

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL- 2023**

OPTICAL INSTRUMENTATION

[Maximum marks: 100]

(Time: 3 Hours)

PART – A

Maximum marks : 10

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

1. Define Refraction.
2. List the constructional parts of optical fiber.
3. Define holography.
4. List any four advantages of semiconductor laser.
5. Define interferometer.

(5 x 2 = 10)

PART – B

Maximum marks : 30

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

1. Explain the phenomenon of dispersion.
2. List any six advantages of optical fiber communication.
3. Describe absorption, spontaneous emission and stimulated emission.
4. List any six industrial applications of laser.
5. Describe the working of He-Ne laser.
6. Explain displacement measurement using interferometer.
7. Explain with neat diagram the working of fiber optic temperature sensor.

(5 x 6 = 30)

PART – C

Maximum marks : 60

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

UNIT – I

- III. (a) Describe the formation of Newton rings. (8)
- (b) Explain the phenomenon of interference. (7)

OR

- IV.(a) Explain laws of polarization. (8)
(b) Describe the phenomenon of diffraction. (7)

UNIT-II

- V. (a) Explain the block diagram of fiber optic communication system. (8)
(b) Describe the working of LED drive circuit. (7)

OR

- VI. (a) Describe the classification of optical fiber based on refractive index profile. (8)
(b) Explain the working of fiber optic displacement sensor. (7)

UNIT-III

- VII.(a) Describe ruby laser with energy level diagram. (8)
(b) Explain basic requirements of producing laser. (7)

OR

- VIII.(a) Describe the operation of Nd-YAG laser with energy level diagram. (8)
(b) List the different characteristics of laser beam. (7)

UNIT-IV

- IX. (a) Explain the working of laser printer. (8)
(b) Describe any two medical applications of laser. (7)

OR

- X. (a) Describe holography. (8)
(b) Explain laser doppler velocity meter. (7)
