

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, NOVEMBER – 2023**

**OPTICAL INSTRUMENTATION**

[Maximum Marks : 100]

[Time : 3 hours]

**PART – A**  
(Maximum Marks : 10)

Marks

**I.** Answer **all** questions in one or two sentences. Each question carries 2 marks.

1. State Malus law.
2. Define Numerical aperture.
3. List the types of solid state laser.
4. List any 2 medical application of Laser.
5. Define refraction.

(5x2=10)

**PART – B**  
(Maximum Marks : 30)

**II.** Answer any **five** of the following questions. Each question carries 6 marks.

1. Illustrate the formation of Newtons ring.
2. Explain the phenomenon of interference.
3. Describe the advantages of optical fibre communication.
4. Explain the working of LED driver circuit.
5. Explain the concept of population inversion in laser.
6. Describe the working of semiconductor laser.
7. Explain laser based displacement measurement.

(5x6=30)



**PART – C**

(Maximum Marks : 60)

(Answer **one full** question from each unit. Each full question carries 15 marks)

**UNIT – I**

- III.** (a) Explain the condition for bright and dark fringes in interference. (8)  
(b) Describe the phenomenon of diffraction. (7)

**OR**

- IV.** (a) Explain the laws of reflection and refraction. (8)  
(b) Describe the phenomenon of polarization. (7)

**UNIT – II**

- V.** (a) Describe the structure and light propagation method in optical fibre. (8)  
(b) Explain the operation of fiber optic displacement sensor. (7)

**OR**

- VI.** (a) Explain the working of PIN diode. (7)  
(b) Describe the operation of fiber optic level sensor. (8)

**UNIT –III**

- VII.** (a) Explain the working of Nd YAG laser with neat diagram. (8)  
(b) Explain the basic requirements for producing laser. (7)

**OR**

- VIII.** (a) Explain the construction and operation of argon laser. (8)  
(b) Describe the characteristics of laser beam. (7)

**UNIT – IV**

- IX.** (a) Define holography and explain the construction of a hologram. (8)  
(b) Explain about laser drilling method. (7)

**OR**

- X.** (a) Explain about laser welding method. (8)  
(b) Write short notes on optical disc recording method. (7)

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