

245110732104

VASAVI LIBRARY

Code No. : 5004/N

FACULTY OF ENGINEERING AND INFORMATICS
B.E. I Year (New) Common to all Branches (Suppl.)
Examination, January 2012
ENGINEERING PHYSICS

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. How many orders will be observed by a grating having 4000 lines per cm if it is illuminated by visible light in the range 4000 Å and 7000 Å. 3
2. Match the following :
- | I | II | |
|---|---|---|
| 1) The inner most part of optical fibre | (a) Refractive index of core increases towards the axis of the core | |
| 2) In Graded index fibre | (b) Interference | |
| 3) Laser beam is made of | (c) Core | |
| 4) Hologram is related to | (d) Highly coherent photons | |
| | (e) Electrons | |
| | (f) Non-uniform refractive index | |
| A) 1 – b, 2 – a, 3 – d, 4 – b | B) 1 – c, 2 – a, 3 – d, 4 – b | |
| C) 1 – d, 2 – c, 3 – a, 4 – f | D) 1 – b, 2 – c, 3 – d, 4 – e | 2 |
3. The energy of an electron contained to move in a one-dimensional box of length 4.0 Å is 9.664×10^{-17} J. Find out the order of excited state. 2
4. What is displacement current ? Explain. 2
5. i) The Miller indices of a set of parallel planes which make equal intercepts on the three axes are 1
- a) (121) b) (111) c) (100) d) (101)
- ii) In a simple cubic lattice the ratio of $d_{100} : d_{110} : d_{111}$ is 2
- a) $\sqrt{6} : \sqrt{3} : \sqrt{2}$ b) $\sqrt{3} : \sqrt{6} : \sqrt{1}$ c) $6 : \sqrt{3} : \sqrt{2}$ d) 6 : 3 : 1



- 6. Mobilities of electrons and holes in a sample of intrinsic Ge at 300 K are $0.36 \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$ and $0.17 \text{ m}^2 \text{ V}^{-1} \text{ S}^{-1}$ respectively. If the resistivity of the specimen is $2.12 \text{ } \Omega \text{ m}$, compute the intrinsic concentration of carriers for Ge. Where $m_e^* = 0.5 m_0$ and $m_h^* = 0.37 m_0$. 3
- 7. Draw the crystal structure of Barium titanate above 393 K and explain how its structure and polarization changes with decreasing temperature. 3
- 8. Define the terms critical temperature, critical magnetic field and critical current. 3
- 9. What are carbon nano tubes ? Explain. 2
- 10. Explain the basic principle used in atomic force microscopes. 2

PART – B

(5×10=50 Marks)

- 11. What is optical activity ? Explain construction and working of Larentz's half shade polarimeter. 10
- 12. a) Explain what is phase-space. (2+2+6)
b) Distinguish between Basons and fermions. Obtain the expression for Fermi-Dirac distribution law.
- 13. a) Show that among SC, B.C.C. and FCC, FCC has closed packed structure. 5
b) Obtain an expression for the concentration of Schottkey defects in an ionic crystals. 5
- 14. a) What are dielectrics ? Explain various electrical polarization mechanism. 6
b) Distinguish between soft and hard magnetic materials. 4
- 15. a) Distinguish between bulk, thin film and nano-scale materials. 3
b) Explain the thermal evaporation method of depositing thin films. 7
- 16. a) Describe the classification of optical fibres. 4
b) Write down the Maxwells equations and deduce an expression for the velocity of propagation of a plane electro magnetic wave in homogeneous, isotropic dielectric medium. 6
- 17. Write a note on :
a) LED. 5
b) High temperature super conductors. 5