

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE- SEMESTER-VI EXAMINATION – WINTER 2025**

**Subject Code: 3160510**

**Date: 21-11-2025**

**Subject Name: Petroleum Refining and Petrochemicals**

**Time: 02:30 PM TO 05:00 PM**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		<b>MARKS</b>
<b>Q.1</b>	(a) Discuss the composition of crude oil..	<b>03</b>
	(b) Discuss classification of crude oil in brief.	<b>04</b>
	(c) Discuss the recent scenario of production of crude oil and refineries in India.	<b>07</b>
<b>Q.2</b>	(a) Discuss briefly; Flash point and Fire point.	<b>03</b>
	(b) Discuss in brief Vacuum Distillation Unit.	<b>04</b>
	(c) Discuss any three tests for testing of gasoline in detail.	<b>07</b>
	<b>OR</b>	
	(c) Discuss about different types of additives added in gasoline and their functions.	<b>07</b>
<b>Q.3</b>	(a) Explain in brief: Cloud and Pour Point.	<b>03</b>
	(b) Write short note on Electric desalting process.	<b>04</b>
	(c) Discuss with neat diagram Fluid catalytic cracking in detail..	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Explain ASTM distillation process.	<b>03</b>
	(b) Discuss any two tests recommended for kerosene.	<b>04</b>
	(c) Discuss in detail about Plat forming with neat sketch.	<b>07</b>
<b>Q.4</b>	(a) Explain briefly Visbreaking.	<b>03</b>
	(b) Discuss in brief about Lead Doctor sweetening process for gasoline.	<b>04</b>
	(c) Discuss manufacturing process of Ethylene with neat sketch.	<b>07</b>

**OR**

**Q.4** (a) Discuss properties of Formaldehyde. **03**  
(b) Discuss major engineering problems involved in production of PVC. **04**  
(c) With the help of a detailed flow diagram explain the manufacturing process of Styrene. **07**

**Q.5** (a) Discuss Octane number and its significance. **03**  
(b) Explain the major engineering problems involved in the Manufacturing of Methanol. **04**  
(c) Discuss manufacturing process of LDPE with neat sketch along with its application. **07**

**OR**

**Q.5** (a) Discuss properties and applications of Polypropylene. **03**  
(b) Explain True boiling point test with neat sketch. **04**  
(c) Discuss with neat flow diagram the manufacturing process of Ethylene dichloride. **07**

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2024****Subject Code:3160510****Date:02-12-2024****Subject Name:Petroleum Refining and Petrochemicals****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		<b>MARKS</b>
<b>Q.1</b>	(a) Define: Flash point, Pour point, Smoke point (b) Brief about Indian refining scenario and oil reservoirs in India. (c) Enlist various tests for gasoline and explain all in detail.	<b>03</b> <b>04</b> <b>07</b>
<b>Q.2</b>	(a) List various sweetening processes and brief the adverse effects of impurities present in the petroleum product. (b) Explain electric desalter with neat sketch. (c) Classify crude oil based on various properties.	<b>03</b> <b>04</b> <b>07</b>
<b>OR</b>		
	(c) Explain the role and need of additives of gasoline. Discuss each type of additive in detail.	<b>07</b>
<b>Q.3</b>	(a) Explain ASTM distillation test for gasoline. (b) Explain the biogenic theory for formation of crude oil in detail. (c) Explain isomerization and polymerization units of refinery.	<b>03</b> <b>04</b> <b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Explain Ball and Ring test for bitumen. (b) Briefly explain catalytic alkylation. (c) Explain about delayed coker unit in detail.	<b>03</b> <b>04</b> <b>07</b>
<b>Q.4</b>	(a) Compare thermal and catalytic cracking. (b) Explain lead Doctor process in detail. Also explain its reactions, (c) Explain FCC with neat sketch.	<b>03</b> <b>04</b> <b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) Explain pumping of waxy crude oil. (b) Compare phenol extraction and furfural extraction. (c) Explain need of reforming unit and explain with neat sketch. Also write on regeneration of catalyst in reformer unit.	<b>03</b> <b>04</b> <b>07</b>
<b>Q.5</b>	(a) Enlist various routes for methanol synthesis. (b) Discuss various applications of SBR and Methanol. (c) Discuss formaldehyde production with neat sketch.	<b>03</b> <b>04</b> <b>07</b>
<b>OR</b>		
<b>Q.5</b>	(a) List various C1, C2 based and aromatic petrochemicals. (b) Explain BTX separation in brief. (c) Explain LDPE production with neat sketch and differentiate between HDPE and LDPE.	<b>03</b> <b>04</b> <b>07</b>

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023****Subject Code:3160510****Date:11-12-2023****Subject Name:Petroleum Refining and Petrochemicals****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**MARKS**

