

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Odd Mid Semester Examination for Academic Session 2024-25

COURSE NAME: B. Tech.

SEMESTER: 3rd

BRANCH NAME: Production Engg.

SUBJECT NAME: Materials Engineering & Metallurgy

FULL MARKS: 30

TIME: 90 Minutes

Answer All Questions.

The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

- Q1. Answer all Questions. [2 × 3]
- a) Classify crystal imperfections on the basis of their geometry. - CO1
 - b) Explain recovery, recrystallization and grain growth. - CO2
 - c) What is eutectic reaction? How it can be advantageous for Pb-Sn alloy system? - CO3
- Q2. [8]
- Explain various defects in solids with molecular diagrams. Differentiate Frenkel defect and Schottky defect. - CO1
- OR
- What is nucleation? How the critical radius is determined in case of homogeneous nucleation? - CO1
- Q3. [8]
- What information does a phase diagram provide? Explain various terminologies associated with the phase diagram. Explain the experimental methods to obtain phase diagrams. - CO2
- OR
- With example, explain how the Lever rule is applied to calculate the fraction of the solid and liquid phase present in the multiphase region. - CO2
- A 90 wt% Ag-10 wt% Cu alloy is heated to a temperature within the β + liquid phase region. If the composition of the liquid phase is 85 wt% Ag and the composition of the β phase is 95 wt% Ag. Determine the mass fractions of both phases.
- Q4. [8]
- Draw Fe-Fe₃C phase diagram. Explain various phase reactions. Also describe characteristics of different phases appeared in Fe-Fe₃C phase diagram. - CO3
- OR
- Write short notes on: - CO3
- (i) Allotropic Transformations
 - (ii) Order-disorder Transformations