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

Question Paper Code : 40506

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh Semester

Electrical and Electronics Engineering

EI8075 — FIBRE OPTICS AND LASER INSTRUMENTATION

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

(Regulations 2017)

Time : Three hours | Maximum : 100 marks

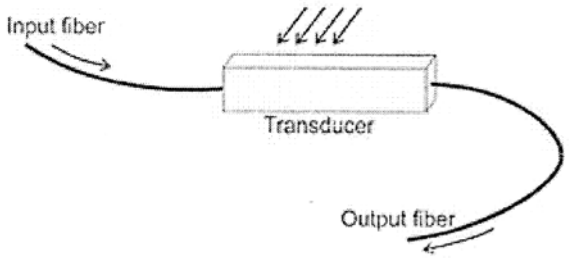
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Light travels from air into an optical fiber with an index of refraction of 1.44. If the angle of incidence on the end of the fiber is 22°, what is the angle of refraction inside the fiber?

2. List any two advantages of Graded index fibers over step index fibers.

3. Identify whether the given diagram is a representation of intrinsic or extrinsic fiber optic sensor.



4. What are moire fringes?

5. When is the laser said to be mode locked?

6. What is the importance of brewster windows in gas lasers?

7. How are lasers used for distance measurement?

8. List any four industrial applications of lasers in material processing.

9. What is the role of lasers in endoscopy?

10. Distinguish between a hologram and photographic film.

PART B — (5 × 13 = 65 marks)

11. (a) With a neat diagram, explain how total internal reflection is achieve in optical fibers?

Or

(b) Discuss about the optical source and optical detector used in fiber optic communication.

12. (a) Elaborate about the construction and operation of optical domain reflectometer.

Or

(b) Explain how optical fibers can be used to measure temperature, pressure and liquid level in industries.

13. (a) Discuss about construction and working of CO_2 laser and Nd-YAG laser.

Or

(b) Write short notes on the following:

(i) Cavity dumping

(ii) Q Switiching

14. (a) Explain about the construction and working of LIDAR.

Or

(b) Discuss how lasers are used for trimming and melting of materials.

15. (a) Elaborate about the working principle of holography. Brief how holography is used in non destructive testing.

Or

(b) Explain how lasers are useful in medical treatment and diagnosis.

PART C — (1 × 15 = 15 marks)

16. (a) Discuss about the various sources of fiber losses in fiber optic communication.

Or

(b) Elaborate about the three level and four level energy level diagram for laser operation.

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