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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, September/October - 2021
ENGINEERING PHYSICS
(Common to CE, EEE, ME, ECE, CSE, IT, AE, AME, MIE, PTM)

Time: 3 Hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.a) Define basis, lattice parameters, unit cell.
  b) Describe seven crystal systems and their corresponding Bravias lattice.   [7+8]

2.a) Explain bonding in solids briefly.
  b) Derive an expression for cohesive energy of general solids.   [7+8]

3.a) Compare the properties of waves and particles.
  b) Derive an expression for energy of a particle in an infinite potential well.
  c) State and explain about Heisenberg's uncertainty principle.   [5+5+5]

4.a) Define Fermi level and derive an expression for Fermi energy.
  b) Compare Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac statistics.   [7+8]

5.a) Obtain expression for internal fields in the solids.
  b) Discuss about ferro-electricity in magnetic materials.
  c) The dielectric constant of helium gas at NTP is 1.0000684. Calculate the electronic polarisability of helium atoms if the gas contains 2.7×10^{25} atoms/m^3.   [4+4+7]

6.a) Define the terms permeability, magnetic moment and magnetic field induction.
  b) Explain origin of magnetic moment and based on magnetic moment explain the classification of magnetic materials.
  c) Compare and contrast soft and hard magnetic materials.   [4+7+4]

7.a) Explain superposition of waves.
  b) Compare and contrast Fressnel and Fraunhofer diffractions.
  c) Derive an expression for interference in thin films by reflection.   [4+4+7]

8.a) Obtain an expression of Sabine's formula for reverberation time.
  b) Define phenomena of reverberation and reverberation time.
  c) A hall has a volume of 2500 m^3 Its total absorption is equivalent to 100 m^2 of open windows. If the hall is filled with audience who add another 80 m^2 of open window, then what is the effect on the reverberation time?   [4+4+7]

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