*Total No. of Questions: 6* *Total No. of Printed Pages:2*

**Enrollment No.....**

# Faculty of Engineering

## End Sem (Odd) Examination Dec-2022

## FT3CO27 Fuel Technology

Programme: B.Tech. Branch/Specialisation: FT

**Duration: 3 Hrs.** **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. The largest lignite coal reserves of India? **1**
(a) Neyveli (b) Madhya Pradesh
(c) Uttar Pradesh (d) Ujjain

ii. In determination of %C and %H, the coal is burnt in stream of- **1**
(a) Sulphur (b) Oxygen (c) Nitrogen (d) Carbon

iii. Coal which becomes soft, plastic and fuse together to form large coherent mass are called- **1**
(a) Coking coke (b) Caking coke
(c) Pulverized coal (d) Carbon coke

iv. Which of the following can be made into briquettes without the use of binder? **1**
(a) Lignite (b) Peat
(c) Bituminous (d) Anthracite

v. Heavy oil's API gravity will be- **1**
(a) Less than 5 (b) Greater than 5
(c) Less than 10 (d) Greater than 10

vi. Which kind of liquid fuel is risky to store? **1**
(a) Heavy oil (b) Gas oil (c) Tar oil (d) Crude oil

vii. For domestic purpose, flash point above_____ is not desirable. **1**
(a) 50 ºC (b) 14 ºC (c) 24 ºC (d) 48 ºC

viii. Kerosene is also called- **1**
(a) Lamp oil (b) Gasoline (c) Coil oil (d) Heavy oil

ix. Which gas has least calorific value? **1**
(a) Coal gas (b) Water gas
(c) Producer gas (d) CNG

P.T.O.



x. CNG is a- **1**
(a) Cleanest fuel (b) Dairy fuel
(c) Pure fuel (d) Mixed fuel

Q.2 i. How coal is formed under earth? **2**
ii. Why washing of coal is essential before use? **3**
iii. Explain the quantitative analysis of coal with significance. **5**
OR iv. Classify the solid fuel according to ranking and uses. **5**

Q.3 i. How coke can be obtained from coal. **2**
ii. A gas used in internal combustion engine had the following composition by volume: $H_2 = 45\%$, $CH_4 = 36\%$, $CO=15\%$, $N_2=4\%$. Find the volume of air required for the combustion of $1m^3$ of the gas. Also calculate the dry product percentage composition if 30 percent excess air is used. **8**
OR iii. Calculate the weight and volume of air needed for complete combustion of 5 Kg of a coal containing 85% carbon, 10% hydrogen and rest oxygen. Also calculate the dry product percentage composition if 30 percent excess air is used. **8**

Q.4 i. What do understand by the term isomerization and cracking? **3**
ii. Explain fixed bed catalytic cracking with diagram. **7**
OR iii. Explain in detailed about the reserves of hydrocarbon in India. **7**

Q.5 i. Define flash and fire point with significance. **4**
ii. Differentiate between octane number and cetane number. **6**
OR iii. Write short note on: **6**
(a) Gasoline (b) Aviation fuel

Q.6 Attempt any two: under headings preparation, properties and uses.
i. Hydrogen Fuel **5**
ii. CNG **5**
iii. Producer Gas **5**

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## Marking Scheme
## FT3CO27 Fuel Technology

| | | | |
|---|---|---|---|
| Q.1 | i) | (a) Neyveli | **1** |
| | ii) | (b) Oxygen | **1** |
| | iii) | (a) coking coke | **1** |
| | iv) | (a)Lignite | **1** |
| | v) | (c)less than 10 | **1** |
| | vi) | (b)Gas oil | **1** |
| | vii) | (a)50 $^{o}$C | **1** |
| | viii) | (a)Lamp oil | **1** |
| | ix) | (c)Producer gas | **1** |
| | x) | (a)Cleanest fuel | **1** |
| | | | |
| Q.2 | i. | How coal is formed under earth? | **2** |
| | ii. | Why washing of coal is essential before use? | **3** |
| | iii. | Explain the quantitative analysis of coal with significance | **5** |
| OR | iv. | Classify the solid fuel according to ranking and uses. | |
| | | | |
| Q.3 | i. | How coke can be obtained from coal. | **2** |
| | ii. | A gas used in internal combustion engine had the following composition by volume: $H_2$ = 45%, $CH_4$ = 36%, CO=15%, $N_2$=4%. Find the volume of air required for the combustion of 1$m^3$ of the gas.<br>3 marks<br>Also calculate the dry product percentage composition if 30 percent excess air is used.<br>5 marks | **8** |
| OR | iii. | Calculate the weight and volume of air needed for complete combustion of 5 Kg of a coal containing 85% carbon, 10% hydrogen and rest oxygen.<br>4 marks<br>Also calculate the dry product percentage composition if 30 percent excess air is used.<br>4 marks | |
| | | | |
| Q.4 | i. | What do understand by the term isomerization and cracking | **3** |
| | | 1.5 marks each | |
| | ii. | Explain fixed bed catalytic cracking with diagram<br>Process 4<br>Diagram 3 | **7** |
| OR | iii. | Explain in detailed about the reserves of hydrocarbon in India?<br>7 marks | **7** |
| | | | |
| Q.5 | i. | Define flash and fire point with significance<br>2 marks each | **4** |
| | ii. | Differentiate between octane number and cetane number.<br>1 mark each | **6** |
| OR | iii. | Write short note on<br>a. Gasoline b. Aviation fuel<br>3 marks each | **6** |
| | | | |
| Q.6 | | Attempt any two: | |
| | i. | Hydrogen Fuel<br>Preparation ,2 marks<br>Properties 2 marks<br>and uses 1 marks | **5** |
| | ii. | CNG<br>Preparation ,2 marks<br>Properties 2 marks<br>and uses 1 marks | **5** |
| | iii. | Producer Gas<br>Preparation ,2 marks<br>Properties 2 marks<br>and uses 1 marks | **5** |

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