

# Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



## B. Tech (Eighth Semester - Regular) Examinations, April - 2025 21BCHPE48021 – PETROLEUM REFINERY ENGINEERING (Chemical Engineering)

Time: 3 hrs

Maximum: 70 Marks

**Answer ALL questions**  
(The figures in the right hand margin indicate marks)

**PART – A****(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Illustrate some of the Reforming Reactions.	CO2	K1
b. What is delayed coking?	CO3	K1
c. Differentiate between hydro cracking and hydro treating.	CO3	K2
d. What are the Primary, Metallic and synthetic catalyst used in Cracking Process	CO4	K1
e. How furfural extractions carried out for upgrading the Lube oil.	CO4	K3

**PART – B****(15 x 4=60 Marks)**Answer **all** the questions

	Marks	CO #	Blooms Level
2. a. Explain the different theories for the formation of crude petroleum in the Earth's crust and justify them with relevant chemical reactions	8	CO1	K1
b. Discuss in detail the properties of petroleum products that make them suitable for specific use.	7	CO2	K2
(OR)			
c. Describe the composition and constituents of petroleum crude and analyze its classification based on the nature of hydrocarbons.	8	CO1	K1
d. Explain the general properties of paraffins, unsaturates, and aromatics, and compare their characteristics in terms of chemical structure and behavior.	7	CO2	K2
3.a. Describe the three-stage distillation units used in crude oil processing and explain how each stage contributes to the separation of petroleum fractions	8	CO2	K2
b. Define a box-type still heater and describe its construction and working principle in petroleum refining.	7	CO2	K1
(OR)			
c. List and explain the pre-treatment processes carried out on crude petroleum before refining.	8	CO2	K2
d. Describe the different types of additives blended into gasoline and explain how they enhance fuel performance and properties.	7	CO3	K3
4.a. Explain the Edeleanu Process used for kerosene treatment and illustrate it with a neat and labeled flow sheet.	8	CO3	K2
b. Explain the principle and process of furfural extraction and describe how it is carried out to upgrade lube oil.	7	CO4	K3
(OR)			
c. Explain the necessity of purifying petroleum products and analyze the various techniques used for sulphur removal.	8	CO3	K1
d. Describe the necessity of removing wax and asphalt from petroleum products and explain one commercial purification process used for each.	7	CO4	K2
5.a. Explain the principle of low-temperature isomerisation and describe how the	8	CO4	K1

process is carried out for butane, including key operating conditions and catalysts used.

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|----|---|---|-----|----|
| b. | Explain the HF acid alkylation process and describe how it is carried out to produce alkylate, including the reaction mechanism, conditions, and role of HF acid. | 7 | CO3 | K2 |
|----|---|---|-----|----|

(OR)

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|----|---|---|-----|----|
| c. | Define cracking and explain its types and importance in petroleum refining  | 8 | CO4 | K1 |
| d. | Describe in detail the catalytic cracking process, including feedstocks, catalysts, key reactions, and major commercial technologies involved." | 7 | CO4 | K3 |

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