Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016

Subject Code:2133403 Date:04/01/2017

Subject Name:Engineering Materials and Metallurgy

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	The stiffness is the ability of a material to resist deformation under the stress. True or False?	
	2	The ability of a material to resist fracture due to high impact loads is called _____.	
	3	The property of material which enables it to retain the deformation permanently is called _____.	
	4	The malleability is the property of a material due to which it can be rolled or hammered into thin sheets. Agree or disagree?	
	5	Cast iron is a ductile material. Right or wrong?	
	6	The percentage of carbon in cast iron varies from ___ to ____.	
	7	Hardness of steel is increased by adding sulphur, lead and phosphorus. Yes or No?	
	8	The hardness and tensile strength in austenitic stainless steel can be increased by _____.	
	9	_____ is not equilibrium heat treatment. (Annealing or Precipitation.)	
	10	The slowest cooling rate is obtained when steel is quenched in _____.	
	11	The fastest cooling rate is achieved when steel is quenched in _____.	
	12	Hardenability of steel is assessed by _____ test.	
	13	Annealing consists of heating a metal to a suitable temperature, holding at that temperature for a certain time, and then slowly cooling: True or False?	
	14	Hardenability refers to the relative capacity of steel to be hardened by transformation to martensite: True or False?	
Q.2	**(a)**	Write any six non-ferrous mates / alloys.	**03**
	(b)	Brief the properties and uses of Copper.	**04**
	(c)	Explain briefly the Iron- carbon equilibrium diagram with a neat sketch.	**07**
		OR	
	(c)	Write the procedure to measure the Steel hardness by using Jominy end quench test with neat sketch.	**07**
Q.3	**(a)**	Write the types of Magnesium and its alloys.	**03**
	(b)	Write the properties, characteristics of Magnesium and its	**04**

		alloys.	
	(c)	Write the advantages of Bio – Degradable Plastics with suitable example.	**07**
		OR	
Q.3	**(a)**	Write the uses of Nickel and its alloys.	**03**
	(b)	Write the properties, characteristics of Nickel and its alloys.	**04**
	(c)	Write the Case hardening - Nitriding process.	**07**
Q.4	**(a)**	Define the term: Elasticity.	**03**
	(b)	Define the following term: Viscoelasticity and Plastic deformation.	**04**
	(c)	Write the Gibb's phase rule. Explain the T.T.T. Diagram.	**07**
		OR	
Q.4	**(a)**	Distinguish between Thermo Plastics & Thermosetting Plastics.	**03**
	(b)	Write any eight purpose of Alloying.	**04**
	(c)	How to conduct Creep Testing? Explain with neat sketch.	**07**
Q.5	**(a)**	Explain the crystal imperfection.	**03**
	(b)	Discuss about the types of Plastics.	**04**
	(c)	Explain the procedure to conduct the Impact Testing Method with sketch.	**07**
		OR	
Q.5	**(a)**	Discuss about the types of Thermosetting Plastics.	**03**
	(b)	Discuss about the properties and applications of Plastics.	**04**
	(c)	Explain crystal imperfection and discuss the strengthening mechanisms and modulus of elasticity with a neat sketch.	**07**

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