Code No: 121AD

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year Examinations, March/April - 2023
ENGINEERING PHYSICS
(Common to CE, EEE, ME, ECE, CSE, IT, AME, MIE, PTM)

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)	What is meant by crystal structure?	[2]
b)	Draw the following planes of cubic structure (112), (101), (200).	[3]
c)	What is the physical significance of wave function?	[2]
d)	What explains E- K curve?	[3]
e)	Define piezoelectricity and pyroelectricity.	[2]
f)	Explain the Permeability in magnetism.	[3]
g)	What are the characteristics of laser radiation?	[2]
h)	Mention the different types of losses in optical fiber.	[3]
i)	Mention the applications of Hall Effect.	[2]
j)	Why nonmaterial's exhibiting different properties?	[3]

PART - B

(50 Marks)

2.a) Derive an expression for the cohesive energy of an ionic crystal.
 b) Explain the Laue method of crystal structure analysis.   [5+5]

OR

3.a) Explain the formation of an ionic bond. Calculate the cohesive energy of Nacl molecule.
 b) Mention the different kinds of crystal imperfections.   [5+5]

4.a) Show that the energies of a particle in a potential box are quantized.
 b) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential.

[5+5]

OR

5.a) What are the matter waves? Explain in detail Thomson experiment to prove the existence of matter waves.
 b) Explain the origin of energy bands in solids.   [5+5]

6.a) Explain electronic polarization. Derive an expression for electronic polarizability.
 b) Explain in detail domain theory of ferromagnetism.   [5+5]

OR

7.a) Distinguish between piezo and ferroelectric effects.
  b) Explain how ferrites are superior to ferromagnetic materials. Discuss hard and soft magnetic materials. [4+6]

8.a) Discuss about the Newton rings experiment and deduce the equations for the diameters of dark and bright fringes.
  b) Sketch the ray propagation in different types of optical fibers. [6+4]

OR

9.a) Distinguish between the spontaneous and stimulated emission processes of light.
  b) With necessary energy level diagram, explain the working of a Ruby laser. [5+5]

10.a) Drive an expression for the density of holes in intrinsic semiconductors.
  b) Explain how the PN junction diode is formed and the rectifying action of PN diode. [5+5]

OR

11.a) Explain what are the factors are affecting the architectural acoustics, and mention the difficulties are overcome.
  b) Explain the chemical vapor deposition method to synthesis the nonmaterials. [5+5]

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