TED (15/19) 5214
(Revision-2015/19)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL - 2024

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 dispersion.
2. List the modes of operation of optical fibre.
3. State the condition to occur population inversion.
4. List any 2 industrial application of Laser.
5. Define total internal reflection. (5 x 2 = 10)

PART – B
Maximum marks: 30

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

1. Distinguish between the phenomenon of interference and diffraction.
2. Explain the phenomenon of diffraction.
3. Illustrate the operation of fibre optic displacement sensor.
4. Explain the block diagram of fibre optic communication.
5. Describe the characteristics of Laser beam.
6. Differentiate between spontaneous emission and stimulated emission.
7. Illustrate the working of Laser doppler velocity meter. (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) Explain the use of Newtons ring to measure the radius of curvature of lens. (8)

(b) Describe the phenomenon of polarization. (7)

OR

IV. (a) Illustrate Young's double slit experiment with a neat diagram. (10)

(b) Describe the laws of refraction. (5)

UNIT - II

V. (a) Compare step index and graded index fiber. (7)

(b) Explain the operation of fiber optic pressure sensor. (8)

OR

VI. (a) Explain the working of photo diode. (8)

(b) Describe the operation of fiber optic temperature sensor. (7)

UNIT - III

VII. (a) Explain the working of Ruby Laser with neat diagram. (8)

(b) Explain the basic requirements for producing laser. (7)

OR

VIII. (a) Explain the working of He-Ne laser with energy level diagram. (8)

(b) Describe the working of semiconductor laser. (7)

UNIT – IV

IX. (a) Define holography and explain the construction of hologram. (8)

(b) Explain optical disc recording method. (7)

OR

X. (a) Explain about laser cutting and its advantages. (8)

(b) Illustrate the working of laser printer. (7)
