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## UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

**Program: M. Tech. Petroleum Exploration**  
**Subject (Course): Oil and Gas Field Development**  
**Course Code : PTEG 807**  
**No. of page/s: 3**

**Semester – III**  
**Max. Marks : 100**  
**Duration : 3 Hrs.**

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### Instructions:

- a. Answers must carry the supporting material such as equations and diagrams
- b. Abbreviations used in the questions are standard and have their usual meaning
- c. Make appropriate assumptions where data is not supplied

### SECTION A

**Answer all five questions. Each Question carries 4 Marks** **5x4= 20 Marks**

- Question 1** Define the Classification of Traps. Explain in detail with suitable figures. (4 Marks)
- Question 2** Describe Sedimentary Rock, O/W; O/G; G/W Contact, Migration and Generation of Hydrocarbons. (4 Marks)
- Question 3** Write down the Short Notes on Time Value of Money (TVM), Pay Back Period, Capex and Gross Revenue. (4 Marks)
- Question 4** Define Well Spacing. What are the different rules of Well Spacing? (4 Marks)
- Question 5** Define Contour Map, Faults, Isobar and Isopach maps with suitable figure. (4 Marks)

### SECTION B

**Answer all five questions. Question No. 1 to 4 are compulsory. Answer any one question from Questions No.5. Each Question carries 8 Marks** **5x8= 40 Marks**

- Question 1** Write down the short notes on Probable Possible, Proved Reserves, Contingent and Prospective Resources.

**Given the following data of oil field, calculate the Initial Oil in Place.**

Area = 24,650 acres

Net productive thickness = 54 ft.

Porosity = 20%

Average  $S_{wi}$  = 35%

$B_o$  at  $p_i$  = 1.42 bbl/STB

(8 Marks)

**Question 2** Explain Direct Line Drive, Staggered Line Drive, 5-Spot, and Central Line Pattern with suitable Figures. (8 Marks)

**Question 3** Write down the Output and Input Files in Black Oil IMEX Simulator of CMG. What are the different deliverables for Geo-cellular modeling in Petrel?

**Define a BOX and Set the depth below sea level of the tops of each cell in the box to 5,000 feet using the BOX, TOPS and ENDBOX keywords for given values:**

X direction - cell 1 to cell 10

Y direction - cell 1 to cell 10

Z direction - cell 1 to cell 1 (top layer only)

(8 Marks)

**Question 4** What is Decline Curve Analysis? What are the Advantages of Decline Curve Analysis?

A well has declined from 100 BOPD to 95 BOPD during a one-month period. Assuming exponential decline, predict the rate after 11 more months and after 22 months. Also predict the amount of oil produced after one year

(8 Marks)

**Question 5** What are the different types of Drive Mechanism? Explain Types of Drive Mechanism in Detail with suitable Figures and examples. (8 Marks)

**OR**

**Question 5** What is Portfolio? Describe Portfolio Management. What are the applications of Portfolio Optimization? (8 Marks)

### SECTION C

**Answer all two questions. Question No.1 is compulsory. Answer any one question from Questions No. 2. Each Question carries 20 Marks** **2x20 = 40 Marks**

**Question 1** (20 Marks)

1-a Define Initial Development Plan. Write down the different steps of Initial Development Plan. Write down the different factors on which development strategy of Oil and Gas Fields depends. (10 Marks)

1-b Find the payback period for the cash flows given as below:

Year	Cash flow (\$)
0	-30,000
1	10,000
2	9,000
3	8,000
4	4,000

(10 Marks)

**Question 2**

**(20 Marks)**

2-a Explain Monte Carlo Simulation. What are the advantages and drawbacks of Monte Carlo Simulation? What are the Limitations and benefits of using MBE?

(10 Marks)

2-b Define decision tree. What are the advantages and disadvantages of decision tree? Explain Sensitivity Analysis and Tornado Plot.

(10 Marks)

**OR**

2-a What is Net Present Value (NPV)? **How to calculate NPV? If any Person invested in three opportunities and invested as follows:**

Rs.1000      1<sup>st</sup> Year  
Rs.2000      2<sup>nd</sup> Year  
Rs.3000      3<sup>rd</sup> Year

To calculate NPV, we have to calculate PV factor of every cash flow on a discount rate of 9% (say)

(10 Marks)

2-b Define Return on Investment (ROI), Objectives of Well Testing, Investment Efficiency, Internal Rate of Return (IRR) and Expected Monetary Value (EMV)?

**Find the payback period for the cash flows given as below:**

Year	Cash flow (\$)
0	-25,000
1	20,000
2	15,000
3	10,000
4	5,000

(10 Marks)