Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BVOC- SEMESTER– II EXAMINATION – SUMMER 2023

Subject Code:21120304 Date:21-07-2023

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)**	Define following properties of metals: (a) Hardness, (b) Toughness (c) Fatigue (d) Creep (e) Hardenability	**05**
	(b)	Do the detailed classification of Engineering Material.	**05**
Q.2	**(a)**	Describe the conditions that govern formation of solid solution.	**05**
	(b)	What is the difference between Hot working and Cold working?	**05**
		OR	
	(b)	Explain homogeneous and heterogeneous nucleation process with neat sketch.	**05**
Q.3	**(a)**	Differentiate between Austenite and Ferrite.	**05**
	(b)	What are the effects of alloying chromium, nickel, molybdenum, Tungsten and carbon in steels?	**05**
		OR	
Q.3	**(a)**	Draw iron- carbon diagram and mention all major elements.	**05**
	(b)	Write short note on Heat Resisting alloy Steels.	**05**
Q.4	**(a)**	Explain the NDT method widely used for inspection of castings.	**05**
	(b)	Explain magnetic particle testing (MPT) method with neat sketch. Also explain its benefits and limitations.	**05**
		OR	
Q.4	**(a)**	Describe Ultrasonic Testing Method and also mention its advantages and limitations.	**05**
	(b)	List the characteristics required in dye material for dye penetration testing.	**05**
Q.5	**(a)**	Describe effect of quenching media on properties of steel during heat treatment.	**05**
	(b)	Draw Jominy hardenability set-up including labeling & important dimensions.	**05**
		OR	
Q.5	**(a)**	Explain briefly Full Annealing process.	**05**
	(b)	Explain with a neat sketch Time-Temperature-Transformation (TTT) diagram for a eutectoid composition steel.	**05**

****