

Reg. No. :

Question Paper Code : 90578

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2025.

Fifth/Sixth Semester

Electronics and Communication Engineering

CEC 345 – OPTICAL COMMUNICATION AND NETWORKS

(Common to : Computer and Communication Engineering/Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by total internal reflection?
2. Write the advantages of graded index fiber.
3. Define fiber bend loss.
4. Define extrinsic absorption.
5. State the basic concept of LASER.
6. Give the principle of PIN photo diode.
7. What is total fiber attenuation?
8. Define optical return loss.
9. Mention few optical network terminologies.
10. How can optical network protection be made?

PART B — (5 × 13 = 65 marks)

11. (a) Explain in detail with illustrations about the ray theory in optical fiber.

Or

- (b) Discuss the different modes of propagation in a planar guide and throw light on the phase and group velocity.

12. (a) (i) Discuss the concept of dispersion in optical fiber communication. (5)
(ii) Explain material dispersion and waveguide dispersion. (8)

Or

- (b) Differentiate linear scattering and nonlinear scattering losses.
13. (a) Explain the working principle of the PN junction diode for optical emission with illustrations and expression.

Or

- (b) Explain the working principle and operation optical detector. What is quantum efficiency and give its expression?
14. (a) Explain how is fiber dispersion measurement made in the time domain and frequency domain.

Or

- (b) Discuss the procedure to measure the optical fiber aperture and field measurement in optical fiber.
15. (a) Explain in detail about the open system inter connection Reference model with its different layers.

Or

- (b) Discuss wavelength routing networks.

PART C — (1 × 15 = 15 marks)

16. (a) What is the working principle of LED? Define various types of LED structures. Explain the characteristics of LED.

Or

- (b) Write short notes on the following
- (i) MAN (5)
- (ii) Access networks (5)
- (iii) Wave length division multiplexed networks. (5)