Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

School of Engineering

Mid - Term Examinations - November 2024

Semester: VII | **Date**: 06.11.2024

Course Code: PET3013 | **Time**: 11:45am – 01:15pm

Course Name: Advanced Refining Engineering | **Max Marks**: 50

Program: B. Tech | **Weightage**: 25%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **5Qx2M =10M**

1	In the context of modern petroleum and chemical processing, explain in detail the concept of "Advanced Refining Technology".	**2 Marks**	**L1**	**CO1**
2	Discuss the concept of **Cracking** as a fundamental process in the petrochemical refinery industry.	**2 Marks**	**L1**	**CO1**
3	Analyze the need for advanced refining technology by identifying and explaining three significant ways in which it impacts the efficiency, environmental sustainability, and economic performance of modern refineries.	**2 Marks**	**L1**	**CO1**
4	Distinguish between catalytic cracking and thermal cracking. (Maximum three points)	**2 Marks**	**L1**	**CO2**
5	Explain the purposes of **catalyst** in a petroleum refining industry.	**2 Marks**	**L1**	**CO2**

Part B

Answer ALL Questions. Each question carries 10 marks. **4QX10M=40M**

6	**6a**	Evaluate the role of secondary processes in the refinery industry.	**2 Marks**	**L1**	**CO1**
	6b	Analyze how secondary processing in refining technology enhances the value of crude oil, and discuss three key benefits it provides in terms of product quality, efficiency, and environmental performance.	**3 Marks**	**L2**	**CO1**
	6c	Assess the critical role of hydrogen in the hydrocracking process.	**5 Marks**	**L3**	**CO1**

		or			
7	**7a**	Evaluate the function and significance of the vis-breaking process in refining operations.	**2 Marks**	**L1**	**CO1**
	7b	Elaborately explain advantages and disadvantages of thermal cracking process.	**3 Marks**	**L2**	**CO1**
	7c	Draw the schematic of soak visbreaking process and explain the importance of soaker drum.	**5 Marks**	**L3**	**CO1**
8	**8a**	Explain various value-added chemicals that are coming out from a petroleum refinery industry and also discuss their uses.	**2 Marks**	**L1**	**CO1**
	8b	Discuss the purpose of utilizing the zeolite-like catalyst for thermal cracking in a petroleum refinery industry.	**3 Marks**	**L2**	**CO1**
	8c	With a suitable diagram discuss the hydrocracking process (mention the followings: catalysts, temperature, pressure, and Hydrogen-to-Hydrocarbon Ratio required). Also explain the by-products that are being produced after this process.	**5 Marks**	**L3**	**CO1**
		or			
9	**9a**	Discuss two differences between octane number and cetane number.	**2 Marks**	**L1**	**CO1**
	9b	Explain the importance of Iso-Max process in a petroleum refinery industry.	**2 Marks**	**L1**	**CO1**
	9c	Draw the flow diagram of Iso-Max process.	**2 Marks**	**L1**	**CO1**
	9d	State hydro-desulfurization process and its importance in terms of environmental protection and quality enhancement in the petroleum refinery industry.	**4 Marks**	**L3**	**CO1**
10	**10a**	Explain the recycle of coke in a petroleum refinery industry.	**2 Marks**	**L1**	**CO2**
	10b	"Coke formation in an oil and gas refinery industry may hinder the process efficacy". Explain the reason behind the process.	**3 Marks**	**L2**	**CO2**
	10c	Discuss on overview, process description, application, advantages, and disadvantages of the Delayed coking process.	**5 Marks**	**L3**	**CO2**
		or			
11	**11a**	Discuss the importance of combustor in a refinery industry.	**2 Marks**	**L1**	**CO2**

	11b	Explain the reasons behind catalyst deactivation and also explain its disadvantages in yield of a oil and gas refinery industry.	**3 Marks**	**L2**	**CO2**
	11c	With a suitable example and flow diagram explain the catalytic cracking process.	**5 Marks**	**L3**	**CO2**
12	**12a**	Explain the mechanism of the fixed bed catalytic cracking with a suitable diagram.	**4 Marks**	**L3**	**CO2**
	12b	Discuss the working principle of the fluidized-catalytic bed reactor.	**4 Marks**	**L3**	**CO2**
	12c	In your opinion, from the above two types of catalytic reactor explain the effective catalytic process.	**2 Marks**	**L2**	**CO2**
		or			
13	**13a**	Discuss the flexi coking process with a suitable flow diagram.	**5 Marks**	**L3**	**CO2**
	13b	Explain the pros and cons of the flexi coking process elaborately.	**5 Marks**	**L3**	**CO2**