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Roll No. 0411 ECO 7MEO

MEDC–302(A)

M. Tech. (Third Semester)
EXAMINATION, Feb./March, 2009

OPTICAL INSTRUMENTATION AND MEASUREMENT

(Elective – V)

[MEDC – 302(A)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe what is meant by optical time domain reflectometry ? Discuss how the technique may be used to take field measurements on optical fiber ?

   (b) Describe how optical power and energy meters are used for optical measurement ? Also discuss the design criteria for field measurement equipment.

2. (a) With the aid of simple sketches outline the major categories of multiport optical fiber coupler. Also discuss the function of couplers.

   (b) With the help of neat sketch explain the working of beam splitters.

3. (a) Describe the structure and operation of a fiber laser. Comment on the glass compounds currently employed together with their fluorescence spectra.

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   (b) Why isolation is required ? Explain. Give the applications and discuss the working of fiber optic isolators.

4. (a) Explain with the aid of neat diagram designing of optical temperature sensors.

   (b) Discuss how optical polarization is used to design photoelastic pressure sensor ?

5. (a) Describe what is meant by equilibrium mode distribution and cladding mode stripping with regard to transmission measurement in optical fibers ?

   (b) Discuss the measurement of fiber scattering loss.

6. (a) Compare and contrast the major techniques employed to obtain a measurement of the refractive index profile for an optical fiber.

   (b) Describe with the aid of suitable diagrams the common method used to determine the effective cut-off wavelength in single mode fiber.

7. Explain the following in multimode fiber. Also discuss their measurement techniques :

   (i) Differential mode delay

   (ii) Bandwidth of jointed fiber

8. Write short notes on any *two* of the following :

   (i) Optical low coherence reflectometer

   (ii) Ellipsometer

   (iii) Wavelength filters

   (iv) Polarization controllers

   (v) Birefringence measurement