Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 21377

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Seventh Semester

Electronics and Communication Engineering

EC 2402/EC 72 — OPTICAL COMMUNICATION AND NETWORKING

(Common to PTEC 2402 – Optical Communication and Networking for B.E. (Part-Time) Sixth Semester – Electronics and Communication Engineering – (Regulation 2009))

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. For n_1 = 1.55 and n_2 = 1.52, calculate the critical angle and Numerical aperture.
2. What is a Linearly polarized mode?
3. What is Rayleigh scattering?
4. What is meant by mechanical splice?
5. Calculate the band gap energy for an LED to emit 850 nm.
6. Define : Detector response time.
7. What are the error sources of receiver?
8. What is known as quantum limit?
9. What is a broadcast and select network?
10. What is a soliton?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive the mode equations for a circular fibre using Maxwell's equations. (8)

(ii) Calculate the Numerical Apertures of a fibre having n_1 = 1.6 and n_2 = 1.49 and another fibre having n_1 = 1.458 and n_2 = 1.405. Which fibre has greater Acceptance angle? (8)

Or

(b) (i) Explain the ray theory of a fibre with a special mention about TIR, Acceptance angle and NA. (8)

(ii) Describe Single mode fibres and their mode – field diameter. What are the propagation modes in them? (8)

12. (a) (i) Derive expressions for material dispersion and waveguide dispersion and explain them. (8)

(ii) Describe the various types of fiber connectors and couplers. (8)

Or

(b) (i) Explain fiber alignment and joint losses. (6)

(ii) Describe various fiber splicing techniques with their diagrams. (10)

13. (a) (i) Draw the structures of SLED and ELED and explain their principle of operation. (8)

(ii) Draw the injection laser diode structure and explain lasing in it. (8)

Or

(b) (i) Draw the structures of PIN and APD photo detectors and explain their operations. (8)

(ii) Derive expressions for the SNR of both PIN and APD by incorporating all noise sources. (8)

14. (a) What are the various types of Preamplifiers available for optical networks? Explain any three of them with their circuit diagrams. (16)

Or

(b) Write detailed notes on the following :

(i) Fibre refractive index profile measurement (8)

(ii) Fibre cut off wavelength measurement (8)

15. (a) (i) Explain the SA/SA protocol and modified SA/SA protocol of Broadcast and select networks. (8)

(ii) What are the non – linear effects on network performance? Explain them briefly. (8)

Or

(b) (i) Explain the layered architecture of SONET/SDH with neat diagram. (8)

(ii) Write a detailed notes on optical CDMA and its applications. (8)

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