Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– V • EXAMINATION – WINTER 2016

Subject Code: 152104   **Date: 17/11/2016**
Subject Name: Fuels, Furnaces and Refractory
Time: 10:30AM – 01:00PM   **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)**	Discuss the applicability of Solar energy and Hydrogen energy as a fuel.	**07**
	(b)	Mention the types of arc furnace and explain the construction and working of arc furnace. Enlist the advantages of direct arc furnaces.	**07**
Q.2	**(a)**	Differentiate between low temperature carbonization (LTC) & high temperature carbonization (HTC) process.	**07**
	(b)	Define fuel. Prepare a comparative statement between advantages and disadvantages of solid, liquid and gaseous fuels.	**07**

<div align="center">OR</div>

	(b)	Explain that how one can determine the calorific value of a given coal sample by using bomb calorimeter.	**07**
Q.3	**(a)**	Explain the construction and working of muffle furnace with figure.	**07**
	(b)	Write the composition and application of LD gas. Discuss the factors affecting quantity of converter gas recovered.	**07**

<div align="center">OR</div>

Q.3	**(a)**	Explain the construction and working of induction furnace.	**07**
	(b)	Write the composition and application of natural gas. Discuss about advantage and disadvantage of CNG.	**07**
Q.4	**(a)**	Discuss various possible reasons of heat losses in furnaces and method of their minimization.	**07**
	(b)	Mention the types of arc furnace and explain the construction and working of arc furnace. Enlist the advantages of direct arc furnaces.	**07**

<div align="center">OR</div>

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**
Q.5	**(a)**	Enlist the general requirements of a refractory material. Describe the procedure for selection of refractories for a particular application.	**07**
	(b)	Explain the method used for thermocouple construction and calibration.	**07**

<div align="center">OR</div>

Q.5	**(a)**	What is refractoriness under load? Explain the method to determine refractoriness under load.	**07**
	(b)	Discuss the working principle of Optical Pyrometers and explain the procedure of temperature measurement by it.	**07**

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