Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 152104 **Date: 27/04/2017**

Subject Name: Fuels, Furnaces and Refractory

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**

Figures to the right indicate full marks.

Q.1	**(a)**	Prepare a comparative statement between advantages and disadvantages of solid, liquid and gaseous fuels.	**07**
	(b)	Explain the proximate analysis method for a given coal sample.	**07**
Q.2	**(a)**	Differentiate between low temperature carbonization (LTC) & high temperature carbonization (HTC) process.	**07**
	(b)	Write the composition and application of natural gas. Discuss about advantage and disadvantage of CNG.	**07**
		OR	
	(b)	Write the composition and application of LD gas. Discuss the factors affecting quantity of converter gas recovered.	**07**
Q.3	**(a)**	Discuss the applicability of Hydrogen energy and Solar energy as a fuel.	**07**
	(b)	Mention types of arc furnace and explain the construction and working of arc furnace.	**07**
		OR	
Q.3	**(a)**	Define refractory and classify it with example of each. List the main properties of a refractory material.	**07**
	(b)	What are the Plasma heating furnaces? Discuss about it and mention the applications.	**07**
Q.4	**(a)**	Define exit flue gas temperature and explain with Fig. the suitable temperature range for it.	**07**
	(b)	Explain the role of draft in furnace design. Differentiate between Natural, forced, induced and balanced draft.	**07**
		OR	
Q.4	**(a)**	What do you mean by Combustion of fuels? Discuss the factors governing complete combustion of a fuel.	**07**
	(b)	Explain the construction and working of muffle furnace with figure.	**07**
Q.5	**(a)**	Explain the general method for manufacturing of refractories.	**07**
	(b)	Discuss the working principle of Optical Pyrometers and explain with diagram the procedure of temperature measurement by it.	**07**
		OR	
Q.5	**(a)**	What is refractoriness under load? Explain the method to determine refractoriness under load.	**07**
	(b)	Explain the method used for thermocouple construction and calibration. What is thermoelectric inversion? Explain.	**07**

****