Code No: 121AD

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech I Year Examinations, August/September - 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)	State and explain about Bragg's law.	[2]
b)	Estimate packing fraction of simple cubic system.	[3]
c)	Discuss about the properties of matter waves.	[2]
d)	Define effective mass of an electron.	[3]
e)	State and explain about Bohr Magneton.	[2]
f)	Discuss about ferroelectricity.	[3]
g)	Explain the concept of population inversion.	[2]
h)	Compare step index and graded index fibers.	[3]
i)	Explain briefly quantum confinement.	[2]
j)	Discuss about diode equation.	[3]

PART-B

(50 Marks)

2.a) Find the expression for the inter planar spacing between two planes in an orthogonal system?
  b) Describe the structure of diamond and NaCl crystals.   [5+5]

OR

3.a) Explain power method of X-ray diffraction for the determination of crystal structure.
  b) Calculate the number of Frenkel defects per cubic meter in ZnO at 1000^0C. The energy for defect formation is 2.51ev, where as the density of ZnO is 5.55gm/cm^3 at 1000^0C.

[5+5]

4.a) Derive an expression for time independent Schrodinger's wave equation.
  b) Explain the physical significance of wave function.
  c) Write short notes on grand canonical ensemble.   [4+3+3]

OR

5.a) Explain the motion of an electron in a periodic potential using Kronig and Penney model.
  b) Discuss about the origin of energy bands formation in solids.   [5+5]

6.a) Derive expressions for electronic and ionic polarizations.
  b) Write short notes on Clausius-Mosottie equation.
  c) Explain the classification of magnetic materials.   [4+3+3]

OR

7.a) Discuss about the domain theory of ferromagnetism and explain hysteresis behavior of ferroelectric material using domain theory.
  b) List out the properties of ferro, antiferro and ferri magnetic materials.
  c) Write short notes on applications of superconductors. [4+3+3]

8.a) Explain principle, construction and working and write procedure to find out radius of curvature of plano-convex lens.
  b) Describe absorption, spontaneous emission and stimulated emission phenomena.
  c) Discuss about the attenuation in optical fibers. [4+3+3]

OR

9.a) Describe various parts in an optical fiber and draw a neat figure and identify the various parts.
  b) Derive an expression for the numerical aperture of an optical fiber.
  c) Explain application of optical fiber in communication system. [4+3+3]

10.a) Discuss about formation of a p-n junction and draw energy band diagram of p-n junction.
  b) What is Hall effect and obtain an expression for Hall coefficient.
  c) Write short notes on solar cell. [4+3+3]

OR

11.a) Explain the procedure to measure absorption coefficient of a material.
  b) Discuss about surface to volume ratio in nano-materials.
  c) Discuss in brief about the principle of TEM. [4+3+3]

---ooOoo---