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Seat No.:	Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V(New) • EXAMINATION - WINTER 2016

Subject Code:2152104 Date:19/11/2016

Subject Name: Fuels, Furnaces, Refractories and Pyrometry

Time: 10:30 AM to 01:00 PM Total Marks: 70

Instructions:

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures o the right indicate full marks.

			MARKS		
Q.1		Short Questions	14		
€	1	What is working principle of thermocouple?			
	2	What is thermopile?			
	3	Which bimetallic materials are used to make K type			
		thermocouple?			
	4	Define fuel.	1		
	5	Petroleum is primary liquid fuel. True or false.			
	6	Nuclear fuel is conventional energy resources. True or			
	7	false.	1		
	7	Define producer gas.	1		
	8 9	What is water gas? Define furnace.	1 1		
		Define refractoriness of refractory.			
	11	· · · · · · · · · · · · · · · · · · ·			
		a. ingots b. sheets	1		
		c. coils d. slabs			
	12	Which of the following is a heat treatment furnace?	1		
		a. Rotary kiln b. Annealing furnace			
		c. Reheating Furnace d. Muffle furnace			
	13	Which furnace employs preheating, heating and soaking	1		
		zones?			
		a. Soaking pit b. Reheating furnace			
		c. Cupola d. Open hearth furnace	1		
	14				
		prevent surface attack by			
		a. decarburizingb. oxidation/scalingc. either of the aboved. sulphur penetration			
Q.2	(a)	What is Pyrometry? State the principle of Radiation	03		
Q. 2	(a)	pyrometer.			
	(b)				
	(c)				
	` /	principle, working and advantages.			
		OR			
	(c)	Classify fuels. Give Classification and grading of coal.	07		
Q.3	(a)	What is the effect of high volatile matter on coal?	03		
	(b)	List significance of the various constituents of coal.	04		
	(c)	Explain in detail determination of calorific value by	07		
		bomb calorimeter.			
0.2	(6)	OR What is calcrific value?	02		
Q.3	(a)	What is calorific value? Give the formula for determination of ash in coal and	03 04		
	(b)	fixed carbon.	V 4		
		IIACU CUI UUII.			

	(c)	Describe the proximate analysis method for a given coal	07
		sample.	
Q.4	(a)	Define carbonization.	03
	(b)	What is Flash and Fire point?	04
	(c)	Differentiate between LTC and HTC.	07
		OR	
Q.4	(a)	What is recuperator? Explain in brief.	03
	(b)	Explain By-product coke oven high temperature	04
		carbonization process.	
	(c)	Describe the construction and working of cupola furnace.	07
		Give advantage of its applications.	
Q.5	(a)	What do you mean by furnace?	03
	(b)	Give different classification of furnaces.	04
	(c)	Explain the construction and working of muffle furnace	07
	` '	with figure.	
		OR	
Q.5	(a)	What is spalling in refractory? Give reasons for spalling.	03
	(b)	Discuss pyrometric cone equivalent (PEC) test for	04
		refractory.	
	(c)	What is refractoriness under load? Explain the method to	07
		determine refractoriness under load.	
