Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 152104 Date: 01-12-2014

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)**	Define furnace. Discuss various possible reasons of heat losses in furnaces and suggest method to minimize heat loss.	**07**
	(b)	Define refractory and classify it. Give two examples of each. Give the advantages of monolithic refractories.	**07**
Q.2	**(a)**	Explain By-product coke oven high temperature carbonization process (HTC) and differentiate between waste heat oven HTC & regenerative oven HTC process with suitable figure.	**07**
	(b)	Mention the requirements of fuel storage. Discuss the methods to minimize spontaneous oxidation during coal storage.	**07**
		OR	
	(b)	Write the composition and application of producer gas. Discuss the manufacturing process of it.	**07**
Q.3	**(a)**	Explain the proximate analysis method for a given coal sample.	**07**
	(b)	Explain the role of draft in furnace design. Differentiate between Natural, forced, induced and balanced draft.	**07**
		OR	
Q.3	**(a)**	What do you mean by flash and fire point of a fuel? Describe the method used for determination.	**07**
	(b)	What do you mean by Combustion of fuels? Discuss the factors governing complete combustion of a fuel. Discuss effect of excess air on products of combustion.	**07**
Q.4	**(a)**	Explain the construction and working of arc furnace. Enlist the advantages of direct arc furnaces.	**07**
	(b)	Describe the construction and working of cupola furnace. Give advantage of its applications.	**07**
		OR	
Q.4	**(a)**	What are the Plasma heating furnaces? Discuss about it. Mention the advantages and applications.	**07**
	(b)	What do you mean by non conventional energy resources? Discuss the applicability of Hydrogen energy a fuel.	**07**
Q.5	**(a)**	Explain with diagram the working principle of temperature measurement by radiation pyrometer. Enlist the parameters affect accuracy of Radiation Pyrometers.	**07**
	(b)	What is refractoriness under load? Explain the method to determine refractoriness under load.	**07**
		OR	
Q.5	**(a)**	What is Thermocouple? Explain the method used for thermocouple construction and calibration. Discuss about thermoelectric inversion.	**07**
	(b)	Explain the pyrometric cone equivalent test of refractories with suitable figure. Discuss importance of this test.	**07**

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