Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec-2023

FT3EL11

Safety in Petroleum & Petrochemical Industries

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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. What is the main factor that determines the color of crude oil? **1**

(a) Sulfur content (b) Carbon content

(c) Presence of metals (d) Impurities

ii. Which of the following is a primary component of natural gas? **1**

(a) Methane (b) Ethanol (c) Butane (d) Hexane

iii. What does ADU stand for in the context of refining? **1**

(a) Atmospheric Distillation Unit

(b) Advanced Desulfurization Unit

(c) Alkylation and Dehydrogenation Unit

(d) Acrylonitrile Dimerization Unit

iv. Hydro cracking is a process that combines: **1**

(a) Hydrogenation and cracking

(b) Hydro treating and polymerization

(c) Hydrogenation and reforming

(d) Cracking and alkylation

v. Subsurface injection systems are used for: **1**

(a) Fire detection

(b) Fire suppression in underground areas

(c) Gas leak detection

(d) Smoke evacuation

vi. Steam snuffing systems are employed to: **1**
(a) Generate electricity
(b) Cool down overheated equipment
(c) Suppress fires using steam
(d) Provide emergency lighting

vii. In firefighting, what does BLEVE stand for? **1**
(a) Boiling Liquid Evaporation Vessel Explosion
(b) Blast Liquefied Evacuation via Vents and Exhaust
(c) Boiling Liquid Expanding Vapor Explosion
(d) Burn LPG Efficiently, Ventilate Environment

viii. What is the purpose of water injection into an LPG vessel (water bottoming)? **1**
(a) Increase gas pressure (b) Prevent vessel corrosion
(c) Promote gas leakage (d) Enhance the smell of gas

ix. SCADA is used in refineries for: **1**
(a) Employee training
(b) Real-time monitoring and control
(c) Marketing strategies
(d) Environmental impact assessments

x. SAP (Systems, Applications, and Products) is commonly utilized in refineries for: **1**
(a) Cooking oil production
(b) Human resource management
(c) Advanced process simulation
(d) Safety inspections

Q.2 Attempt any two:

i. Discuss the physical properties of crude oil? How do these properties impact the handling and processing of crude oil in the petroleum industry? **5**

ii. Review the MSDS for LPG and natural gas. Discuss the differences in the safety considerations for these gaseous fuels? **5**

iii. Explain the processes of distillation and fractionation in the refining of crude oil. **5**

Q.3 Attempt any two:

i. Discuss the different types of storage tanks used in refineries. What are the specific applications and considerations for each type? **5**

ii. Discuss the sulfur recovery process in refining. Why is sulfur recovery crucial, and how is it accomplished to meet environmental standards? **5**

iii. Discuss the role of catalytic cracking in the refining process. What are the catalysts used in this process? **5**

Q.4 Attempt any two:

i. Describe the function and design considerations for fire hydrant systems in a petroleum facility. How they are strategically placed to address fire emergencies? **5**

ii. Discuss the use of foam pourer systems for fire protection in petroleum facilities. How do these systems suppress flammable liquid fires, and what are their design considerations? **5**

iii. Examine the use of Dry Chemical Powder (DCP) in combating gas and liquid fires. How does DCP act as a fire suppressant, and what are its limitations? **5**

Q.5 Attempt any two:

i. Discuss the essential firefighting facilities required for depots and terminals handling petroleum products? **5**

ii. Compare and contrast firefighting facilities for onshore and offshore drilling platforms. **5**

iii. Explain the firefighting facilities along pipelines for the transportation of petroleum products and gas. How are pipelines protected against fire incidents, and what measures are in place for rapid response? **5**

Q.6 Attempt any two:

i. What is the role of the Petroleum & Natural Gas Regulatory Board (PNGRB) in the oil and gas sector? **5**

ii. Discuss the safety standards and requirements specified for the design and construction of gas cylinders as per Gas Cylinder Rules 2004? **5**

iii. Explain the role of OISD in ensuring safety standards in the oil industry. **5**

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