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# PRESIDENCY UNIVERSITY

BENGALURU

## Mid - Term Examinations - March 2026

Date: 13- 03-2026

Time: 11.45am to 01.15pm

<b>School:</b> SOE	<b>Program:</b> B.Tech. (PET)		
<b>Course Code:</b> PET2011	<b>Course Name:</b> Oil and Gas Downstream Operations		
<b>Semester:</b> VI	<b>Max Marks:</b> 50	<b>Weightage:</b> 25%	

CO - Levels	C01	C02	C03	C04	C05
Marks	14	12	24	NA	NA

### 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.

5Q x 2M=10M

1	Outline the catalytic cracking of a petroleum refinery industry in brief.	2 Marks	L1	C01
2	Define the term "catalysts poisoning."	2 Marks	L1	C01
3	Describe the basic difference between hydrogenation and hydrocracking.	2 Marks	L1	C02
4	Label the primary chemical components of Liquefied Petroleum Gas (LPG) and define its key physical properties.	2 Marks	L1	C03
5	Describe "Petcoke" and its any two applications.	2 Marks	L1	C03

## Part B

### Answer the Questions.

**Total Marks 40M**

<b>6.</b>	<p>Crude oil is a complex mixture of hydrocarbons with varying physical and chemical properties that determine its classification and refining potential. Explain in detail the physical and chemical properties of crude oil and their significance in petroleum refining. In your explanation, consider the following aspects:</p> <p><b>I. API Gravity</b></p> <ul style="list-style-type: none"> <li>○ Define API gravity and explain the way it is used to classify crude oil as light, medium, or heavy.</li> <li>○ Discuss the relationship between API gravity and crude oil density.</li> <li>○ Explain the importance of API gravity in the influences of ease refining and product yield.</li> </ul> <p><b>II. Classification by Sulfur Content:</b></p> <ul style="list-style-type: none"> <li>○ Explain various types of crude oil according to the sulfur content.</li> <li>○ Discuss the environmental and refining challenges associated with high-sulfur crude oils.</li> <li>○ Highlight the importance of sulfur removal techniques in refining operations.</li> </ul> <p><b>III. Importance of Crude Oil Classification:</b></p> <ul style="list-style-type: none"> <li>○ Explain the importance of crude oil classification.</li> <li>○ crude oil classification helps in choosing the right refining process for different types of crude. Explain this.</li> <li>○ Provide examples of how different crude oils are processed for various end products.</li> </ul>	<b>10 Marks</b>		<b>L2</b>	<b>CO1</b>
<b>Or</b>					
<b>7.</b>	<p>Naphtha cracking by steam cracking is a crucial process in the petrochemical industry for producing valuable products like ethylene and propylene. With the help of a suitable flow chart, explain the steam cracking process for naphtha. Additionally, discuss the energy analysis involved in this process and explore the latest technological developments in steam cracking to improve efficiency and sustainability. Also discuss use of the products of the steam cracking of naphtha in point wise.</p>	<b>10 Marks</b>		<b>L2</b>	<b>CO1</b>

8.	Hydrocracking is a crucial refining process used in naphtha cracking to break down heavy hydrocarbons into valuable lighter products. With the help of a suitable example, illustrate the hydrocracking process in detail. Your answer should include a description of the process, key reactions involved, operating conditions, catalysts used, and the importance of hydrocracking in refining operations. Address the following aspects in your explanation.	10 Marks	L3	CO2
<b>Or</b>				
9.	"Hydrocracking is an alternative process in naphtha cracking process in a petroleum refinery industry". Examine the reasons behinds this. Also explain the products that are coming out from the separation section of steam cracking of naphtha.	10 Marks	L3	CO2

10.	Ethylene is a fundamental building block in the petrochemical industry, used to manufacture essential chemicals such as ethylene oxide, monoethylene glycol, and styrene. Demonstrate the specifications, chemical properties, and industrial applications of the ethylene-oxide.	10 Marks	L3	CO3	
<b>Or</b>					
11.	a.	Illustrate the specification of polypropylene (PP), different types of PP, their properties and utilization.	5+5 Marks	L3	CO3
	b.	Demonstrate Physical and Chemical Properties of ammonia (NH <sub>3</sub> ), reaction mechanism, and its industrial applications.		L3	CO3

12.	a.	With suitable diagram illustrate the Physical and Chemical Properties of LLDPE, and its several applications.	5+5 Marks	L3	CO3
	b.	With a schematic flowchart demonstrate the specifications and applications of petroleum product "HDPE".		L3	CO3
<b>Or</b>					
13.	With suitable schematic diagrams illustrate elaborately formation of vinyl chloride monomer (VCM) formation, handling of VCM in a polymerization plant, and polymerization of vinyl chloride monomer.	10 Marks	L3	CO3	