# FACULTY OF ENGINEERING & INFORMATICS

**B.E. I-Year (Common to All) (Supplementary) Examination, December 2013**

**Subject : Engineering Physics**

**Time : 3 Hours**                                                                              **Max. Marks: 75**

*Note: Answer all questions of Part - A and answer any five questions from Part-B.*

## PART – A  (25 Marks)

1. What do you understand by division of wave front and division of amplitude?         (3)
2. Determine the specific rotation of the sugar solution if the plane of polarization is turned through $15^o$. The length of the tube containing 20% of sugar is 20 cm.         (2)
3. Obtain Rayleigh Jeans law and Wien's law from Planck's law.         (3)
4. Explain the significance of wave function in wave mechanics.         (2)
5. Calculate the packing fraction of BCC and FCC lattices.         (3)
6. Distinguish between intrinsic and extrinsic semi conductors.         (3)
7. Distinguish between Ferrimagnetism and Anti Ferromagnetism.         (2)
8. What are the applications of superconductors in Engineering?         (3)
9. Explain the characteristics of carbon nanotubes.         (2)
10. Match the following:         (2)

    (i) Ball Milling          (a) Kronig-Penney model
    (ii) BCS theory          (b) Maxwell-Boltzmann statistics
    (iii) Electron gas        (c) Fermi-Dirac statistics
    (iv) Band theory          (d) Superconductivity
                              (e) Nano materials

    1. i(a), ii(d), iii(c), iv(e)        2.i(a), ii(b), iii(c), iv (d)
    3. i(b), ii(a), iii(c), iv(e)        4. i(e), ii(d), iii(c), iv (a)

## PART – B  (5x10=50 Marks)

11.(a) Describe the necessary theory of interference in thin films by reflected light.         (5)
    (b) Explain the experiment to determine the wavelength of a monochromatic light using diffraction grating.         (5)

12.(a) Describe the working of a He-Ne laser with suitable energy level diagram.         (5)
    (b) Explain the propagation of a signal in step index and graded index fibers.         (5)

13.(a) Derive Bose-Einstein distribution law and explain the limitations.         (5)
    (b) Explain the classification of ensembles in statistical mechanics.         (5)

14.(a) Derive the expression for the concentration of Schottky defects in ionic crystals.         (5)
    (b) Describe the construction and working of LED.         (5)

15.(a) Describe the technique to determine the dielectric constant of a given dielectric material.         (5)
    (b) Using domain theory of magnetism, explain various stages in the study of Hysteresis curve.         (5)

16.(a) Explain in detail the preparation of a nano material using sol – gel method.         (5)
    (b) Describe the working of a thin film solar cell.         (5)

17. Write short notes on any **two** of the following:         (10)
    (a) X-ray florescence
    (b) Free electron theory
    (c) High $T_c$ super conductors

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