Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3162115 Date:20-05-2024

Subject Name:Advanced Materials

Time:10:30 AM TO 01:00 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)**	"Stainless steels have good corrosion resistance "Justify .	**03**
	(b)	Discuss Dual phase steel with composition, Properties, microstructure and Application.	**04**
	(c)	Enlist properties and applications of Austenitic stainless steel. How Inter Granular corrosion is harmful for stainless steel? List preventions methods.	**07**
Q.2	**(a)**	Discuss maraging steel.	**03**
	(b)	State important characteristics of High speed steels. Give composition of one Tungsten base & one Molybdenum based High speed steel.	**04**
	(c)	List out different types of Super alloys with its properties and application	**07**
		OR	
	(c)	Discuss and classify Titanium and its alloys including their properties and applications.	**07**
Q.3	**(a)**	How to prevent drop in the corrosion resistance in austenitic stainless steels?	**03**
	(b)	Write note about TRIP steel including its types, properties and applications.	**04**
	(c)	Which are Ni -hard and Heat resistance cast irons ? Explain each one in detail.	**07**
		OR	
Q.3	**(a)**	Define Nano Technology and Nano materials.	**03**
	(b)	Explain Hastelloy with suitable examples.	**04**
	(c)	Which elements in steel improve wear resistance? Explain Hadfeild Mn steel in detail.	**07**
Q.4	**(a)**	Explain the Heat treatment cycle for 18-4-1 tool steel.	**03**
	(b)	What is SOL-GEL p/c for nano crystal particle synthesis?	**04**
	(c)	Give detail classification of Aluminum alloys. Write composition, properties and applications of any Al-Li alloy.	**07**
		OR	
Q.4	**(a)**	Define and explain biocompatibility.	**03**
	(b)	Discuss the properties of cryogenic materials.	**04**
	(c)	Write note on carbon nanotubes.	**07**
Q.5	**(a)**	What is Smart Material? List out their advantages.	**03**
	(b)	What are the quality requirements for Bio materials for use in human body parts?	**04**
	(c)	Give detail Classification of composites. Discuss properties & applications of Ceramic matrix composites.	**07**

OR

Q.5	**(a)**	Discuss properties of semi conducting materials.	**03**
	(b)	List out property and applications of shape memory alloy	**04**
	(c)	Discuss in detail properties of metallic glasses with their crystalline counter parts.	**07**