

9. (a) Briefly explain the Intensity Modulated Sensors and Microbend Strain Intensity Modulated Sensor.

Or

- (b) What are intrinsic and extrinsic sensors? Discuss the types and principles of intrinsic and extrinsic sensors.

10. (a) With a neat diagram explain the working principle of Optical Time-Domain Reflectometer (OTDR) and give the applications of OTDR.

Or

- (b) Discuss in detail the components and construction of Michelson and Fabriperot Interferometric FOS with neat diagram.

S.No. 192

12PPHZ02

(For the candidates admitted from 2012–2013 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2017.

First to Fourth Semester

Physics

OPTO ELECTRONICS

Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 5 = 25 marks)

Answer ALL questions.

1. (a) Discuss the intermodal (multipath) dispersion.

Or

- (b) Compute the NA, acceptance angle and the critical angle of the fibre having μ_1 (core refractive index) = 1.50 and the refractive index of the cladding = 1.45.

2. (a) Explain spatial and temporal coherence.

Or

- (b) Briefly explain with energy level diagram, three level pumping scheme for laser operation.

3. (a) Explain the principle, construction and working of Light Emitting Diode.

Or

- (b) Describe the principle and working of electro-optic modulator circuit.

4. (a) Explain the working principle of fibre Bragg grating used for strain and temperature sensors.

Or

- (b) Describe the displacement measurement sensors.

5. (a) Explain the working principle of fibre optic gyroscope.

Or

- (b) With neat diagram, explain inter-ferometric sensors.

SECTION B — (5 × 10 = 50 marks)

Answer ALL questions.

6. (a) What is meant by mode of propagation of light in optical fibre? Explain the formation of a mode in a planar dielectric wave guide.

Or

- (b) Briefly explain the characteristics, advantages and disadvantages of single mode and multimode step index fibre.

7. (a) Briefly explain the principle and working of hetero structure diode laser with neat energy level diagram. Give its advantages and disadvantages.

Or

- (b) (i) Briefly explain the four level laser actions.

- (ii) A 5 mW He-Ne laser tube operates at a d.c. voltage of 2000 V and carries a current of 7 mA. What is the efficiency of the laser?

8. (a) What is a photomultiplier? Describe the construction, working and uses of photomultipliers.

Or

- (b) Explain the principle, construction and working of Avalanche Photo Diode (APD).