

II B.Tech II Semester Supplementary Examinations, April/May 2005
MATERIAL TECHNOLOGY
(Chemical Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Describe briefly about surface imperfections.
(b) The surface of a copper crystal is of (111) type. Calculate the surface energy (enthalpy) of copper.
2. (a) Explain Gibbs phase rule.
(b) The H_2O - NaCl system has the following eutectic reaction occurring at $-21^\circ C$
$$L \xrightleftharpoons{\text{cool}} \text{Ice} + \text{salt}$$

23.3%0%100% NaCl

How much pure water can be extracted from sea water (3.5% NaCl) by cooling to $-20.9^\circ C$?
3. (a) Explain the Rubber-like elasticity of materials.
(b) Describe the phenomena of elastic deformation.
4. Explain thermosetting plastics and thermoplastics with suitable examples.
5. Explain the principles of corrosion with reference to electrode potential and galvanic cells.
6. (a) Briefly explain iron-iron carbide phase diagram.
(b) How much pro-eutectoid ferrite is there in a slowly cooled 0.6% steel? How much eutectoid ferrite is there in the same steel.
7. (a) How do fatigue fractures occur in materials?
(b) Explain the fatigue behavior of a material with the help of S-N curves.
8. Write short notes on any THREE of the following:
 - (a) Microstructure
 - (b) X-ray diffraction
 - (c) Ionic bonding
 - (d) Point imperfection
