

- Note: 1) Question no. 1 is compulsory.
2) Answer any 4 from question no. 2 to 7

- Q.1 A What do you mean by direct and indirect band gap semiconductors?
(05 Marks)
- Q.1 B Explain following terms. (10 Marks)
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|------------------------------|-------------------------|
| i) Total internal reflection | ii) Acceptance angle |
| ii) Critical angle | iii) Quantum efficiency |
| v) Responsivity. | |
- Q.1 C Which are the different connection problems occur while jointing fibers.
(05 Marks)
- Q.2 A Discuss inter modal and intra modal dispersion. (10 Marks)
- Q.2 B Find critical radius of curvature at which large bending losses occur for a multimode fiber with a core refractive index of 1.5, a refractive index difference of 3% and an operating wavelength of $0.82\mu\text{m}$. (10 Marks)
- Q.3 A Explain linear and nonlinear scattering losses. (12 Marks)
- Q.3 B Explain working principle of Avalanche Photo diode. (08 Marks)
- Q.4 A Define i) Bit error rate ii) Quantum limit (05 Marks)
- Q.4 B Write advantages of optical fiber communication over conventional electrical communication. (05 Marks)
- Q.4 C Write advantages of LASER over LED. (05 Marks)
- Q.4 D Compare surface and edge emitting LEDs. (05 Marks)
- Q.5 A i) Explain measurement of spectral loss in optical fiber using cutback technique. (06 Marks)
- ii) A 2 km length of multimode fiber is attached to apparatus for spectral loss measurement. The measured output voltage from photo receiver using the full 2 km fiber length is 2.1 V at a wavelength of $0.85\mu\text{m}$. When the fiber is then cut back to leave a 2 m length the output voltage increases to 10.7 V. Determine the attenuation per kilometer for the fiber at a wavelength of $0.85\mu\text{m}$. (04 Marks)
- Q.5 B Explain all aspects of link power budget. (10 Marks)

Q.6 A How preamplifiers used in optical fiber communication receivers are classified. Explain different types. (10 Marks)

Q.6 B Discuss how numerical aperture is measured using scanning photo detector and rotating stage method. (10 Marks)

Q.7 Write note on (Any two) : (20 Marks)

- i) Splicing techniques
 - ii) Fabrication techniques (List all methods and explain one method only)
 - iii) Optical fiber communication system
 - iv) OTDR
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