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**Question Paper Code : 60541**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Electronics and Instrumentation Engineering

EI 2404/EI 74/EI 1354 A/IC 1002/10133 EI 704 — FIBRE OPTICS AND LASER INSTRUMENTS

(Common to Sixth Semester – Instrumentation and Control Engineering/  
Electrical and Electronics Engineering)

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Enumerate the different types of glass fibers. Mention a potential application of each.
2. Define Intermodal and Intramodal dispersions.
3. What is meant by fibre optic temperature sensor?
4. What are Moire fringes?
5. Illustrate the principle of Q-switching and cavity damping.
6. List any four properties of laser.
7. State any two industrial applications of laser.
8. What is meant by laser vaporization?
9. Distinguish between a hologram and photographic film.
10. What are the advantages of laser surgery?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the various types optical fibres. (12)  
(ii) What are the required properties of optical detectors? (4)

Or

- (b) (i) Explain the absorption and scattering losses in an optical fibre. (12)  
(ii) Among different fibres which has the least dispersion? (4)
12. (a) (i) Explain the working in measurement of flow rates using the optical fibre strain gauges. (8)  
(ii) Explain different types of modulators used in fiber optic instrumentation system. (8)

Or

- (b) (i) Explain the principle of interferometric method of measurement of length. (8)  
(ii) Explain the method of measurement of temperature using fibre optic sensors. (8)
13. (a) (i) Explain the difference between direct and indirect band gap semiconductors. Give examples. (6)  
(ii) Explain the structure of Fabry Perot resonator and its principle of operation with a neat diagram. (10)

Or

- (b) (i) Distinguish 3 level laser from 4 level laser. Explain the concept of population inversion in them. (8)  
(ii) Explain the principle of working of a Semiconductor laser with a diagram. (8)
14. (a) Explain the role of laser for measurement of acceleration and voltage. (16)

Or

- (b) Give the theory of material processing and explain the trimming of materials by laser. (16)
15. (a) (i) Discuss holography for non-destructive testing. (8)  
(ii) Describe the LASER instruments for surgery and removal of tumors of vocal cards. (8)

Or

- (b) (i) Explain holography in detail. (8)  
(ii) Explain the medical applications of LASER in gynecology and oncology. (8)