

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2023****Subject Code:3172119****Date:19-12-2023****Subject Name: Alloy Steel****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 the steel.	03
	(b) Explain the purpose of adding alloying elements to steel, while emphasizing on the limitation of plain C steels?	04
	(c) Based on the carbon content, divide the plain carbon steel. Discuss the application, advantages and limitations of plain carbon steel.	07
Q.2	(a) What is the ripple effect or orange-peel effect in low C steel?	03
	(b) What are the elements are needed to make free cutting steel? How it is important over other steels?	04
	(c) Discuss the carbon content and inherent impurities of steel and their effect on the properties of steel.	07
	OR	
	(c) Write a short note on manganese steel.	07
Q.3	(a) What is the role of boron in the low alloy steel?	03
	(b) Explain the ultra-high strength steel.	04
	(c) What do you mean by alloy steel? Categorize the alloy steel. Give the general designation by AISI-SAE steels.	07
	OR	
Q.3	(a) What are the grades of maraging steel based on the principal alloying element?	03
	(b) Compare and contrast, ausforming and austempering.	04
	(c) Discuss the typical compositions, TTT/CCT curves and strengthening mechanism of ausforming steel.	07
Q.4	(a) What is the full form of HSLA? How the strengthening to be achieved in it?	03
	(b) Briefly explain the hadfield manganese steel.	04
	(c) What is the purpose of maraging process? Discuss effects of alloying elements on maraging steel.	07
	OR	
Q.4	(a) What are the stabilizers are used in the stabilized grade of stainless steel? What is the purpose of it?	03
	(b) Designate the stainless steel based on phases and alloying elements present.	04
	(c) Describe how a dual phase steel can be obtained? Give typical compositions, properties, and application of it.	07
Q.5	(a) Classify the tool steels.	03
	(b) Designate the tool steels.	04
	(c) Highlight the issue related to the microstructure in stainless steel. Discuss anyone issue in detail.	07

OR

