

**III B.Tech II Semester Supplementary Examinations,  
November/December 2005  
OPTO ELECTRONIC AND LASER INSTRUMENTATION  
(Electronics & Instrumentation Engineering)**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions  
All Questions carry equal marks**

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1. (a) Write about the following with the necessary diagrams, graphs and expressions.
  - i. The Numerical Aperture.
  - ii. Single mode fibres.
- (b) What is a Multimode graded index fibre and explain about it with the necessary figures and equations. [10+6]
2. (a) Give any three applications of optical fibers for instrumentation and explain them with the necessary figures.
- (b) Draw the block diagram of a typical fiber optic communication system and explain the function of each block in detail. [8+8]
3. (a) Explain the construction and working principle of Dye laser with neat diagram. Show the energy level diagram also.
- (b) Explain the principle of PN junction lasers with neat diagrams. [8+8]
4. (a) Describe the working of Moire-fringe modulation fiber optic sensor.
- (b) Differentiate between an intensity modulated sensor and interferometric fiber optic sensor. [8+8]
5. (a) What is an Evanescent sensor? Explain.
- (b) List the limitations of the Evanescent sensor? [8+8]
6. With neat diagrams explain about:
  - (a) Laser tracking
  - (b) Lasers in weather monitoring (Lidar) [8+8]
7. (a) With the help of neat sketches explain holographic interferometry?
- (b) With the help of neat sketches explain holographic computer memories? [8+8]
8. (a) Define and explain the meaning of responsivity and quantum efficiency of photodiode and derive expressions for the same.
- (b) Discuss the advantages of p.i.n. photodiode over p.n. structure in a photodiode. [8+8]

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