R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, May - 2016
ENGINEERING PHYSICS
(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, IT, MCT, MMT, AE, AME, MIE, PTE, CEE, MSNT, AGE)

Time: 3 hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a)   What are the properties of Metallic bond solids.   [2]
   b)   Calculate packing factor of Simple cubic and FCC lattices.   [3]
   c)   What are matter waves?   [2]
   d)   What are the features of Micro canonical and Grand canonical ensembles? [3]
   e)   Define the terms dielectric polarizability and Susceptibility.   [2]
   f)   What are the properties of superconductors?   [3]
   g)   What is double refraction?   [2]
   h)   Distinguish between spontaneous and stimulated emission.   [3]
   i)   What is Hall effect?   [2]
   j)   What do you understand by quantum confinement?   [3]

PART-B
(50 Marks)

2.a)   Calculate the cohesive energy of diatomic molecule.
   b)   Describe the powder method to determine lattice parameters.   [5+5]
OR
3.a)   Classify the crystal systems with neat diagrams.
   b)   Derive the formula to determine the concentration of Frenkel defects.   [5+5]

4.a)   Derive Schrodinger's time independent equation.
   b)   Explain the salient features of Kronig – Penny model.   [5+5]
OR
5.a)   Describe Davisson and Germer experiment and explain the results.
   b)   Distinguish between Maxwell – Boltzman statistics and Fermi – Dirac statistics.
                                                             [5+5]

6.a) Derive the expression for electronic polarizability.
  b) Explain Hysteresis curve on the basis of domain theory of ferromagnetism.

                                                                    [5+5]

OR

7.a) Explain the theory of internal fields in a dielectric.
  b) Distinguish between type – I and type – II superconductors.   [5+5]

8.a) Describe the construction and working of Nicol's prism.
  b) Derive Einstein coefficients in laser emission.   [5+5]

OR

9.a) Describe Newton's rings experiment to determine the wavelength of a light source.
  b) Explain the phenomenon of total internal reflection and derive the expression for numerical aperture of an optical fiber.   [5+5]

10.a) Derive Diode equation and explain the Energy diagram of PN diode.
   b) Describe the method to determine the absorption coefficient of a material. [5+5]

OR

11.a) What is reverberation? Derive Sabine's formula.
   b) Describe sol – gel method of synthesis of nano materials.   [5+5]

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