SYLLABUS FOR B.SC., (Petroleum & Petrochemicals) I B.Sc., - First Semester Paper I – Fundamentals of Petroleum & Petrochemicals Production

Unit – 1: Petroleum Reservoirs:

Types of Reservoir Rock and Rock Characteristics, Reservoir formations, Physical Properties of Reservoir fluids, Reservoir Drive mechanisms – Gas cap expansion Drive, Solution Gas expansion Drive, Water Drive Mechanism, Secondary recovery Techniques.

Unit – 2: Locating, and Reaching Reservoirs:

Exploration, Snell's law of refraction and reflection – general scheme of Seismic surveys – Drilling-types of drilling – components of rotary oil well drill-offshore drilling technology-Drilling fluids and their properties-Lost Circulation zones.

Unit – 3: Reservoir Evaluation:

Cutting analysis – Mud analysis -Core Analysis-Well logging-self Potential log-Resistivity log-Gamma ray log-Neutron logs - Density logs-Drill stem testing and swab testing.

Unit 4: Natural Gas:

Physical and thermodynamic properties of Natural gas – Low temperature processing of Natural gas for separation of ethane and heavy hydrocarbons

 dehydration and sweetening of Natural Gas, Liquefaction of Natural gas and its Production of Substitute Natural Gas (SNG) from Naphtha.

Unit 5: Liquefied Petroleum Gas:

Sources of LPG – Composition of LPG – Chemical and physical properties of LPG – Production of LPG - Handling and safe use of LPG.

Suggested Reading:

 Introduction to Petroleum Production Volume – 1 by D.R. Skinner Gulf Publishing Company – Houston.

- Petroleum Production in Non Technical language by Forest Gray, Penwell Publishing Company – Tulsa Oklahoma.
- 3) Introduction to Petrochemicals by Sukumar Maiti Oxford I.B.H.
- 4) A text on petrochemicals by Dr. B.K. Bhaskara Rao, Khanna Publishers, Delhi.

I B.Sc., - Petroleum & Petrochemicals MODEL QUESTION PAPER Paper I (At the end of first semester) Fundamentals of Petroleum & Petrochemicals Production

(Time 2 ^{1/2} HRS) Fundamentals of Petroleum & Petrochemicals Production SECTION – I

Answer any **FOUR** questions. All questions carry **equal** marks. 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 - IV

SECTION – II

Answer any **four** questions. All questions carry **equal** marks.

 $4 \ge 5 =$

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 - IV

4 X 10 =

I B.Sc., - Petroleum & Petrochemicals BLUE PRINT Paper – I: SEMESTER - I Fundamentals of Petroleum & Petrochemicals Production

<u>Blue print:</u>

| 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 | 1 | 1 | 2 |
| 4 | Unit –IV | 2 | 2 | 4 |
| 5 | Unit –V | 1 | 1 | 2 |
| | TOTAL | 8 | 8 | 16 |

Note: Questions should be given from Question bank

I B.Sc., - Petroleum & Petrochemicals Paper –I: SEMESTER -I Fundamentals of Petroleum Production <u>QUESTION BANK</u>

Essay Questions: 10 Marks

<u>UNIT –I:</u>

- 1. Explain about the water drive mechanism
- 2. Explain briefly secondary recovery Techniques.
- 3. Write about Gas cap expansion drive mechanism
- 4. Explain about the solution gas expansion drive mechanism
- 5. Explain about the formation and structure of petroleum reservoirs
- 6. Explain briefly about the following,
 - i. Physical properties of reservoir fluids
 - ii. Characteristic properties of reservoir rocks

<u>UNIT –II:</u>

- 1. Write about the general scheme of seismic operations
- 2. Write briefly about components of a Rotary Oil well drill.
- 3. Write about various types of drillings
- 4. Explain in detail about off-shore drilling technology
- 5. Write about the drilling fluids and their properties

<u>UNIT –III:</u>

- 1. Explain about Core Analysis
- 2. Explain about Self-potential log (SPOLOG)
- 3. Explain about the γ ray logging and neuron logs

UNIT –IV:

- 1. What is natural gas? Explain about the physical and thermodynamic properties of natural gas.
- 2. Explain how Dehydration and sweetening of Natural gas is carried out.
- 3. Explain about the Low temperature processing of Natural gas for separation of Ethane.
- 4. Explain in detail about the Production of Substitute Natural Gas (SNG) from Naphtha.

<u>UNIT –V:</u>

- 1. Write down the various sources of LPG. Discuss in detail about the safe handling and safe usage of LPG as a fuel keeping in view its properties.
- 2. What is LPG? Explain in detail about the production of LPG

Short answer questions: 05 Marks

<u>UNIT - I:</u>

- 1. Write about the types of reservoir rocks
- 2. Write a note on reservoir energy
- 3. Write about the characteristic properties of reservoir rocks
- 4. Write a note on contents of reservoirs.
- 5. Write about the physical properties of reservoir fluids

<u>UNIT - II:</u>

- 1. Write about lost circulation zones
- 2. Write about the Snell's law of reflection and refraction
- 3. Write about drilling fluids
- 4. Explain briefly about the properties of drilling fluids

UNIT - III:

- 1. Write a short note on cutting analysis
- 2. Write about the principles of well logging
- 3. Write a note on mud analysis

UNIT - IV:

- 1. Write about composition of natural gas
- 2. Write about the properties of natural gas
- 3. Explain about the liquefaction of natural gas
- 4. Distinguish LNG, SNG and CNG

UNIT - V:

- 1. What is LPG? Write the composition of LPG
- 2. Write briefly about the properties of LPG
- 3. Write briefly about the sources and uses of LPG

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

Practical I (At the end of First Semester)

- 1) Determination of Flash point and Fire point by Penskey Marten apparatus.
- 2) Abel's Flash and Fire Point determination.
- 3) Cleaveland Flash point determination.
- 4) Smoke point determination.

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 |