

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2024

Subject Code:3144401

Date:05-07-2024

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.**

- Q.1** (a) Define and classify fuel with suitable examples. **03**
(b) Define flash point and fire point and explain the significance of both.. **04**
(c) Define calorific value. Explain the bomb calorimetric experiment with neat diagram to estimate calorific value. **07**

- Q.2** (a) Define coal and classify it based on calorific value. **03**
(b) Discuss the significance of washing of coal in power sector. **04**
(c) Discuss in detail about the proximate analysis of coal. **07**

OR

- (c) Discuss in detail about the ultimate analysis of coal. **07**

- Q.3** (a) Discuss the significance of cetane number in diesel fuel. **03**
(b) Explain the delayed coking process in refineries. **04**
(c) Describe the atmospheric distillation process with neat flow diagram **07**

OR

- Q.3** (a) Discuss the significance of octane number in gasoline fuel. **03**
(b) Explain the solvent de-waxing process in refineries. **04**
(c) Describe the vacuum distillation process with neat flow diagram **07**

- Q.4** (a) Define coal gas with its composition. **03**
(b) Explain ammonia decomposition process for hydrogen production. **04**
(c) Define bio-fuel. Describe in detail about the production processes and technologies available for ethanol production. **07**

OR

- Q.4** (a) Discuss in detail about Liquefied Petroleum Gas (LPG) **03**
- (b) Explain turn down ratio of burner. State the various types of gas burner with their application. **04**
- (c) Define producer gas. Discuss the different reactions involved in the production of producer gas. **07**

- Q.5** (a) Define adiabatic flame temperature. **03**
- (b) Briefly discuss diffusion flames and premixed flames. **04**
- (c) Draw a neat diagram of ORSAT apparatus and explain the analysis of flue gas in detail. **07**

OR

- Q.5** (a) Write in brief about velocity of flame propagation. **03**
- (b) List out the various characteristics of an efficient furnace. **04**
- (c) Describe fluidized bed combustion technology for coal combustion and explain how it superior than fixed bed combustion. **07**
