Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI(NEW) EXAMINATION – WINTER 2022

Subject Code:3162115 Date:15-12-2022

Subject Name:Advanced Materials

Time:02:30 PM TO 05:00 PM Total Marks:70

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)**	How to prevent drop in the corrosion resistance in Austenitic stainless steels?	**03**
	(b)	Explain which properties of spring steels are critical? Give a typical composition of spring steel.	**04**
	(c)	State important characteristics of High speed steels. Give composition of one Tungsten base & one Molybdenum based High speed steel.	**07**
Q.2	**(a)**	Why stainless steels have good corrosion resistance?	**03**
	(b)	What is a TRIP steel? Explain the structure of these steels.	**04**
	(c)	Explain in detail about Heat resistance cast irons with its properties and applications.	**07**
		OR	
	(c)	What are Ni -hard cast Iron. Enlist properties and applications of it .	**07**
Q.3	**(a)**	Explain phenomenon of secondary hardening in H.S.S.	**03**
	(b)	Describe properties and applications of Ti & its alloys.	**04**
	(c)	Give typical composition and applications of following super alloys like INCONEL, DS-NICKE.	**07**
		OR	
Q.3	**(a)**	Enlist properties and applications of Mg alloys.	**03**
	(b)	Explain Hadfield Mn steel with its composition and properties .	**04**
	(c)	Explain different mechanisms by which high strength and creep resistance are achieved by super alloys.	**07**
Q.4	**(a)**	Discuss briefly STELLITE-6B super alloy.	**03**
	(b)	Explain Glass transition temperature in Metallic glasses.	**04**
	(c)	Write short note on dispersion strengthened nano composites.	**07**
		OR	
Q.4	**(a)**	What are the quality requirements for Bio materials for use in human body parts?	**03**
	(b)	How do you manufacture Carbon Nano Tube?	**04**
	(c)	What is Smart Material? Why does piezo electric is called a smart Material?	**07**
Q.5	**(a)**	Enlist different bearing materials use in Engineering applications with their properties.	**03**
	(b)	List out different types of stainless steel(SS). Draw microstructure of all types SS.	**04**

	(c)	Discuss briefly techniques for Production of metallic glasses.	**07**

OR

Q.5	**(a)**	Discuss any one Aerospace materials with its composition, properties and applications.	**03**
	(b)	Write note on Cryogenic materials.	**04**
	(c)	Compare Semi conducting and Superconducting materials with its composition, properties and applications.	**07**

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