<b>Q.1</b>	(a) Give classification of crude oil.	<b>03</b>
	(b) Discuss about ADU for the crude petroleum.	<b>04</b>
	(c) Describe different arrangement of distillation towers in petroleum fractioning with the help of neat sketches.	<b>07</b>
<b>Q.2</b>	(a) Define: (i) Octane number (ii) Cetane number (iii) Softening point	<b>03</b>
	(b) Explain lead doctoring method for treatment of gasoline in brief.	<b>04</b>
	(c) Explain (FCC) fluidized catalytic cracking with neat sketch.	<b>07</b>
	<b>OR</b>	
	(c) Explain the catalytic reforming process in detail.	<b>07</b>
<b>Q.3</b>	(a) State various routes of production of methanol.	<b>03</b>
	(b) Discuss major engineering problems of methanol.	<b>04</b>
	(c) Explain Merox sweetening process for gasoline treatment.	<b>07</b>
	<b>OR</b>	
<b>Q.3</b>	(a) Discuss major engineering problems, properties and uses of acetic acid.	<b>03</b>
	(b) Write down various properties and uses of Poly Vinyl Chloride (PVC).	<b>04</b>
	(c) Describe manufacturing process of LDPE with neat process flow diagram.	<b>07</b>
<b>Q.4</b>	(a) Write explanatory note on visbreaking.	<b>03</b>
	(b) Discuss industrial uses of polypropylene.	<b>04</b>
	(c) Discuss manufacturing process of styrene with neat flow diagram.	<b>07</b>
	<b>OR</b>	
<b>Q.4</b>	(a) Enlist major engineering problems associated with production of ethylene oxide.	<b>03</b>
	(b) What is dewaxing? Why it is required? Explain any one method for dewaxing of lubes.	<b>04</b>
	(c) Discuss various types of naphtha and their important properties & applications.	<b>07</b>
<b>Q.5</b>	(a) List the various types of gases from petroleum.	<b>03</b>
	(b) Write down various properties and uses of formaldehyde.	<b>04</b>
	(c) Discuss about different test and properties of petroleum oil.	<b>07</b>
	<b>OR</b>	
<b>Q.5</b>	(a) Enlist major petrochemical units in India.	<b>03</b>
	(b) Discuss in brief: Role of crude oil in global economy.	<b>04</b>
	(c) Discuss about the current scenario of world petrochemical industry.	<b>07</b>

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**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022****Subject Code:3160510****Date:16-12-2022****Subject Name:Petroleum Refining and Petrochemicals****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**Q.1 (a)** Differentiate: Atmospheric Distillation Unit (ADU) and Vacuum Distillation Unit (VDU) for crude petroleum **03**  
**(b)** Explain in brief: Necessity and types of Cracking **04**  
**(c)** Explain in detail with a neat flow diagram: Manufacturing process of Butadiene **07**

**Q.2 (a)** Define sweetening of gas. Enlist various sweetening techniques for gases. **03**  
**(b)** Enlist important properties & tests for gasoline and explain any one in brief. **04**  
**(c)** Explain in detail with a neat flow diagram: Manufacturing process of Methanol **07**

**OR**

**(c)** Explain in detail with a neat flow diagram: Manufacturing process of Ethylene Glycol **07**

**Q.3 (a)** Explain in brief: Visbreaking technique for crude petroleum **03**  
**(b)** Discuss in brief: Pumping of waxy crude **04**  
**(c)** Explain in detail: Composition of crude oil **07**

**OR**

**Q.3 (a)** Explain in brief: Hydrocracking technique for crude petroleum **03**  
**(b)** Discuss major engineering problems associated with the manufacturing process of Ethylene in brief. **04**  
**(c)** Enlist various pipe still heaters used for heating crude petroleum. Explain any two in brief. **07**

**Q.4 (a)** Enlist various properties and uses of Chloromethane. **03**  
**(b)** Define Following: **04**  
 (i) Smoke point (ii) Pour point (iii) Cetane number (iv) Softening point  
**(c)** Define cracking of crude petroleum. Explain Dubb's two coil process of thermal cracking in detail. **07**

**OR**

**Q.4 (a)** Explain in brief: LPG and its various composition **03**  
**(b)** Explain in brief: Conradson carbon residue method for lube oil **04**  
**(c)** Explain in detail with a neat flow diagram: Manufacturing process of Polypropylene **07**

**Q.5 (a)** Explain in brief: Role of crude oil in Global economy **03**  
**(b)** Explain the Fluid Catalytic Cracking process in brief. **04**  
**(c)** Enlist various treatment techniques of gasoline. Explain Lead Doctoring treatment technique for gasoline in detail. **07**

**OR**

**Q.5 (a)** Explain in brief: BTX separation **03**

**(b)** Explain Penetration index test for Bitumen in brief. **04**  
**(c)** Enlist various treatment methods of lube oil. Explain Phenol extraction **07**  
method in detail.

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