Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023

Subject Code:3144401 Date:21-07-2023

Subject Name:Fuel and Combustion

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)**	Characteristics for good fuel.	**03**
	(b)	Explain Net calorific value and Gross calorific value.	**04**
	(c)	Write in brief about the proximate and ultimate analysis of coal.	**07**
Q.2	**(a)**	Briefly explain various important properties of coal.	**03**
	(b)	Sate the different objectives and industrial application of coal washing.	**04**
	(c)	Explain the coal gasification techniques in detail with neat sketch.	**07**
		OR	
	(c)	Discuss the different types of coal combustion techniques.	**07**
Q.3	**(a)**	State advantages of liquid fuel over solid and gaseous fuels.	**03**
	(b)	Write a short note on origin of petroleum.	**04**
	(c)	Describe the atmospheric distillation process with neat flow diagram.	**07**
		OR	
Q.3	**(a)**	List out types of crude distillation methods used in petroleum industries.	**03**
	(b)	Write in short about storage and handling of liquid fuels.	**04**
	(c)	With neat diagram discuss the working and industrial application of circulating fluidized bed boiler.	**07**
Q.4	**(a)**	List out various methods to produce the hydrogen gas.	**03**
	(b)	Briefly explain the storage and handling of acetylene gas.	**04**
	(c)	What is producer gas? Discuss the different reactions involved in the production of producer gas.	**07**
		OR	
Q.4	**(a)**	Differentiate between theoretical and actual combustion process.	**03**
	(b)	How to estimate of dry flue gases for known fuel composition?	**04**
	(c)	Write in detail calculation step for the composition of fuel and excess air supplied from exhaust gas analysis.	**07**
Q.5	**(a)**	Discuss about heat of formation and heat of combustion.	**03**
	(b)	Application of batch and continuous furnaces.	**04**
	(c)	Explain various types of furnaces and discuss the working, application, limitation of any one with neat sketch.	**07**
		OR	
Q.5	**(a)**	Write in detail factor affecting burners and combustion.	**03**
	(b)	Write in detail about Orsat apparatus.	**04**
	(c)	With neat diagram discuss the working and industrial application of fluidized bed combustion.	**07**

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