VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD
B.E. I Year II-Semester (Supplementary) Examinations, Dec./Jan.: 2015-16

Engineering Physics – II
(For CSE, ECE, and IT Branches)

Time: **3** hours

Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** questions from **Part-B***

Part-A (10 X 2=20 Marks)

1. Explain the significance of wave function in wave mechanics.
2. A beam of X-rays are incident on an ionic crystal with lattice spacing 0.313nm. Calculate the wavelength of X-rays if the first order Bragg's reflection takes place at a glancing angle of 30°.
3. Define the terms Drift Current and Diffusion Current.
4. Explain the concept of effective mass in intrinsic semiconductor.
5. Distinguish the solids on the basis of band theory.
6. The critical values of magnetic field are 2×10^5A/m and 1×10^5A/m for niobium at 0K and 8K. Determine its critical temperature.
7. Write the postulates of special theory of relativity.
8. What is the velocity of π^- mesons whose observed mean life is 2.5×10^{-7}sec. The proper life of these π^- mesons is 2.5×10^{-8}sec.
9. Discuss the chemical properties of Nano Materials.
10. Distinguish bulk, thin and nano materials.

Part-B (5X10=50 Marks)

11. a) Obtain Schrodinger time independent wave equations for matter waves. [6]
    b) Explain the experimental method to determine the lattice constant 'α' by powder diffraction method. [4]

12. a) What is Super Conductivity? Explain the general properties of Super conductors. [6]
    b) Show that the Kronig-Penney model leads to energy band structure in solids. [4]

13. a) Explain the Conductivity in Intrinsic and Extrinsic Semi Conductors and obtain the expressions. [5]
    b) Explain the working of photo diode and discuss for its efficiency and Responsivity. [5]

14. a) What is Galelian Transformation? Derive Galilian transformation equations. [5]
    b) What is relativistic mass? Derive the relation for relativistic mass. [5]

15. a) Describe with a neat sketch how nano particles are prepared employing the Chemical Vapor Deposition. [6]
    b) Write the applications of carbon nano tubes and describe the ball milling method. [4]

16. a) Explain the point defects and line defects in crystals. [5]
    b) What is Hall Effect and derive expression for Hall Coefficient. [5]

17. Answer any **two** of the following:
    a) Describe the working principle and characterization of nanomaterials by TEM. [5]
    b) Derive the expression for $E = mc^2$ [5]
    c) Explain the construction and working of Solar Cell. [5]

******