Hall Ticket No ☐☐☐☐☐☐☐☐☐☐

INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

B.TECH I SEMESTER CIE – I EXAMINATIONS, NOVEMBER – 2023
Regulation: BT23
APPLIED PHYSICS

Time: 2 Hours

(COMMON TO CSE | CSE(DS) | CSE(CS))

Max Marks: 20

Answer any FOUR questions
All parts of the question must be answered in one place only

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1. (a) Write a short note on lattice parameter. Determine an expression for lattice parameter based on density of the atom, volume of the unit cell. [BL: Understand| CO: 1|Marks: 2]

   (b) Copper has FCC structure and the atomic radius is 1.278 A^0. Calculate the density of copper crystal, given atomic weight of copper is 63.5. [BL: Apply| CO: 1|Marks: 3]

2. (a) Explain the terms coordination number, nearest neighbour distance, atomic radius and packing fraction. [BL: Understand| CO: 1|Marks: 2]

   (b) Potassium chloride is a FCC crystal having a density of 1980 Kg/m^3. If its molecular weight is 74.6, calculate

   i) Distance from one atom to the next atom of the same kind and

   ii) Distance between adjacent atoms. [BL: Apply| CO: 1|Marks: 3]

3. (a) Describe Davisson Germer experiment with a neat diagram and explain how it established the proof for wave nature of electrons. [BL: Understand| CO: 2|Marks: 2]

   (b) Determine the de Broglie wavelength associated with a proton moving with a velocity of 1/10 of velocity of light. (Mass of proton = 1.674×10^{-27} kg). [BL: Apply| CO: 2|Marks: 3]

4. (a) Discuss different phenomenon's that show the behavior of light radiation interacting with matter. [BL: Understand| CO: 2|Marks: 2]

   (b) Electrons are accelerated by 344 volts and are reflected from a crystal. The first reflection maximum occurs when the glancing angle is 60^0. Determine the spacing of the crystal. [BL: Apply| CO: 2|Marks: 3]

5. (a) Illustrate the characteristics of lasers, and highlight the phenomenon of lasing action required for the production of laser light. [BL: Understand| CO: 3|Marks: 2]

   (b) For a He-Ne laser at 1 m and 2 m distances from the laser the output beam spot diameters are 4 mm and 6 mm respectively, calculate the divergence. [BL: Apply| CO: 3|Marks: 3]

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