

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- VI EXAMINATION – SUMMER 2026

Subject Code:3162113

Date:03-06-2026

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 to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) What do you mean by furnace? Give classification of furnace.	03
	(b) Explain the difference between coreless and channel induction furnace.	04
	(c) Discuss classification of fuel. Compares advantages and disadvantages of	07
Q.2	(a) Describe the importance of proximate analysis of fuel.	03
	(b) Define fuel. Describe the importance of ultimate analysis of fuel.	04
	(c) Discuss the method for determining viscosity of a liquid hydrocarbon. Differentiate in Redwood Viscometer no.1 & 2.	07
OR		
	(c) Describe various grades of coal.	07
Q.3	(a) What is Thermopile? Give its advantage.	03
	(b) Describe methods to control the temperature in electrically heated furnace.	04
	(c) Describe construction and working of cupola furnace. Give advantage of it.	07
OR		
Q.3	(a) Explain the cold junction correction in thermocouples. Give its significance.	03
	(b) Explain in brief the method used for thermocouple construction and calibration.	04
	(c) Using a diagram discuss the temperature measurement by Optical Pyrometer.	07
Q.4	(a) Discuss effect of excess air on products of combustion.	03
	(b) Discuss the manufacturing process of producer gas.	04
	(c) Explain By-product coke oven high temperature carbonization (HTC) process. Differentiate waste heat oven HTC & regenerative oven HTC.	07
OR		
Q.4	(a) Write the composition and application of producer gas.	03
	(b) Discuss the factors governing complete combustion of a fuel.	04
	(c) Explain the construction and working of arc furnace. Enlist the advantages.	07
Q.5	(a) Describe importance of resistance to slag attack in the selection of refractories.	03
	(b) Define refractory. Classify refractory and give examples of each.	04
	(c) Explain the role of draft in furnace design. Differentiate in different draft.	07
OR		
Q.5	(a) List the advantages of monolithic refractories,	03
	(b) Describe factors which affect heating capacity of furnaces.	04
	(c) Explain method of permeability test of refractories. Enlist factors affecting permeability.	07

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