R09

Code No: 51004

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year Examinations, June - 2015

ENGINEERING PHYSICS

(Common to CE, EEE, ME, ECE, CSE, CHEM, EIE, BME, IT, MCT, ETM, MMT, ECM, AE, BT, AME, MIE, PTE, MSNT, AGE)

Time: 3 hours Max. Marks: 75

Answer any five questions

All questions carry equal marks

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1.a) Explain the bonding in diamond. In what way covalent bonding is different than ionic bonding?

b) What are Bravais lattices? Describe them in combination with crystal systems. [7+8]

2.a) Describe the powder method of X-ray diffraction.

b) Derive an expression for the frenkel defect concentration in ionic crystals.

c) Explain about the edge and screw dislocations in crystals. [5+5+5]

3.a) Distinguish the MB statistics, BE statistics and FD statistical distribution functions.

b) Give at least one illustration of Heisenberg's uncertainty principle.

c) Determine the wavelength associated with an electron having kinetic energy equal to 1Kev. [5+5+5]

4.a) Describe about the Bloch theorem.

b) Show that the Kronig-Penny model leads to energy band structure in solids. [7+8]

5.a) Derive an expression for the carrier concentration in n-type of semiconductor.

b) Draw and explain the energy band diagram for a p-n junction diode in an unbiased condition.

c) Write a short note on LEDs. [6+6+3]

6 a) What is electronic polarization? Derive an expression for the electronic polarizability in dielectric materials?

b) Explain the magnetization curve for a ferromagnetic material on the basis of domains.

c) The atomic weight of gadolinium is 157.25. Its density is 7.8×10^3 Kg/m^3. It is ferromagnetic below 17^0C. What is its saturation magnetization? [6+5+4]

7.a) Obtain the expression for occupation index in terms of Einstein's coefficients.

b) A particle hypothetical atom has two atomic levels spaced by 3 eV in energy. Calculate the ratio of in higher energy and lower energy.

c) Explain numerical aperture and derive an expression for it. [5+6+4]

8.a) What are the basic requirement of a acoustically good hall?

b) A cinema hall has a volume of 7500 m^3. It is required to have reverberation time of 1.5 seconds. What should be the total absorption in the hall?

c) Explain about the pulsed vapor deposition method in nano materials. [5+6+4]

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