaller
 - b) Larger
 - c) The same
 - d) Independent
- (iii) Which theory states that the light wave behaves as if it consists of many tiny particles?
- a) Huygen's theory
 - b) Wave theory of light
 - c) Nyquist theory
 - d) Quantum theory
- (iv) Which among the following is described by the concept of numerical aperture in an optical fiber?
- a) Light collection
 - b) Light scattering
 - c) Light dispersion
 - d) Light polarization
- (v) During the development of FOC system, which among the following reasons is/are responsible for an extrinsic absorption?
- a) Atomic defects in the composition of glass
 - b) Impurity atoms in glass material
 - c) Basic constituent atoms of fiber material
 - d) All of these
- (vi) Which phenomenon produces the dynamic line width broadening under the direct modulation of injection current?
- a) Modal noise
 - b) Mode-partition noise
 - c) Frequency chirping
 - d) Reflection Noise
- (vii) In the structure of fiber, the light is guided through the core due to total internal _____

- a) reflection
 - b) refraction
 - c) diffraction
 - d) dispersion
- (viii) The rays which do not intersect the core axis are defined
- a) meridional rays
 - b) radial rays
 - c) Gamma rays
 - d) skew rays
- (ix) When the incidence angle is _____ the specified critical angle, the light rays bend along the intersection line of two different mediums of propagation.
- a) more than
 - b) less than
 - c) equal to
 - d) not related with
- (x) The material employed for fabrication of inner core of an optical fiber is
- a) glass or plastic
 - b) copper
 - c) liquid
 - d) bimetallic
- (xi) In optical fiber, identify the outer layer and inner layer
- a) core, cladding
 - b) cladding, core
 - c) reflect, transmit
 - d) transmit, reflect
- (xii) Which one of the following is not a guided medium of transmission?
- a) Fiber-Optic cable
 - b) Twisted-pair cable
 - c) The atmosphere
 - d) Coaxial cable
- (xiii) Which mechanism is employed in Laser Technology for generation of light?
- a) Dispersion
 - b) Stimulated Emission
 - c) Absorption
 - d) Spontaneous Emission
- (xiv) Which of these converts the electrical signal to optical signals?
- a) Optical photo detectors
 - b) Optical modulators
 - c) Demultiplexers
 - d) Multiplexers
- (xv) The macroscopic bending losses show an exponential increase due to _____ in radius of curvature.
- a) Increase
 - b) Decrease
 - c) Stability
 - d) None of these

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe the function of core and cladding in optical fiber. (3)
3. Define Rayleigh scattering. (3)
4. Write the advantages of light emitting diodes. (3)
5. Explain shortly the requirements of optical detectors. (3)
6. Explain the basic components of an optical network. (3)

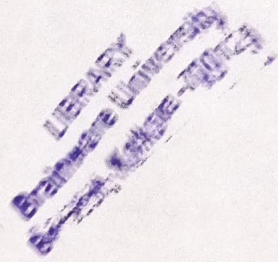
OR

Explain how data transmission occurs in optical networks. (3)

Group-C
(Long Answer Type Questions)

5 x 6=30

7. Justify the need of an isolator in optical network. (5)
8. Discuss on photonic crystal fiber. (5)
9. Explain the primary characteristics of light detectors. (5)
10. Explain shortly the operating principle of an OTDR. (5)
11. Compare satellite communication and fiber optic communication. (5)
12. Justify how optical nonlinearity and dispersion balance the propagation of temporal soliton. (5)



OR

Compare between Self-Phase Modulation (SPM) and Cross-Phase Modulation (XPM). (5)
