Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–III • EXAMINATION – SUMMER • 2014

Subject Code: X 31902 **Date: 20-06-2014**

Subject Name: Material Science and Metallurgy

Time: 02:30 pm – 05:00 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)**	Explain any two methods for production of metal powders	**07**
	(b)	(1)Which are the objectives of heat treatment? (2)Give difference between annealing and normalizing.	**07**
Q.2	**(a)**	Explain ultrasonic testing with advantages and limitations.	**07**
	(b)	Which are various surface hardening processes? Explain Induction hardening process with sketch.	**07**
		OR	
	(b)	Explain selection criteria for engineering materials.	**07**
Q.3	**(a)**	(1) Give difference between metals and non metals. (2)Define ;(I) Creep (ii) Malleability(iii) Hardness	**07**
	(b)	List the properties of wrought iron and applications of wrought iron and limitations of wrought iron	**07**
		OR	
Q.3	**(a)**	Give composition properties and uses of malleable cast iron.	**07**
	(b)	Which are advantages and limitations of powder metallurgy?	**07**
Q.4	**(a)**	Draw neat sketch of metallurgical microscope. Explain its construction	**07**
	(b)	What is solid solution? Explain types of solid solution. Also give Hume Rothay's rules.	**07**
		OR	
Q.4	**(a)**	What are the purpose of alloying? Give effects of nickel as an alloying elements.	**07**
	(b)	Give composition and uses of Monel metal and nichrome.	**07**
Q.5	**(a)**	What is non destructive test? List various non destructive test. Explain X-ray radiography.	**07**
	(b)	(1)Draw iron carbon equilibrium diagram. (2)Define allotropy. Explain allotropy of iron.	**07**
		OR	
Q.5	**(a)**	What is cathodic protection? Explain	**07**
	(b)	Give composition properties and uses of Y-alloys.	**07**

****