Code No: 132AA

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, April - 2018
ENGINEERING PHYSICS – II
(Common to EEE, ECE, CSE, EIE, IT, ETM)

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)	Show that matter waves velocity is greater than the velocity of light.	[2]
b)	Explain Heisenberg uncertainty principle.	[3]
c)	Write any three applications of direct band gap semiconductors.	[2]
d)	Draw E-K diagram and explain briefly.	[3]
e)	Define Polarization in dielectric materials.	[2]
f)	Show that $P = \epsilon_0 E (\epsilon_r - 1)$.	[3]
g)	Show that $\mu_r = 1 + \chi$	[2]
h)	What is superconductivity	[3]
i)	What is nano scale?	[2]
j)	Explain how nanomaterials show size dependent properties.	[3]

PART-B

(50 Marks)

2.a) Derive an expression for energy of a particle in one dimensional potential box.
b) Explain classification of materials based on band theory of solids.   [6+4]

OR

3.a) Explain how de-Broglie's hypothesis supports the concept of the duality.
b) Describe Kronig-Penny model.   [4+6]

4.a) Determine the concentration of holes in the valance band of intrinsic semiconductors.
b) With neat diagram explain how Fermi energy level varies in n-type and p-type
semiconductors with respect to temperature.   [5+5]

OR

5.a) With neat diagram explain energy diagram of PN junction diode. Explain how energy
levels varies with respect to forward bias and reverse bias.
b) Distinguish between n-type and p-type semiconductors.   [5+5]

6.a) Derive an expression for ionic polarizability.
b) Describe ferro electricity of dielectric materials.   [5+5]

OR

7.a) Explain $BaTiO_3$ structure and behaviour with respect to temperature.
b) Derive an expression for Internal fileds in dielectric material.   [5+5]

8.a) Explain origin of magnetic moment in magnetic materials.
 b) What are the applications of superconductivity?   [5+5]

OR

9.a) Write a short note on properties of anti-ferro and ferri magnetic materials.
 b) Distinguish between dia, para, ferro magnetic materials.   [5+5]

10.a) Explain characterization of nanomaterials by using XRD.
  b) Discuss CVD method for the preparation of nanomaterials.   [4+6]

OR

11.a) Explain PVD method for the preparation of nanomaterials.
  b) With neat diagram explain Ball Mill method.   [5+5]

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