

Code No. 6004 / M

FACULTY OF ENGINEERING AND INFORMATICS
B.E. I – Year (Main) Examination, June 2014

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 A plane transmission grating having 5000 lines per cm. is being used under normal incident of light. If the width of the opaque parts be double than that of transparent parts of the grating then which order of the spectra will be absent. (2)
- 2 Define the terms, i) Population inversion ii) active medium
iii) pumping (3)
- 3 What is photon gas? Explain. (2)
- 4 The pointing vector is expressed as (2)
a) $\vec{H} \times \vec{E}$ b) $\vec{E} \times \vec{H}$ c) $(\vec{E} \times \vec{H}) \cdot ds$ d) $(\vec{H} \times \vec{E}) \cdot ds$
- 5 The number of atoms per unit cell for a _____ crystal is _____ (2)
(choose the correct answer)
a) SC, 2 b) FCC, 4 c) BCC, 1 d) BCC, 3
- 6 Distinguish between intrinsic and extrinsic semiconductors. (3)
- 7 Match the following : (3)

1 Superconductivity	a) Materials at reduced size
2 Dielectric Materials	b) X-ray diffraction
3 Band theory of solids	c) Magnetic field
4 Nanomaterials	d) Charge storage
5 Crystal structure	e) Meissner effect
	f) Kronig-Penny model
	g) Thin films

A) 1 – e, 2 – d, 3 – f, 4 – a, 5 – b
B) 1 – b, 2 – e, 3 – h, 4 – a, 5 – d
C) 1 – d, 2 – c, 3 – a, 4 – b, 5 – e
D) 1 – c, 2 – d, 3 – f, 4 – e, 5 – g
- 8 Explain briefly the principle the CVD method. (3)

- 9 Explain the principle of Electron Microscope. (2)
- 10 A solar cell having fill factor 0.6 gives the maximum power output of 18×10^{-3} watts. (3)
Then calculate the product $v_{oc} I_{sc}$

PART – B (50 Marks)

- 11 a) Define quarter wave plate and Half wave plate. (4)
b) Describe the construction and working of Half shade polarimeter. (6)
- 12 a) Explain how coherent sources are obtained by division of wave front and division of amplitude. (4)
b) Explain the construction and re-construction of image with a hologram. (6)
- 13 Describe the necessary theory of potential barrier using the Schrodinger's wave equation and explain what is quantum tunneling. (8+2)
- 14 What is Frenkel defect? Derive an expression for the concentration of Frenkel defects in a crystal. (2+8)
- 15 a) Based on energy bands, distinguish between conductors, semiconductors and insulators. (4)
b) What is Hall effect and derive the expression for the hall coefficient, carrier concentration and mobility? (6)
- 16 a) Discuss the Weiss theory of ferromagnetism. (7)
b) Write the applications of ferrites. (3)
- 17 a) Describe the thermal evaporation method for the preparation of thin films. (6)
b) Describe the principle and working of X-ray fluorescence process. (4)
