Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:130904 **Date:10/01/2017**

Subject Name:Electrical Machines-1

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.**

Q.1	**(a)**	Draw iron carbon equilibrium diagram and label all the phases. Explain any two reactions.	**07**
	(b)	Define following i) Tensile strength ii) Ductility iii) Toughness iv) Hardness v) Creep vi) Fatigue vii) Malleability	**07**
Q.2	**(a)**	Explain the Spark Test and Magnetic test for metallic materials.	**07**
	(b)	Differentiate between i) Induction hardening and Flame hardening ii) Annealing and Normalising.	**07**
		OR	
	(b)	What are the objectives of tempering? Discuss briefly the tempering process.	**07**
Q.3	**(a)**	Explain Hume Rothary's rules as applied to the formation of solid solutions.	**07**
	(b)	Discuss the effects of alloying elements on the properties of steel.	**07**
		OR	
Q.3	**(a)**	What is solid solution? Differentiate between substitutional and interstitial solid solution with example.	**07**
	(b)	State the composition, properties and applications of white cast iron.	**07**
Q.4	**(a)**	Discuss types of corrosion. Explain galvanic corrosion.	**07**
	(b)	Define the term 'non ferrous alloy'. State the composition, properties and application of muntz metal.	**07**
		OR	
Q.4	**(a)**	Define the term 'corrosion of metal'. Discuss different methods of preventing corrosion of metals.	**07**
	(b)	Discuss the properties and applications of magnesium alloys.	**07**
Q.5	**(a)**	Discuss the advantages and limitations of powder metallurgy process.	**07**
	(b)	Describe suitable non destructive testing which may be used to detect flaws on, or close to, the surface of a metal component.	**07**
		OR	
Q.5	**(a)**	Discuss three methods by which powders suitable for powder metallurgy can be produced.	**07**
	(b)	Describe suitable non destructive testing which may be used to detect internal flaws in cast engineering ferrous component.	**07**

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