Code No: 111AD

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, October/November - 2016
ENGINEERING PHYSICS
(Common to all Branches)

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)	Define atomic radius, coordination number and packing fraction.	[2]
b)	Explain salient features of miller indices.	[3]
c)	What is micro canonical ensemble? Explain.	[2]
d)	State and explain about de Broglie's hypothesis.	[3]
e)	Define magnetic permeability, susceptibility, magnetic field induction.	[2]
f)	Explain Meissner effect.	[3]
g)	Write short notes on population inversion.	[2]
h)	What is numerical aperture?	[3]
i)	Define Piezo-electricity.	[2]
j)	What is the basic principal involved in TEM.	[3]

PART-B

(50 Marks)

2.a)   Discuss about various types of bonding in solids and also discuss about the properties of various types of crystals.
  b)   Estimate the number of Frenkel defects at a given temperature.
  c)   Explain Laue's method of X-ray diffraction and compare merits and demerits.   [3+3+4]

OR
3.a)   Obtain expression for inter-planar spacing (d) of orthogonal crystal system.
  b)   Explain powder method of X-ray diffraction.
  c)   Discuss about NaCl crystal structure.   [3+3+4]

4.a)   Derive Schrodinger's time independent equation.
  b)   Explain the origin of energy band formation.
  c)   What is the significance of matter waves? Explain.   [4+3+3]
OR
5.a)   Explain the motion of an electron in a periodic potential with the help of Kronig-Penney model.
  b)   Compare M-B, B-E and F-D statistics.   [5+5]

6.a) Derive expressions for ionic and electronic polarizations.
  b) Explain hysteresis behavior in case of ferroelectric materials.
  c) What is Bohr magneton and explain its significance.

[4+3+3]

OR

7.a) Derive Classius-Mosotti equation.
  b) Explain the origin of magnetic moment.
  c) Compare soft and hard magnetic materials. [4+3+3]

8.a) Explain principle, construction and working of Nicol prism.
  b) Discuss about diffraction grating experiment.
  c) Establish the relation between Einstein's coefficients. [3+4+3]

OR

9.a) Obtain an expression for numerical aperture.
  b) Explain attenuation in optical fibers.
  c) Explain application of optical fibers in communication systems. [3+3+4]

10.a) Calculate carrier concentration in p-type semiconductor and also find the position of Fermi level.
  b) Explain the measurement of absorption coefficient of material.
  c) Define reverberation and time of reverberation. [3+3+4]

OR

11.a) Discuss about direct and indirect band gap semiconductors.
  b) Explain chemical vapor deposition method of synthesis of nano-materials.
  c) Write short notes on photodiodes. [4+3+3]

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