

II B.Tech II Semester Supplementary Examinations, April/May 2005
MATERIAL SCIENCE FOR CHEMICAL ENGINEERING
(Chemical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Determine the indices of all six vertical faces of the hexagonal unit cell.
(b) Show the directions having the indices $[1\ 1\ 2]$, $[1\ 0\ \bar{1}]$, and $[1\ 1\ \bar{1}]$ in relation to a cubic unit cell.
2. (a) How would you explain that H_2O is a liquid while H_2S is a gas at ordinary temperature, although the molecular weight of H_2O is lower than that of H_2S .
(b) In what respect the van der Waals bonds resemble the metallic bonds?
3. (a) Draw a Burgers circuit around a dislocation of symbol T and determine its Burgers vector.
(b) The concentration of carbon in an iron-carbon alloy is 0.15 wt%. What is the concentration in Kg. Of carbon per cubic meter of alloy?
4. Discuss the applications of phase rule in the study of binary systems forming compounds with congruent melting-point.
5. (a) What is Hall-Petch equation? What is its importance?
(b) The yield strength of a polycrystalline material increases from 120 MNm^{-2} to 220 MNm^{-2} , on decreasing the grain diameter from 0.04 to 0.01mm. Find the yield stress for a grain size of ASTM 9?
6. Write short notes on the following:
 - (a) Protective Coatings
 - (b) Cathodic Protection
 - (c) Inhibition
 - (d) Avoidance of Galvanic Couples
7. Explain the energy gap theory in solids. What is forbidden gap, Explain.
8. What are the characteristics of ferroelectric? Name some important ferroelectric materials.
