

Syllabus for B.Sc., - Petroleum & Petrochemicals
I B.Sc., Second semester
Paper II - Modern Petroleum Refining Processes

- Unit – 1: Petroleum Processing Data:
Classification of Crude Oils, API Gravity, Characterization factors and correlation Index.
ASTM & TBP distillation of crude petroleum, Average boiling points, thermal properties of petroleum fractions.
- Unit – 2: Crude oil Distillation:
Impurities in crude oils, Need for desalting of Crude oils, - electrical desalting of crude oils, Heating of crude in pipe still Heaters, Atmospheric distillation of crude oil, vacuum distillation of reduced crude oil,
- Unit -3: Cracking processes:
Thermal cracking Reactions – Thermal cracking process –Dubbs two coil Cracking, Visbreaking

Catalytic cracking: mechanism of catalytic cracking – Moving Bed Air – lift thermoform catalytic cracker, Hydro Cracking – Isomax hydro cracking process
- Unit – 4: Catalytic Conversions, and Finishing processes.
Catalytic Reforming: - Reforming reactions – catalytic reforming process.
Alkylation: Alkylation Reactions, Sulphuric Acid alkylation and HF alkylation. Isomerization: Aluminium chloride isomerization process,
- Unit – 5: Petroleum Fractions: (Gasoline and Kerosene)
Gasoline: – ASTM distillation, Reid – vapour pressure, Octane number, Types of additives used in gasoline.
Kerosene: – Flash & Fire Points, Smoke point, Aniline point – Experimental determinations, Hydro treating process for smoke point improvement.
- Suggested reading:
1) Modern Petroleum Refining processes by Dr. B.K. Bhaskara Rao.
 Oxford I B H.
2) Petroleum Refining Technology – by Dr. Ram Prasad, Khanna
 Publishers, Delhi.

I B.Sc., - Petroleum & Petrochemicals
MODEL QUESTION PAPER
Paper II (At the end of Second semester)
Modern Petroleum Refining Processes

(Time 2½ HRS)

(Max.marks
60)

Section – I

Answer any **FOUR** questions.

All questions carry **equal** marks.

4 X 10 =

40M

1. Question from Unit –I
2. Question from Unit –II
3. Question from Unit –III
4. Question from Unit - IV
5. Question from Unit – V
6. Question from Unit – I
7. Question from Unit – II
8. Question from Unit – III

SECTION – II

Answer any **four** questions.

All questions carry **equal** marks.

4 x 5 =

20M

9. Question from Unit - I
10. Question from Unit – II
11. Question from Unit – III
12. Question from Unit – IV
13. Question from Unit – V
14. Question from Unit – I
15. Question from Unit – II
16. Question from Unit - III

I B.Sc., - Petroleum & Petrochemicals
BLUE PRINT
Paper – II: SEMESSTER - II
Modern Petroleum Refining Processes

BLUE PRINT

S. No.	Course Content	Essay Questions (10M)	Short Answer Questions (5M)	Total No. Of Questions from each Unit
1	Unit –I	2	2	4
2	Unit –II	2	2	4
3	Unit –III	2	2	4
4	Unit –IV	1	1	2
5	Unit –V	1	1	2
	TOTAL	8	8	16

NOTE: Questions should be given from Question Bank

I B.Sc., - Petroleum & Petrochemicals
Paper –II: SEMESTER -II
Modern Petroleum Refining Processes
QUESTION BANK

Essay Questions: 10 Marks

UNIT –I:

1. Explain about the experimental details of ASTM distillation of crude oil
2. Write the experimental details of TBP Analysis
3. Explain about thermal properties of petroleum and petroleum fractions
4. Write about various average boiling points.
5. Explain about the Characterization factor and correlation Index.
6. Write about the Classification of Crude Oils and API Gravity

UNIT –II:

1. Explain about the heating of crude oils in pipe still heaters
2. Write about the atmospheric distillation of crude oil
3. Write about the vacuum distillation of reduced crude oil
4. Explain about the electrical desalting of crude oils.
5. Write about the atmospheric distillation of crude oil

UNIT –III:

1. Write about different types of cracking processes and thermal cracking reactions.
2. Explain about the process of Dubbs two coil cracking.
3. Write about Visbreaking operation
4. Explain about the moving bed air lift thermofor catalytic cracking
5. With a neat flow diagram, describe the process of fluid catalytic cracking
6. With a neat flow diagram describe Isomax - Hydrocracking process

UNIT –IV:

1. With a neat flow diagram describe the process of catalytic reforming
2. With a neat flow diagram describe the process of cascade sulphuric acid alkylation.
3. With a neat flow diagram describe the process of hydro fluoric acid alkylation
4. With a neat flow diagram describe the process of Aluminum chloride isomerization.

UNIT –V:

1. Explain about the experimental details of ASTM distillation of Gasoline
2. Write about the experimental details of determination of Reid vapour pressure of the Gasoline
3. Write about the experimental details of the determination of Flash point and Fire point by Pensky marten apparatus.
4. Explain about the experimental determination of smoke point of kerosene oil.

Short answer questions: 05 Marks

UNIT - I:

1. Write about the classification of crude oils
2. Explain about API Gravity
3. Write about Characterization factor
4. Write about Correlation index
5. Write about thermal properties of petroleum fractions

UNIT - II:

1. Write about the impurities in crude oils
2. Write a short note on desalting of crude oils
3. Explain briefly about crude oil distillation
4. Write a note on pipe still heaters.
5. Explain briefly about Vacuum distillation

UNIT - III:

1. Write a short note on thermal cracking
2. Explain about thermal cracking reactions
3. Explain briefly the process of hydro cracking
4. Write a note on catalytic cracking

UNIT - IV:

1. Write briefly about the reactions during catalytic reforming
2. Write about the catalysts used for alkylation process
3. Explain briefly about isomerization process.

UNIT - V:

1. Write a short note on Octane number
2. Write briefly about the additives used in gasoline
3. Write briefly about the Aniline point determination

Practical Syllabus for I B.Sc.,
Petroleum and Petrochemicals

Practical II (At the end of Second Semester)

- 1) Cloud point determination.
- 2) Pour point determination
- 3) Determination of specific gravity of Petroleum fractions by Hydrometers.
- 4) ASTM Distillation of Gasoline
- 5) Determination of Specific gravity by Specific gravity bottle.
- 6) Determination of Specific gravity by Pyknometer.

SCHEME OF
VALUATION

Max. Marks: 35

- | | | |
|----|---|----------|
| 1) | Procedure to be written in the first 15 minutes | 10 Marks |
| 2) | Recording of data and reporting the value | 15 |
| | Marks upto 2% error | |
| | Error up to 5% | 10 Marks |
| | Error greater than 5% | 5 Marks |
| 3) | Viva – Voice | 5 Marks |
| 4) | Record | 5 Marks |