Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER– VI EXAMINATION – SUMMER 2026

Subject Code:3162115 Date:26-05-2026

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)**	Mention the properties of Ferritic stainless steel.	**03**
	(b)	Define Nano technology. Give applications of Nano materials.	**04**
	(c)	Describe the properties and applications of Austenitic stainless steel. Give the composition of 316 and 347 stainless steel.	**07**
Q.2	**(a)**	Write a short note on Hadfield steels.	**03**
	(b)	Mention the properties of Dual phase steels.	**04**
	(c)	Describe important characteristics & applications of free cutting steel. Why it contain high sulphur content?	**07**
		OR	
	(c)	Give the properties and applications of High speed steels. Differentiate in M-type and T-type high speed tool steel.	**07**
Q.3	**(a)**	What is alloy cast Iron? Discuss the need of alloying in cast Iron.	**03**
	(b)	Give the properties and applications of High silicon cast iron.	**04**
	(c)	Describe the properties and applications of Titanium and its alloys.	**07**
		OR	
Q.3	**(a)**	Give the applications of Co-based superalloys.	**03**
	(b)	Give the properties and applications of Inconel.	**04**
	(c)	Describe the classification and properties of Fe-based superalloys.	**07**
Q.4	**(a)**	Discuss the properties required by biomaterials.	**03**
	(b)	Write a short note on carbon nanotubes.	**04**
	(c)	Define Piezoelectricity. Discuss the working of Piezoelectric materials in detail.	**07**
		OR	
Q.4	**(a)**	What are smart materials? Give their advantages.	**03**
	(b)	Write a short note on shape memory alloys.	**04**
	(c)	Explain the sol-gel technique for nano-material production.	**07**
Q.5	**(a)**	Mention applications of metallic glasses.	**03**
	(b)	Define metallic glasses. Describe the properties.	**04**
	(c)	Classify the composites. Discuss properties & applications of ceramic matrix composites.	**07**
		OR	
Q.5	**(a)**	Compare metallic glasses with crystalline alloys.	**03**
	(b)	Explain piston and anvil technique to produce the metallic glasses.	**04**
	(c)	Describe the requirements of aero-space materials. Mention few suitable materials.	**07**

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