



BRAINWARE UNIVERSITY

Term End Examination 2023

Programme – B.Tech.(CSE)-2018/B.Tech.(CSE)-2019

Course Name – Fiber optic Communication

Course Code - OEC-802A

(Semester VIII)

Full Marks : 60

Time : 2:30 Hours

[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) _____ is produced by the difference in the propagation times of light rays that take different paths in a fiber.
- | | |
|------------------------|--------------------------|
| a) Material dispersion | b) Wavelength dispersion |
| c) Modal dispersion | d) Delay dispersion |
- (iv) Which method determines the dispersion limitation of an optical link?
- | | |
|----------------------|---------------------|
| a) Link power budget | b) Rise time budget |
| c) Both (a) and (b) | d) None of these |
- (v) 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 |
- (vi) The rays which do not intersect the core axis are defined
- | | |
|--------------------|----------------|
| a) meridional rays | b) radial rays |
| c) Gamma rays | d) skew rays |
- (vii) Usually, various types of transmission media are classified as:
- | | |
|---------------------------------|-----------------------|
| a) metallic or nonmetallic | b) guided or unguided |
| c) determinate or indeterminate | d) fixed or unfixed |
- (viii) Fiber optic system has three basic components, in the order namely
- | | |
|----------------------------------------------|----------------------------------------------|
| a) light guide, light source, light detector | b) light source, light guide, light detector |
|----------------------------------------------|----------------------------------------------|

- c) light detector, light source, light guide d) light guide, light detector, light source
- (ix) 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
- (x) Which mechanism is employed in Laser Technology for generation of light?
- a) Dispersion b) Stimulated Emission
c) Absorption d) Spontaneous Emission
- (xi) Which of these converts the electrical signal to optical signals?
- a) Optical photo detectors b) Optical modulators
c) Demultiplexers d) Multiplexers
- (xii) Define acceptance angle
- a) It is the minimum angle of incidence b) It is the maximum angle of incidence
c) It can be maximum or minimum depending on nature of material used in core d) None of these
- (xiii) Which of the following is not classified as a photoconductive device?
- a) PN photodiode b) PIN photodiode
c) Photo voltaic cell d) Phototransistor
- (xiv) Which one of the following multiplexing technique involves signal composed of light waves?
- a) WDM b) TDM
c) FDM d) CDM
- (xv) Optical fiber communication operates in the wavelength band
- a) 400 μm to 700 μm b) 800 μm to 1600 μm
c) 400 nm to 700 nm d) 800 nm to 1600 nm

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain about fusion splicing (3)
3. List the desirable characteristics of the LASER diode as optical source (3)
4. Tabulate the core and cladding diameter of mono-mode step index fiber and multimode step and graded index fiber (3)
5. Prepare a comparative study between PIN diode and APD. (3)
6. Explain pulse spreading. (3)

OR

Compare between meridional ray and skew ray (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Express the effects of temperature on the performance of a laser diode. (5)
8. Describe the reasons for the signal to get distorted as it travels along a fibre? (5)
9. Discuss the attenuation encountered in optical fiber communication due to Bending, Scattering and Absorption. (5)
10. A multimode step index fiber with a core diameter of 80 μm and a relative index difference of 1.5% is operating at a wavelength of 0.85 μm . If the core refractive index is 1.48, estimate the normalized frequency and the number of guided modes. (5)
11. Distinguish between spatial solitons and temporal solitons in optics. (5)
12. Write the concept of link power budget. (5)

OR

Justify the purpose of rise-time budget analysis. (5)
