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UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination , MAY 2018

Program: **M. Tech (Petroleum Engineering)**

Semester – II

Subject (Course): **Enhanced Oil Recovery Techniques**

Max. Marks: 100

Course Code : **PEAU 7009**

Duration: 3 Hrs.

No. of page/s: **2(TWO)**

**THIS PAPER CONTAINS 3 (THREE) SECTIONS. ALL SECTIONS ARE CUMPULSORY.
ASSUME ANY MISSING DATA.**

SECTION A

**There are FIVE (05) Questions of FOUR (4) Marks each. All questions are compulsory
Limit your answer to maximum of 60 words**

Question- 1

Discuss the essential elements of Field Development with special reference to the Phases of hydrocarbon production.

Question-2

Name any 5 (Five) factors that affect Enhanced Oil Recovery process.

Question-3

Name any 5 (Five) rock properties that result in low recovery of hydrocarbons.

Question-4

Define Displacement Efficiency and list the various factors that affect the displacement efficiency in the field implementation of an EOR project.

Question-5

What are the factors that affect the Efficiency due to Conformance?

SECTION - B

**There are Four (04) Questions of 10 (Ten) Marks each. All questions are compulsory.
Limit your answer to maximum of 200 words**

Question- 1

‘Water flooding is considered to be a proven and most popular technique that is used to improve the oil recovery’.

Express your views and discuss the Technicalities & Operating Conditions.

Continued on Page -2.

Question-2

“Chemical Enhanced Oil Recovery is the oldest and most widely used technique in world over.” Justify the above statement. Also discuss this technique in terms of Objective, Classification and Screening Criteria.

Question-3

- (a) Indicate the various reasons for Polymers Flood application in EOR process. Also indicate the higher suitability of synthetic polymers over natural polymers in Polymer Flooding.
- (b) Indicate the oil field screening criteria of Polymer Flood. Also describe the laboratory tests used to Screen & Characterize the polymers prior to their application.

Question-4

Discuss the behavior of steam with temperature and pressure changes. Also discuss Reservoir Heat transfers during steam injection with special reference to

- (a) Formation Temperature Profile.
- (b) Oil bank formation in Migrating Zone.

SECTION - C

There are TWO(02) Questions of 20(TWENTY) Marks each . Both are compulsory.
Limit your answer to maximum of 500 words

Question- 1

Discuss the merits of In-Situ Combustion over Steam Flood. Also describe the Laboratory Evaluation, that is required to be conducted for assessment of its suitability/ application) in field (In-Situ) while using DRY COMBUSTION.

OR

Discuss the merits of In-Situ combustion over steam Flood. Also describe the laboratory Evaluation/results that is required to be conducted for assessment of its suitability/application in field (In-Situ) using WET COMBUSTION.

Question-2

Discuss any field implementation (CASE STUDY) of Enhanced Oil Recovery Technique.

END OF PAPER

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THIS PAPER CONTAINS 3 (THREE) SECTIONS, ALL SECTIONS ARE CUMPULSARY**ASSUME ANY MISSING VALUE****SECTION A**

There are FIVE(05)Questions of 04(FOUR) marks each. All Questions are compulsory
Limit your answer to maximum of 60 words

Question-1:

Considering the concept of Enhanced Oil Recovery application, complete the following sentences:

- (i) It is a process to increase effectiveness of oil removal from _____ .
- (ii) It is a process to increase the volume of rock contacted by _____.
- (iii) It is a process to reduce/eliminate the _____ that trap the oil.
- (iv)It is a process to reduce the _____ of oil to improve the Mobility.

Question-2:

Name 5 (Five) Drive Mechanisms (on one to five scale in order of their increasing applicability) that are promising / demanding candidates for implementation of Enhanced Oil Recovery application.

Question-3:

Describe briefly the vital properties of oil that affect the recovery Process.

Question-4:

Define Sweep Efficiency and list the various Factors that affect the Sweep Efficiency in implementation of an EOR project.

Question-5:

What are the factors that affect Efficiency due to conformance?

SECTION - B

**There are FOUR (04) questions of 10(TEN) marks each. All questions are compulsory
Limit your answer to maximum of 200 words**

Question-1:

Discuss the application of water flooding in conjunction with various primary drive mechanisms. Also highlight the various issues related to water flood implementation technique.

Question-2:

Describe the basic Factors that are applicable in Hydrocarbon Miscible Flooding (HCMF). Also discuss briefly, the applicability and various aspects of Gas Injection with special reference to Hydrocarbon Gas Injection using Vaporizing gas drive and Condensing gas drive.

Question-3:

What are Surfactants? Also describe the Characterization of surfactants for EOR.

Question-4:

How do you visualize the Thermal Recovery by Steam Injection? Discuss the properties of saturated steam with special reference to quality of steam.

SECTION - C

**There are TWO(02) Questions of 20(Twenty)Marks each. Both are compulsory.
Limit your answer to maximum of 500 words**

Question-1:

‘Heavy oil and extra heavy oil make up about 40% of the world’s total oil resources, but high viscosity creates difficulties with production, transportation and processing of heavy oils’.

In view of above indicate why & which thermal recovery methods should be implemented to produce more hydrocarbons from such reservoir? Further, discuss the salient features of In-Situ Combustion Technique together with the technical aspects in terms of:

- (i) Field application.**
- (ii) Operating Methods**
- (iii) Production Scenario**

OR

Starting from injection well to production well, describe the various zones /segments of Fire Front. Also discuss the variation of methods of in situ combustion.

Question-2

Discuss any field implementation (CASE STUDY) of Enhanced Oil Recovery Technique.

