

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

OPTO ELECTRONICS & LASER INSTRUMENTATION

(Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) What is the principle of light propagation through a fiber?
 - (b) Define dispersion.
 - (c) Write the advantages and disadvantages of LED.
 - (d) What is the principle of PIN diode?
 - (e) What is Pockels effect?
 - (f) Write the applications of Pockels cells.
 - (g) What are the characteristics of lasers?
 - (h) Write the different types of Lasers.
 - (i) What are the uses of holography?
 - (j) Write the classifications of holograms?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

- 2 (a) Define: (i) Total internal reflection. (ii) Snell's Law. (iii) Critical angle.
(b) What are the different types of optical fibers & their characteristics?

OR

- 3 (a) Define numerical aperture and derive an expression for the numerical aperture.
(b) What are the advantages of optical fibers?

UNIT – II

- 4 (a) Describe the construction and working of LED.
(b) Write the different types of light sources for fiber optics.

OR

- 5 (a) Explain the principle and operation of APD and write its applications.
(b) Write a short note on Acousto-optic modulator.

UNIT – III

- 6 (a) Describe measurement of strain using fiber optic sensor.
(b) Explain measurement of temperature using fiber optic sensor.

OR

- 7 Explain the methods for measurement of current and voltage using fiber optics sensor.

UNIT – IV

- 8 (a) Write notes on: (i) Mode-locking. (ii) Q-Switching.
(b) Write the fundamental characteristics of lasers.

OR

- 9 Write short notes on the following:
(a) Solid lasers.
(b) Liquid lasers.

UNIT – V

- 10 (a) What are the applications of holography?
(b) Explain the principle of Hologram recording

OR

- 11 Explain the methods used for measurement of:
(a) Length.
(b) Current and voltage using laser.