

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-IV EXAMINATION – WINTER 2025

Subject Code:3140508

Date:20-11-2025

Subject Name:Unit Processes & Chemical Technology

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
Q.1 (a) What is pigment? Briefly describe their types.	03
(b) Distinguish between unit process and unit operation.	04
(c) Give details about diaphragm and membrane cell process for production of chlorine.	07
Q.2 (a) What is PVC ratio? Why paints are failure many times?	03
(b) Give the classification of drugs.	04
(c) Give the detailed process for manufacturing of H-acid.	07
OR	
(c) Explain DCDA process with major Engineering problems.	07
Q.3 (a) Why Friedel-Craft alkylation of nitrobenzene is disfavoured?	03
(b) Give the details about raw materials used in ceramic industries.	04
(c) Explain the manufacturing process of paints with neat flow diagram	07
OR	
Q.3 (a) What is NPK fertilizer?	03
(b) Discuss the mechanism for alkylation of chlorobenzene.	04
(c) Explain the manufacturing process of Ammonia with major engineering problems.	07
Q.4 (a) Write the important properties of petroleum products.	03
(b) Write basic prerequisites of good fermentation process.	04
(c) Explain the manufacturing process of sugar from sugar cane.	07
OR	
Q.4 (a) Describe in detail settling and hardening of cement.	03
(b) Explain the major engineering problem in the manufacturing of H ₃ PO ₄ by wet process.	04

- (c) Describe the manufacturing process of chrome blue black. 07
- Q.5** (a) Explain preparation of Phenobarbital with chemical reaction. 03
- (b) Discuss the advantages of catalytic cracking over thermal cracking. 04
- (c) Explain pulp manufacturing by Kraft process. 07

OR

- Q.5** (a) List out the advantages and disadvantages of Solvay Process. 03
- (b) Explain the classification of dyes according to its application. 04
- (c) What are antibiotics? Explain the manufacture of penicillin with a neat process flow diagram. 07

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024

Subject Code:3140508

Date:26-11-2024

Subject Name:Unit Processes & Chemical Technology

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

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|------------|-----|--|-----------|
| Q.1 | (a) | Write applications of drugs. | 03 |
| | (b) | Write the stepwise mechanism of Alkylation of benzene. | 04 |
| | (c) | Write notes on: Antibiotics, Industrial Alcohol, Petrochemicals, Paints, Oxidation, Reduction, NPK | 07 |
| | | | |
| Q.2 | (a) | Write intermediates of following unit processes: nitration, acylation, chlorination. | 03 |
| | (b) | Write detailed classification of dyes on the basis of their constitution. | 04 |
| | (c) | Explain following terms: Unit Process, Vitamin D, Drugs, Varnishes, Citric acid, Vitamin B12, Refining | 07 |
| OR | | | |
| | (c) | Construct process flow Diagram of manufacturing of H acid also explain it with the help of reactions. | 07 |
| | | | |
| Q.3 | (a) | Give details of manufacturing process of Caustic soda. | 03 |
| | (b) | Review/support importance of Unit processes in chemical Industries. | 04 |
| | (c) | Explain pulp manufacturing by Kraft process with the help of relevant diagram. | 07 |
| OR | | | |
| Q.3 | (a) | Compare and contrast between membrane cell and Diaphragm process. | 03 |
| | (b) | Give details about pros and cons of advancements of Chemical Industries. | 04 |
| | (c) | Explain manufacturing of cement by wet process with required reactions and diagram. | 07 |
| | | | |
| Q.4 | (a) | Write applications of various pigments. | 03 |
| | (b) | What is hardening of cement, explain with the help of reactions. | 04 |
| | (c) | Construct neat flow diagram for peniciline and state its major engineering problems. | 07 |
| OR | | | |
| Q.4 | (a) | Write a note on refractories. | 03 |
| | (b) | Discuss about ceramic materials. | 04 |
| | (c) | Explain DCDA process of manufacturing of sulphuric acid with major engineering problems involved. | 07 |
| | | | |
| Q.5 | (a) | Give a note on constituents of paints. | 03 |
| | (b) | Discuss the chemistry of C1, C2 petrochemicals. | 04 |
| | (c) | Describe Following terms: Varnish, Thinners, Vat dyes, Pigments, Ascorbic acid, barbitol, Fertilizer | 07 |

