Reg. No. : | | | | | | | | | | |

Question Paper Code: 31689

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Elective

Instrumentation and Control Engineering

01UIC909 - FIBRE OPTICS AND LASER INSTRUMENTS

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define angle of reflection.
2. Mention the advantages of optical fiber as waveguide over conventional metallic waveguide.
3. What are the important parameters of optical detectors?
4. Classify fiber optic sensor.
5. List the properties of LASER.
6. Write about the different types of lasers.
7. What are the two modes of laser welding process?
8. State the principle of velocity measurement using laser.
9. What is meant by holography?
10. Mention the uses of holographic interferometry.

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Discuss about the different types of fibre and their characteristics. (8)

(ii) Explain various types of fiber optic losses in detail. (8)

Or

(b) (i) Derive wave equations for step index fiber and explain. (8)

(ii) With neat diagram explain the construction and working of LED source. (8)

12. (a) (i) Elaborate with the block diagram working principle of single mode optical fiber sensor for current measurement. (8)

(ii) Explain the method of measurement of pressure using fiber optic sensor. (8)

Or

(b) (i) Describe the construction and principle of working of laser Doppler velocity sensor. (8)

(ii) Discuss the fiber optic instrumentation system for the measurement of strain. (8)

13. (a) Discuss about the characteristics of laser. With help of suitable diagram, explain the principle of three level and four level lasers. (16)

Or

(b) Explain about the following: (i) Q switching (ii) Mode hopping and mode drift (iii) Cavity damping in lasers. (16)

14. (a) Explain how laser is used for the measurement of distance, velocity and voltage. (16)

Or

(b) Explain how laser is used in material processing and also explain laser heating and trimming process of material. (16)

15. (a) (i) Discuss holography for non-destructive testing. (8)

(ii) Explain about any three scientific applications of holography. (8)

Or

(b) (i) Describe the laser instruments for surgery and removal of tumors of vocal cards. (8)

(ii) Explain the medical applications of laser in gynecology and oncology. (8)

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