Code No: 51004 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year Examinations, May - 2018
ENGINEERING PHYSICS
(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MCT, AE, BT, AME, MIE, PTM, AGE)

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

Answer any five questions
All questions carry equal marks
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1.a) Describe the seven crystal with diagrams.
b) What is packing fraction? Show that FCC is most closely packed of the three cubic structures by working out the packing factors. [7+8]

2.a) Distinguish between Frenkel and Schottky defects.
b) Explain the powder X-ray diffraction method used for the analysis of crystal structures. [7+8]

3.a) Derive an expression for the de-Broglie wavelength of an electron.
b) Derive time independent Schrödinger's wave equation for a free particle. [7+8]

4.a) Discuss the salient features of Kronig-Penny model of a crystal.
b) Explain the concept of effective mass of an electron. [7+8]

5.a) Derive an expression for the carrier concentration in n-type semiconductors.
b) Explain the working principle of PN junction Diode and I-V Characteristics of PN Junction. [7+8]

6.a) Obtain an expression for paramagnetic susceptibility (χ). How does the Paramagnetic susceptibility of a material vary with temperature?
b) Describe hysteresis loop. How is it used to classify the magnets? [7+8]

7.a) Describe with suitable diagram, principle and working of He-Ne laser system.
b) Define acceptance angle of fiber and numerical aperture of the fiber. Derive expression for them? [7+8]

8.a) Define and explain the sound absorption coefficient of materials.
b) Derive Sabine's mathematical relation for reverberation time. [7+8]

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