

M.Sc. DEGREE (FIVE YEAR INTEGRATED COURSE) IX SEMESTER EXAMINATION
IN PHOTONICS, NOVEMBER 2007

CEL 2917 INDUSTRIAL PHOTONICS



Hrs.

Maximum marks : 50

PART - A

(Answer any FIVE questions)
(Each question carries TWO marks)

- (i) Briefly explain the working principles of an Integrated Optic Mach-Zehnder Interferometer.
(ii) What is meant by synchronization in networking.
(iii) Outline the features of AON.
(iv) What is the significance of a phase lock loop (PLL) in detection.
(v) Construct a non-blocking 4 x 4 switch using a 2 x 2 switch.
(vi) What are FDI and BDI signals.
(vii) Discuss the concept of an optical AND gate.
(viii) Compare different signal formats.

PART - B

(Each question carries EIGHT marks)

- II. (a) (i) What are wavelength converters ? (4)
(ii) Explain different ways of achieving wavelength conversion. (4)
OR
(b) (i) Explain how a Fiber Bragg Grating acts as a wavelength-sensitive element. (4)
(ii) How do you make an optical add/drop element based on FBG. (4)
- III. (a) Compare different types of fiber access network architectures. (8)
OR
(b) Discuss about optical time division multiplexing and demultiplexing. (8)
- IV. (a) (i) Explain the design aspects of a wavelength routing network. (4)
(ii) Discuss the different statistical dimensioning models. (4)
OR
(b) Explain the features of Lambdanet, STARNET and Rainbow test beds. (8)
- V. (a) Discuss how non-linear properties like self-phase modulation and cross-phase modulation affect signal transmission. (8)
OR
(b) (i) Explain the working principle of 2 x 2 fiber optic coupler. (4)
(ii) Consider a fiber optic directional coupler with an interaction length (equal to the coupling length) of 5 mm:
(a) Obtain the corresponding coupling coefficient.
(b) What should be the value of k so that 5 mm-long coupler behaves as a 3dB coupler. (4)
- VI. (a) (i) Draw a typical laser diode characteristics and explain the bias points for (4)
(a) Digital ON OFF modulation,
(b) Analog modulation.
(ii) Explain the temperature dependent behaviour of the output power as a function of the bias current for typical laser diode. (4)
OR
(b) Write notes on:
(i) SDM (4)
(ii) WDM (4)