R16

Code No: 132AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May/June - 2017
ENGINEERING PHYSICS – II
(Common to EEE, ECE, CSE, EIE, IT)

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) Calculate de-Broglie wavelength of 5 KeV neutron. Given mass of the neutron is 1.675×10^{-27} kg. [2]
b) Explain the significance of a wave function. [3]
c) Distinguish between intrinsic and extrinsic semiconductors. [2]
d) Explain the energy diagram of a p-n junction diode. [3]
e) Define the terms electric displacement vector and susceptibility. [2]
f) Explain the structure of $BiTiO_3$. [3]
g) A paramagnetic material has magnetic field intensity 2×10^4 A/m. If the Susceptibility of the material is 3.0×10^{-4}, calculate the flux density. [2]
h) What are the applications of superconductors? [3]
i) What is surface to volume ratio? [2]
j) Explain the working principle of TEM. [3]

PART-B

(50 Marks)

2.a) Derive an expression for Schrodinger's time independent wave equation.
b) Explain the origin of bands formation in solids. [5+5]

OR

3.a) Explain Kronig – penny model qualitatively.
b) Describe the theory of one dimensional particle in a box. [5+5]

4.a) Calculate the carrier concentration in an n-type of semiconductor.
b) Describe the I-V characteristics of a solar cell. [5+5]

OR

5.a) Describe the Fermi level in the context of intrinsic semiconductor and derive an expression for it.
b) Explain the formation of p-n junction. [5+5]

6.a) Derive the expressions for electronic polarizability in a dielectric.
b) Explain Piezo and Pyroelectricity in dielectrics. [5+5]

OR

7.a) Derive Classius – Mosotti relation in dielectrics.
b) Write a note on Ferroelectricity. [5+5]

8.a) Distinguish between para, ferro and Ferri magnetic materials.
b) Distinguish between soft and hard magnetic materials. [5+5]

OR

9.a) Describe Hysteresis curve on the basis of Domain theory.
b) What is superconductivity? Explain Meissner effect. [5+5]

10.a) Describe sol-gel method to synthesis nano materials.
b) How do you characterize nanomaterials by XRD? [5+5]

OR

11.a) Describe the Ball mill method to synthesize nano material.
b) What is nanoscale? Explain the quantum confinement at nanoscale. [5+5]

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