

Code No. 9004 / 0

FACULTY OF ENGINEERING AND INFORMATICS

B.E. I — Year (Old) Examination, May / June 2016

Subject Engineering Physics (Common to All Branches)

Time : 3 hours

Max. Marks : 75

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART — A (25 Marks)

- 1 Explain the basic principle of holography. (2)
- 2 A monochromatic light of wavelength $6500 \text{ \AA}$ falls normally on a grating. The first order spectrum is observed at 15° from the mean position. Calculate the grating element. (3)
- 3 Distinguish between Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics. (3)
- 4 Which of the following is not a Maxwell equation. (2)

a) $\nabla \times \mathbf{H} = \frac{\partial \mathbf{D}}{\partial t}$

b) $\nabla \cdot \mathbf{B} = 0$

c) $\nabla \cdot \mathbf{E} = 0$

d) $\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$
- 5 The distance between the adjacent planes of parallel planes of indices (h, k, l) for simple cubic crystal is _____ (2)
- 6 What is Meissner effect? Explain its importance. (2)
- 7 Match the following : (3)

- 1 Fibre optics
 - 2 Statistical Mechanics
 - 3 Crystallography
 - 4 Solar cells
 - 5 Superconductivity

- a) Miller indices
 - b) Photovoltaic effect
 - c) BCS theory
 - d) Total internal reflection
 - e) Thin films
 - f) Planck's radiation
 - g) Polarization

A) 1 — d, 2 — f, 3 — a, 4 — g, 5 — c

B) 1 — e, 2 — g, 3 — b, 4 — c, 5 — d

C) 1 — f, 2 — a, 3 — b, 4 — d, 5 — c

D) 1 — f, 2 — c, 3 — d, 4 — e, 5 — f
- 8 What are Type-I and Type-II superconductors? (3)
- 9 What is X-ray Fluorescence? Explain. (2)
- 10 The Hall coefficient (R_H) of a semiconductor is $3.22 \times 10^{-4} \text{ m}^3 \text{ C}^{-1}$. Its resistivity is $9 \times 10^{-3} \text{ } \Omega \text{ m}$. Determine the type of semiconductor and its charge concentration. (3)

PART — B (50 Marks)

- 11 a) Distinguish between interference and diffraction.
 b) Explain the method to determine the wavelength of light used by diffraction grating.
- 12 a) Define numerical aperture, acceptance angle and obtain an expression for numerical aperture.
 b) Distinguish between step index and graded index fibres.

..2

Code No. 9004 0

..2..

- 13 Describe in detail the theory of a particle in an infinite square well potential.
- 14 What is Schottky defect? Derive the expression for the concentration of Schottky defects in an ionic crystal.
- 15 a) Based on conductivity, classify the solids into conductors, semiconductors and insulators.
b) What is thermistor and explain the working of a thermistor?
- 16 a) What are Ferritas? Explain their structure.
b) Discuss the Weiss theory of ferromagnetism.
- 17 a) Describe the CVD method for the preparation of thin film.
b) Describe the principle and working of Scanning Electron Microscope (SEM).

OU 1603 OU
www.FirstRanker.com