OR

- | | | |
|------------|--|-----------|
| Q.5 | (a) Write difference between catalytic and thermal cracking. | 03 |
| | (b) Construct process flow diagram for manufacturing of citric acid. | 04 |
| | (c) Give details of the manufacturing process of sugar from sugar cane with the help of diagram. | 07 |

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (NEW) EXAMINATION – WINTER 2023****Subject Code:3140508****Date: 06-02-2024****Subject Name: Unit Processes & Chemical Technology****Time: 10:30 AM TO 01:00 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
Q.1	(a) Explain the mechanism of alkylation of benzene.	03
	(b) Explain nitration and sulfonation of benzene with reaction mechanism.	04
	(c) Explain DCDA process with major Engineering problems	07
Q.2	(a) Discuss the theories of colour and constitution	03
	(b) What is dye? How are dyes classified on the basis of structure?	04
	(c) Explain the manufacturing process of vinyl sulphone dye with neat sketch diagram.	07
	OR	
	(c) Explain the manufacturing process of H-acid dye with neat sketch diagram.	07
Q.3	(a) Write a note on Direct dyes.	03
	(b) Explain the mining of sulfur by frasch methods.	04
	(c) Explain the manufacturing process of caustic soda by membrane cell.	07
	OR	
Q.3	(a) Write a note on Azo dyes.	03
	(b) Explain the claus process for sulfur.	04
	(c) Explain the manufacturing process of Urea with major engineering problems	07
Q.4	(a) What is PVC ratio? Why paints are failure many times?	03
	(b) Write a note on white pigments.	04
	(c) Explain the manufacturing process of paints with neat flow diagram	07
	OR	
Q.4	(a) Explain the role of Pigments/Resin/Binder as an ingredients used in paint	03
	(b) Write a note on ZnO as a pigment	04
	(c) Explain the manufacturing process of sugar from sugar cane	07
Q.5	(a) What are antibiotics?	03
	(b) Explain preparation of Phenobarbital with chemical reaction	04
	(c) Explain the manufacturing process of penicillin with flow diagram	07
	OR	
Q.5	(a) Explain setting and hardening of cement with chemical reaction.	03
	(b) Write basic prerequisites of good fermentation process.	04
	(c) Explain the manufacturing process of cement with flow diagram.	07

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV(NEW) EXAMINATION – WINTER 2022****Subject Code:3140508****Date:16-12-2022****Subject Name:Unit Processes & Chemical Technology****Time:10:30 AM TO 01:00 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

- Q.1** (a) Explain the nitration of benzene with an example. **03**
 (b) Briefly explain the classification of drugs. **04**
 (c) Describe the process of manufacturing of sulphuric acid with flow diagram and reactions. **07**

- Q.2** (a) What are dyes and pigments, explain. **03**
 (b) Classify the dyes on the basis of application. **04**
 (c) Give the detailed process for manufacturing of caustic soda and chlorine using diaphragm. **07**

OR

- (c) Give the detailed process for manufacturing of H-acid. **07**

- Q.3** (a) List the fat soluble and water soluble vitamins. **03**
 (b) Write the reactions involved in synthesis of aspirin. **04**
 (c) Explain the process for extraction, isolation and purification of vitamin D with flow diagram. **07**

OR

- Q.3** (a) What is absolute alcohol? State the uses of industrial alcohol. **03**
 (b) What are the thinners and varnishes? **04**
 (c) Design the process flow diagram for manufacturing of citric acid. **07**

- Q.4** (a) What is refractory? Give their industrial applications. **03**
 (b) Give process diagram for recovery of white liquid from black liquid in manufacturing of pulp. **04**
 (c) With a neat schematic diagram, explain the manufacturing of cement by dry process. **07**

OR

- Q.4** (a) What is role of digester in pulp manufacturing? **03**
 (b) Explain the settling and hardening of cement. **04**
 (c) With a neat schematic diagram, explain the manufacturing of building bricks. **07**

- Q.5** (a) What is cracking of hydrocarbons and its use in petroleum industries? **03**
 (b) Write the reactions for synthesis of 3-nitrochlorobenzene from benzene. **04**
 (c) Write brief description on processing of petroleum and treatment techniques **07**

OR

- Q.5** (a) Explain one example of reductive alkylation of aniline. Write chemical reaction. **03**
 (b) Polymer industries depends on petrochemical industries, explain. **04**

- (c) Give suitable process for manufacturing of nitric acid. Explain its advantages over other processes. **07**
