Exam.Code:0906
Sub. Code: 6666

2031

B.E. (Mechanical), Second Semester

APH-207/107: Physics of Materials

(Common with ECE, IT and EEE)

Time allowed: 3 Hours Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt any five of the following:-

a) Differentiate between primitive and non-primitive lattice.

b) What information can you derive from x-ray diffraction studies in crystals?

c) What do you understand by impurity hardening of a material?

d) How is the behaviour of elastomers understood?

e) How is the strength of metal improves by grain size reduction.

f) What information does the binary phase diagram provides.

g) What are different ionic defects observed in a crystal? (5x2)

UNIT - I

II. a) Consider the binary isomorphous solution of Copper and Nickel, draw its phase diagram and derive essential features from it. Discuss various microstructures developed during its non-equilibrium cooling.

b) What are Home Rothary rules? (7,3)

III. a) What do you understand by symmetry in crystals? Discuss various symmetries observed in crystals.

b) Metallic iron changes from BCC to FCC at 910°C. The atomic radii in two structures are 1.25A and 1.30A respectively. Calculate the volume change during structural change. (6,4)

IV. a) What are visco-elasticity materials? Discuss elastic properties of these materials in light of spring dashpot model.

b) Give brief account of various mechanisms of diffusion. (6,4)

P.T.O.

UNIT - II

V. a) Why do you require strengthening of metals subsequent to plastic deformations? How is metal strengthened using impurity hardening method?

b) A single crystal is subjected to stress in region of its plasticity. How does it deform under the imposed stress. Discuss what happens to polycrystalline specimen in this situation. (6,4)

VI. a) What do you understand by the term fracture? What are various possible causes of fractures? Discuss the principle and mechanism of brittle fracture. Also list observable fingerprints of this process.

b) Write a short note on SN cycle. (6,4)

VII. Consider the binary isomorphous solution of Copper and Nickel, draw its phase diagram and derive essential features from it. Discuss various microstructures developed during its non-equilibrium cooling. (10)

x-x-x