

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

COURSE NAME: BTECH

SEMESTER: 3<sup>rd</sup>

BRANCH NAME: Mechanical Engg

SUBJECT NAME: Engineering Materials and Metallurgy (EM&M)

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) What are the Miller indices of a plane that intersects the X axis at 2 and Y axis at 1/2 and is parallel to the Z axis of a cubic structure. - CO1
  - b) Distinguish between crystalline and amorphous solids. - CO2
  - c) What is solid solution and Gibb's phase rule? - CO3
- Q2. [8]
- (a) Define Berger's vector and show schematically for edge and screw dislocation. - CO1
  - (b) Differentiate between: Grain boundary and Twin boundary
- OR
- (a) Distinguish between slip and twinning as modes of plastic deformation of metals. - CO1
  - (b) Differentiate between: interstitial defect and substitutional defect
- Q3. [8]
- Classify and explain engineering materials. - CO2
- OR
- (a) Differentiate between thermoplastic and thermosetting polymer. - CO2
  - (b) Differentiate between steels and Cast Iron.
- Q4. [8]
- Explain Hume Rothary rules as applied to the formation of solid solution. - CO3
- OR
- Differentiate clearly between substitutional solid solution & interstitial solid solution - CO3

----- Best of Luck -----