

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)

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- 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.

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