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Question Paper Code : X10412

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020

Seventh Semester

Electrical and Electronics Engineering

EI 8075 – FIBRE OPTICS AND LASER INSTRUMENTATION

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

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. What is acceptance angle ?
2. An optical fiber of core index = 1.5 and cladding index = 1.47 is used for operation at 1.31 μm wavelength. Calculate the numerical aperture and critical angle to be employed.
3. Mention the application of fiber optic sensors.
4. Differentiate intrinsic and extrinsic fiber optic sensor.
5. Generalize the properties of LASER.
6. What is cavity damping ?
7. Why population inversion is significant in lasers ?
8. Outline the advantages of laser welding.
9. What are holographic components ?
10. What is meant by liquid lasers ?

PART – B

(5×13=65 Marks)

11. a) Elaborate the various attenuation losses possible in optical fibers.

(OR)

- b) Explain the requirement for an ideal optical source and an ideal optical detector.



12. a) Explain the principle of interferometric method of measurement of length.

(OR)

b) Analyze the features of fiber optic sensors and point out the uses in the measurement of current and voltage.

13. a) With neat diagram, explain the working of liquid and semiconductor laser.

(OR)

b) With the help of an energy diagram, analyze how four level laser system is advantageous to three level laser system.

14. a) Describe the method for the measurement of :

i) Acceleration and

(6)

ii) Current.

(7)

(OR)

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

15. a) Examine the need of holography and compare holography with commercial photographic techniques and explain in detail.

(OR)

b) Describe the LASER instruments for surgery and removal of tumors of vocal cards.

PART – C

(1×15=15 Marks)

16. a) Categorize various medical applications of LASER.

(OR)

b) Analyze how a homo junction and hetero junction laser can be developed using electron beam principle.
