

C 80662

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Name

Reg. No.

COMBINED FIRST AND SECOND SEMESTER B.TECH (ENGINEERING)
[14 SCHEME] DEGREE EXAMINATION, APRIL 2015

EN 14 103—ENGINEERING PHYSICS



Marks

Time : Three Hours

Part A

*Answer any eight questions.
Each question carries 5 marks.*

1. Briefly explain the theory behind colours of thin films.
2. Explain how formulation of Newtons rings differs in reflected and transmitted light.
3. Discuss the engineering applications of ultrasonic waves.
4. Explain the principle and use of quarterwave plate.
5. Compare Newtonian mechanics and Quantum mechanics.
6. What is distribution law in statistical physics ?
7. What is LASER ? Explain how the basic lasing action is achieved.
8. How the light gets attenuated in an optical fibre ? Derive an expression for fibre attenuation in terms of db/km.
9. What are the applications of semiconductor ?
10. Explain the effect of magnetic field on superconductors.

(8 × 5 = 40 marks)

Part B

*Answer one full question from each module.
Each question carries 15 marks.*

Module I

11. (a) With necessary theory, explain how you would determine the wavelength of monochromatic light using Newtons Rings.
(b) Explain the formation of interference fringes by an air wedge.
12. (a) Define and explain the term “dispersive power of a grating”.
(b) Explain the formation of spectra by plane diffraction grating. Discuss in detail how we can find wavelength of light using plane transmission grating.

Turn over

Module II

13. Explain the terms (i) Double refraction ; (ii) Optic axis ; and (iii) Positive and Negative crystals.
14. Derive Schrödinger time dependent and time independent equation. Apply the same for particle in one-dimensional box.

Module III

15. (a) What is the role of metastable ? State in laser media. With a diagram, explain the construction, working and features of He-Ne laser.
- (b) Describe how a hologram is produced and viewed.
16. (a) What are various modes of an optical fibre ? Give their importance and applications. How the various refractive indices how to be related to get better working of an optical fibre ?
- (b) Define V number and give its importance.

Module IV

17. (a) With a neat diagram, explain the construction and working of an LED.
- (b) Explain the working of Zener diode as a stabilizer.
18. (a) Explain "Meissner effect" and define critical field.
- (b) Calculate the critical current density for 1 mm. diameter wire of lead at (i) 4.2 K and (ii) 7 K. Given T_c for lead = 7.18 K and $H_c = 6.5 \times 10^4$ A/m.

(4 × 15 = 60 marks)