R09

Code No: 51004

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech I Year Examinations, December-2014/January-2015
ENGINEERING PHYSICS
(Common to all Branches)

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

Answer any five questions
All questions carry equal marks

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1.a) Define cohesive energy of a solid and calculate cohesive energy of an ionic crystal.
b) Define unit cell, space lattice, lattice parameters and basis.
c) Discuss about diamond structures.

2.a) Explain basic principle of X-ray diffraction and derive Bragg's law.
b) Discuss about the working of powder diffraction method of X-ray diffraction.
c) Write the applications of X-ray diffraction.

3.a) Discuss about various features of M-B, B-E and F-D statistics.
b) Explain characteristic properties of photon gas and electron gas.

4.a) Discuss about the motion of an electron in a periodic potential and also explain how Kronig and Penney model is helpful in classification of materials.
b) Define and derive an expression for effective mass of an electron.

5.a) Discuss about intrinsic and extrinsic semiconductors.
b) Obtain an expression for the carrier concentration in n-type semiconductor and also find the position of Fermi level in n-type semiconductor.

6.a) Define electric dipole, dipole moment, displacement vector and electric susceptibility.
b) Estimate internal fields in a dielectric material.

7.a) Explain the phenomena of absorption, spontaneous emission and stimulated emission.
b) Establish relation between Einstein coefficients.
c) Discuss about the applications of lasers.

8.a) Explain about the architectural acoustics and its significance.
b) Discuss about the factors affecting architectural acoustics and suggest the remedies to overcome those problems.

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