JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, July - 2021
ENGINEERING PHYSICS
(Common to CE, EEE, ME, ECE, CSE, IT, ETM, MMT, 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) Explain the formation of an ionic bond. Calculate the cohesive energy of NaCl molecule.
 b) Mention the different kinds of crystal imperfections.   [7+8]

2.a) What is the packing fraction? Calculate the packing fraction of SC, FCC and BCC lattices.
 b) Explain Bragg's law for X-ray diffraction? Explain Laue method of crystal structure analysis.   [7+8]

3.a) Explain the concept of dual nature of light? Describe Davison and Germer experiment to verify the dual nature of matter.
 b) Derive an expression for density of available electron states between E & E+dE.   [7+8]

4.a) What are the matter waves? Explain in detail G.P. Thomson experiment to prove the existence of matter waves.
 b) Explain the origin of energy bands in solids?   [7+8]

5.a) Define the terms of dipole moment and dielectric constant. Derive Classius-Mossotti relation in dielectrics?
 b) Explain the phenomenon of superconductivity and Meissner effect.   [7+8]

6.a) Distinguish between piezo and ferroelectric effects.
 b) Explain how ferrites are superior to ferromagnetic materials? Discuss hard and soft magnetic materials?   [7+8]

7.a) Distinguish in detail Fraunhoffer diffraction due to a single slit.
 b) Describe the construction and working of Ruby laser?   [7+8]

8.a) What is Hall effect? Explain. What are the uses of Hall Effect?
 b) What is top down approach and explain physical vapor deposition for synthesis of nanomaterials.   [7+8]

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