Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Programme Name: M. Tech. Petroleum Engineering — **Semester : III**
Course Name : Oil/Gas Field Development — **Time : 03 hrs.**
Course Code : PEGS: 8002 — **Max. Marks: 100**
Nos. of page(s) : 3

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

S. No.		Marks	CO
Q 1	Explain different factors on which development strategy of Oil and Gas Fields depends.	4	CO1
Q 2	Define Initial Development Plan. Write down the different steps of Initial Development Plan.	4	CO1
Q 3	Define Appraisal Well, Discovery Well, Development Well and Migration.	4	CO1
Q 4	Explain Source Rock, Sedimentary Basin, Cap Rock and Traps.	4	CO1
Q 5	Describe Contour Map, Generation of Hydrocarbons, OWC and GOC.	4	CO1
	SECTION B		
Q 1	Define Rational Development of reservoir. Explain different studies to be carry out during the rational development of reservoir.	8	CO1
Q 2	Explain Well Spacing, Different rule of well Spacing, Direct Line Drive, Staggered Line Drive and Central Line Pattern with suitable Figures.	8	CO3
Q 3	Explain input and output files in Black Oil IMEX Simulator of CMG? Explain different deliverables for Geo-cellular modeling in Petrel. Write down modeling software available in market.	8	CO5
Q 4	Define Recovery Factor and Volumetric Method. Write down the formula to calculate Oil in place by Volumetric Method.	8	CO2

	Solve the following from the given the data of oil field, calculate the Initial Oil in Place. Area = 25,500 acres Net productive thickness = 75 ft. Porosity = 20% Average S_{wi} = 50% Bo at pi = 1.35 bbl/STB		
	OR		
Q 4	Define Decline Curve Analysis. Explain different types of Decline Curve Analysis. A well has declined from 150 BOPD to 110 BOPD during a one-month period. Assuming Exponential decline, predict the rate after 11 more months.	**8**	**CO2**
Q 5	Define Principle of Material Balance Equation (MBE). Explain Assumptions and Advantages of using MBE. When to use MBE? What are the Sources of Data for use in MBE?	**8**	**CO2**
	OR		
Q 5	Define Reserves. Describe Objective, Time of Estimation and types of Reserves.	**8**	**CO2**
	SECTION-C		
Q 1	Define Drive Mechanism. Write down the correlations to estimate Oil Recovery Factors under Solution gas drive (API Study) and Water drive (API Study) and Guthrie-Greenberger Study. Sandstone oil reservoir has the following reservoir and fluid characteristics: ϕ = 30% Bo = 1.136 RB/STB k=600 mD h=125 ft S_w=24% P_b = 2250 psig μ_w = 0.7 cp μ_b = 3.5 cp The initial reservoir pressure is 2250 psig and abandonment pressure has been calculated 900 psig. Determine expected recovery efficiency for depletion drive condition.	**20**	**CO3**
Q 2	Explain Time Value of Money, Pay Back Period, Internal Rate of Return (IRR), Sensitivity Analysis and Risk Analysis.	**20**	**CO4**

	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 $\text{Payback Period} = [\text{Last Year with a negative NCF}] + \frac{\text{Absolute Value of NCF in that Year}}{\text{Total Cash Flow in the Following Year}}$		
	OR		
Q 2	Explain Net Present Value (NPV). How to calculate NPV? If any Person invested in five opportunities and invested as follows: Rs.500 — 1st Year Rs.1000 — 2nd Year Rs.1500 — 3rd Year Rs.2000 — 4th Year Rs.2500 — 5th Year To calculate NPV, we have to calculate PV factor of every cash flow on a discount rate of 10% (say).	**20**	**CO4**