Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152104 **Date: 20-05-2013**

Subject Name: Fuels, Furnaces and Refractory

Time: 10.30 am - 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)**	Describe different types of fuels based on occurrence, chemical nature, usage and production. List out uses of coal.	**07**
	(b)	Give advantages and disadvantages of Solid, Liquid and Gaseous fuels?	**07**
Q.2	**(a)**	Define carbonization and differentiate between Low Temperature carbonization (LTC) and High Temperature carbonization (HTC)	**07**
	(b)	Describe manufacture of water gas with the help of simplified sketch and relevant chemical reactions.	**07**
		OR	
	(b)	Write short Notes (Any Two) i) Coke Oven gas ii) Blast Furnace Gas iii) Nuclear Fuels	**07**
Q.3	**(a)**	Define refractory and elaborately classify them. What is the importance of pyrometric cone equivalent?	**07**
	(b)	Define the following termsé .. (i) RUL ii) Spalling Resistance	**07**
		OR	
Q.3	**(a)**	Draw flow sheet for wet or dry process of Magnesium bricks manufacture.	**07**
	(b)	What are the factors for selection of a refractory? What is crucible? What are the advantages of Castable Refractories?	**07**
Q.4	**(a)**	Define Stefan-Boltzmannôs Law and what is emissivity? What is the value of emissivity in case of a Black body? How many types of Radiation Pyrometers are there?	**07**
	(b)	Explain with diagram the working principle of temperature measurement by optical pyrometer	**07**
		OR	
Q.4	**(a)**	How waste heat can be recovered from furnace flue gases?	**07**
	(b)	Explain with diagram the construction and working principle of a Radiation Pyrometer.	**07**
Q.5	**(a)**	Define combustion? What are the combustion parameters? Briefly describe the natural forced draft. Compare between natural draft and induced draft.	**07**
	(b)	Explain Flame. Describe various modes of heat losses from a furnace. What are the methods used for furnace performances?	**07**
		OR	
Q.5	**(a)**	Explain with a neat sketch the construction and working principle of a Blast Furnace used in a steel industry.	**07**
	(b)	Short Notes (any two) i) Cupola ii) Muffle Furnace iii) Uses of Laser iv) Induction Furnace	**07**

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