Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3162115 Date:06/06/2022

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)**	Classify Stainless steel. Why stainless steels have good corrosion resistance?	**03**
	(b)	Mention the properties and applications of duplex stainless steels.	**04**
	(c)	Describe properties and applications of Austenitic stainless steel. Give the composition of 304 and 304L Grades.	**07**
Q.2	**(a)**	Describe important characteristics & applications of free cutting steel.	**03**
	(b)	Explain which properties of spring steels are critical.	**04**
	(c)	What is a TRIP steel? Explain the structure and properties of these steels.	**07**
		OR	
	(c)	Mention the properties and applications of Dual phase steels.	**07**
Q.3	**(a)**	Describe the properties of Hastelloy.	**03**
	(b)	Differentiate between M-type and T-type high speed tool steel.	**04**
	(c)	What is alloy cast Iron? Give the composition, properties and applications of High silicon cast iron.	**07**
		OR	
Q.3	**(a)**	Compare metallic glasses with crystalline alloys.	**03**
	(b)	Discuss important characteristics and applications of High speed steel.	**04**
	(c)	Describe the metallurgical aspects of magnesium and its alloys including their properties and applications.	**07**
Q.4	**(a)**	Describe the requirements of aero-space materials.	**03**
	(b)	Describe the Properties required by biomaterials.	**04**
	(c)	Explain Strengthening mechanism in Nickel based super alloys.	**07**
		OR	
Q.4	**(a)**	What are Nano materials? Give applications of Nano materials.	**03**
	(b)	Write note on Glass transition temperature.	**04**
	(c)	Discuss the copper mold casting technique to produce the metallic glasses. List applications of metallic glasses.	**07**
Q.5	**(a)**	Enlist applications of cryogenic materials.	**03**
	(b)	Discuss the working of Piezoelectric materials.	**04**
	(c)	Describe manufacturing of Nano Carbon Tube.	**07**
		OR	
Q.5	**(a)**	Describe properties of superconductors.	**03**
	(b)	Discuss properties & applications of metal matrix composites.	**04**
	(c)	What is Smart Material? Write a note on shape memory alloys.	**07**

****