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Question Paper Code : **71172**

M.E. DEGREE EXAMINATION, JUNE/JULY 2013.

Second Semester

Computer and Communication

CP 9221/CP 921 — OPTICAL FIBER COMMUNICATION AND NETWORKING

(Regulation 2009)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the non-linear effects in optical fiber?

2. Why is intermodal dispersion reduced in Graded index fiber as compared to step index fiber?

3. Compare the spectral distribution of LED and laser

4. Calculate the internal quantum efficiency of a 1 μm. SLED at a forward current of 100mA, assuming that 65% of the LEDs output power is coupled into an optical fiber.

5. Define Sub Carrier Multiplexing.

6. Compare homodyne and heterodyne detection systems.

7. Specify the need for compensation techniques in fiber.

8. Identify the significance of fiber soliton.

9. Draw the frame structure of SONET.

10. What is the difference first and second generation optical networks?

PART B — (5 × 16 = 80 marks)

11. (a) With necessary diagrams, compare the types of fiber with respect to its structure, index profile, modes, transmission windows and dispersion characteristics.   (16)

Or

(b) (i) Calculate the number of modes at 820nm and 1.3 μ m a graded index fibre having a parabolic-index profile, a 25 under μ m core radius, $n_1 = 1.48$, and $n_2 = 1.46$. How will you compare with the step- index fiber. (10)

(ii) Draw the refractive index profiles of Dispersion shifted fiber and write the significance of dispersion flattened fiber. (6)

12. (a) (i) Photons of energy 2.53×10^{-19}J are incident on a photo diode which has a Responsivity of 0.75 A/W. If the optical power level is 10 μ W determine the photo current. (6)

(ii) Draw the structure of Edge emitting LED and explain its operation. (10)

Or

(b) With diagram explain the principle of operation of Erbium doped fiber amplifier and also describe how is it superior to semiconductor optical amplifier. (16)

13. (a) With suitable diagram, explain synchronous and asynchronous detection schemes. (16)

Or

(b) (i) Explain about homodyne and heterodyne keying formats. (10)

(ii) Compare the sub carrier multiplexing with time division multiplexing schemes. (6)

14. (a) Explain the mechanisms of pre and post compensation techniques for fiber dispersion. (16)

Or

(b) (i) Explain the role of filter based Grating techniques. (8)

(ii) Describe about soliton based communication system design. (8)

15. (a) (i) With neat sketch, explain the elements of SONET infrastructure. (8)

(ii) Describe about wavelength routing networks. (8)

Or

(b) Explain the MAC protocols in broadcast and select networks. (16)

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