Code No: 132AA

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, August/September - 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)	Explain Heisenberg's uncertainty principle.	[2]
b)	Give significance of wave function.	[3]
c)	What is direct and indirect band gap semiconductors.	[2]
d)	Explain the I-V characteristics of PN junction diode.	[3]
e)	Define Electric susceptibility and polarizability.	[2]
f)	What is internal field? Give an expression for Clausius -Mosotti relation.	[3]
g)	Define Magnetic field induction and Magnetic susceptibility.	[2]
h)	Give differences between soft and hard magnets.	[3]
i)	What is Quantum confinement?	[2]
j)	Describe any three processes by which nanomaterials are facbricated.	[3]

PART-B
(50 Marks)

2.a) Explain de-Broglie hypothesis. Explain G.P. Thompson's experiment in support of this hypothesis.
b) Write the conclusion of Kronig-Penny model. Using this model show that the energy spectrum of an electron contains number of allowed states separated by forbidden bands. [5+5]

OR

3.a) Describe the Davisson and Germer's experiment and explain how it enabled the verification of wave nature of matter.
b) Derive time independent schrodinger's wave equation for a free particle. [5+5]

4.a) Calculate the carrier concentration in n-type semiconductor.
b) Explain the energy level diagram of a PN junction diode and the energy level diagram of biased PN junction. [5+5]

OR

5.a) Calculate the carrier concentration in intrinsic semiconductor.
b) Explain the diode equation. [5+5]

6.a) Derive a relation between electronic polarization and electric sucectibity of the dielectric medium.

b) Derive Clausius-Mosotti equation. [5+5]

OR

7.a) What is internal field? Describe Lorentz method to calculate the internal field of a cubic structure.

b) Explain briefly Pyroelectericity, Piezoelectricity and ferro-electricity. [5+5]

8.a) What is the origin of Magnetic moment? Define and derive an expression for Bohr Magnetron.

b) Explain superconductivity and give few properties of superconducting material. What is flux quantization and cooper pairs? [5+5]

OR

9.a) Explain Hysteresis curve based on domain theory.

b) What is Meissner Effect? Give few applications of superconductivity. [5+5]

10.a) What are nanomaterials. How are they classified?

b) Explain construction and working of SEM. [5+5]

OR

11.a) Explain CVD and Ball milling method for synthesis of nanomaterials.

b) Explain construction and working of TEM. [5+5]

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