R16

Code No: 132AA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech I Year II Semester Examinations, February - 2025

ENGINEERING PHYSICS - II

(Common to EEE, ECE, CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	Write boundary conditions for particle in 1-D potential box.	[2]
b)	Draw E-K curve.	[3]
c)	Define Fermi level at OK.	[2]
d)	What are the applications of direct and indirect band gap semiconductors?	[3]
e)	Define electric susceptibility.	[2]
f)	Draw structure of $BaTiO_3$.	[3]
g)	What are the properties of anti-ferromagnetic materials?	[2]
h)	Explain origin of magnetic moment.	[3]
i)	What is Nano range?	[2]
j)	List out few applications of nanomaterials.	[3]

PART - B

(50 Marks)

2.a) What are matter waves? Show that velocities of matter waves are greater than velocity of light waves.
b) Describe Kronig-Penny model. [5+5]

OR

3.a) Derive Schrodinger time independent wave equation.
b) Write a note on origin of energy band formation in solids. [5+5]

4.a) Explain formation of PN junction.
b) Distinguish between intrinsic and extrinsic semiconductors. [5+5]

OR

5.a) Derive an expression for carrier concentration in conduction band of intrinsic semiconductor.
b) With neat diagram, explain Fermi level in intrinsic and extrinsic semiconductors. [5+5]

6.a) Derive an equation for Clausius-Mossotti relation.
b) What is Piezoelectricity? Explain its properties. [5+5]

OR

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

8.a) Derive an expression for Bohr magneton.

b) Discuss classification of dia, para and ferro magnetic materials on the basis of magnetic moment [5+5]

OR

9.a) Describe hysteresis curve based on domain theory of ferromagnetism.

b) Explain Meissner effect. [5+5]

10.a) Explain the term quantum confinement.

b) Distinguish between SEM and TEM. [5+5]

OR

11.a) Discuss fabrication nanomaterials using Sol-gel method.

b) With neat diagram, explain ball mill method. [5+5]

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