Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – V (NEW) EXAMINATION – WINTER 2015

Subject Code: 2152104 Date:05/12/2015

Subject Name: Fuels, Furnaces, Refractories and Pyrometry

Time:10:30am to 1:00pm 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)**	Explain with neat diagram the principle, construction, working and advantages of temperature measurement by optical pyrometer.	**07**
	(b)	What is Thermocouple? Discuss the working principle of Thermocouple. Explain the method used for calibration of Thermocouple.	**07**
Q.2	**(a)**	Describe different types of fuels based on occurrence, chemical nature, usage and production. List out uses of coal.	**07**
	(b)	Write a brief note on Proximate and Ultimate analysis of fuel?	**07**
		OR	
	(b)	What do you mean by flash and fire point of a fuel? Describe the method used for determination.	**07**
Q.3	**(a)**	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**
	(b)	Explain By-product coke oven high temperature carbonization process and differentiate between waste heat oven HTC & regenerative oven HTC process.	**07**
		OR	
Q.3	**(a)**	Write the composition and application of coke oven gas. Discuss the factors affecting composition of it.	**07**
	(b)	What do you mean by non-conventional energy resources? Write short note on Geo-thermal and Bio-mass.	**07**
Q.4	**(a)**	Define furnace. Give various classifications of furnaces. Compare and contrast batch and continuous type furnace used for heat treatment of metals and alloys.	**07**
	(b)	Describe various modes of Heat Losses from a furnace.	**07**
		OR	
Q.4	**(a)**	With neat sketch, explain construction, zones, working and advantages and disadvantages of Cupola furnace.	**07**
	(b)	What is the difference between Natural draught, Induced Draught and Balanced Draught?	**07**
Q.5	**(a)**	Mention the types of arc furnace and explain the construction and working of arc furnace. Enlist the advantages of direct arc furnaces?	**07**
	(b)	Define refractory and classify it. Give two examples of each. Give the advantages of monolithic refractories.	**07**
		OR	
Q.5	**(a)**	Draw flow chart of main steps to be followed in Manufacturing of refractory. Described about each step in brief.	**07**
	(b)	Define refractoriness under load (RUL) and explain RUL test.	**07**

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