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Question Paper Code : 33444

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Seventh Semester

Instrumentation and Control Engineering

EI 1001/EI 1353 A/EI 1012 — FIBRE OPTICS AND LASER INSTRUMENTS

(Common to Electrical and Electronics Engineering and Electronics and Instrumentation Engineering)

(Regulation 2004/2007)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define :
 - (a) Bare Fibre
 - (b) PIG TAIL.
2. Name any two semi permanent splicers. Why are they called so?
3. What is the principle of electro optic modulators?
4. What is "Speckle pattern"?
5. State the properties of laser.
6. What are the advantages of gas laser over the solid state laser?
7. What is LASER heating?
8. Define Vaporization.
9. What are the components of Holography?
10. What are the requirements of laser instruments for medical applications?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the different types of fibres and their properties with neat sketches. (7)
- (ii) Define and explain :
- (1) Numerical Aperture (3)
- (2) Acceptance cone. (3)
- (3) Total internal reflection. (3)

Or

- (b) (i) Enumerate and explain the requirements for an optical source and an optical detector. (6)
- (ii) What is ISI in optical fibres? Derive an expression for rms pulse broadening in a multi mode glass fiber due to intermodal dispersion. (10)

12. (a) Explain the interferometric method of measurement of length by using an optical fibre.

Or

- (b) With neat sketches describe how the optical fibres are used for the measurement of pressure, temperature, liquid level and strain.

13. (a) (i) What are the different types of laser cavities? Draw and explain them. (6)
- (ii) Explain the working principle of Ruby laser with a neat diagram. Derive an expression for threshold gain for laser. (10)

Or

- (b) (i) Write Technical notes on :
- (1) Laser modes (4)
- (2) Frequency Chirping. (4)
- (ii) Explain the working principle of He-Ne gas laser with a neat diagram. (8)

14. (a) Describe the method for the measurement of
- (i) Acceleration and (8)
- (ii) Current. (8)

Or

- (b) Explain the industrial application of LASER in material processing. (16)

15. (a) (i) Explain the basic Principle of holography with suitable diagrams.(8)
(ii) Describe the principle of holography for non Destructive Testing. (8)

Or

(b) Write technical notes on the following :

- (i) Laser Based Plastic Surgery (8)
(ii) Lasers for Gynecology and oncology. (8)
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