

GUJARAT TECHNOLOGICAL UNIVERSITY

B.VOC- SEMESTER-II EXAMINATION – SUMMER 2025

Subject Code:21120304

Date:28-05-2025

Subject Name: Material Science and Metallurgy

Time:10:30 AM TO 12:30 PM

Total Marks:50

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		Marks
Q.1	(a) List and define any five properties of metals.	05
	(b) Give classification of Engineering Material.	05
Q.2	(a) Define solid solution and explain types of solid solution in brief.	05
	(b) Explain homogeneous and heterogeneous nucleation process with neat sketch.	05
OR		
	(b) Write a Hume-Rothery rules for Substitutional Solid solution formation.	05
Q.3	(a) Draw iron- carbon diagram and mention all major elements.	05
	(b) What are the effect of alloying various elements, viz., Cr, Ni, Co, V, W in steels?	05
OR		
Q.3	(a) Write short note on Gray Cast Iron.	05
	(b) Write short note on Heat Resisting alloy Steels.	05
Q.4	(a) Explain with a neat sketch Time-Temperature-Transformation (TTT) diagram for a eutectoid composition steel.	05
	(b) Discuss mechanisms of quenching of steel. State the advantages and drawbacks of water & oil as quenching media.	05
OR		
Q.4	(a) Explain briefly Full Annealing process.	05
	(b) Define hardenability and list three factors affecting it	05
Q.5	(a) Explain the NDT method widely used for inspection of castings.	05
	(b) List the characteristics required in dye material for dye penetration testing.	05
OR		
Q.5	(a) Describe Ultrasonic Testing Method and also mention its advantages and Limitations.	05
	(b) Explain in detail Magnetic particle testing method along with its advantages, disadvantages.	05
