UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: Reservoir Engineering I   Semester: IV
Program: B.Tech APE GAS   Time   : 03 hrs.
Course Code: PEAU 2010   Max. Marks: 100

Instructions:
All Questions are Compulsory.

	SECTION A (5Qx4M=20Marks)		
S. No.		Marks	CO
Q 1	Classify the rock types and explain their relevance to petroleum?	4	CO1
Q 2	Recognize various factors that have a major role in understanding the hydrocarbon reservoir? Also, the parameters that are effected by reservoir fluid properties.	4	CO2
Q 3	Describe the causes for oil to flow from reservoirs?	4	CO3
Q 4	State the three basic steps involved for fluid evaluations?	4	CO3
Q 5	Explain the purpose of developing a material balance equation for a reservoir?	4	CO4
	SECTION B (4Qx10M= 40 Marks)		
Q 1	a) The pore compressibility of a reservoir rock has been determined to be $3 * 10^{-6}$ psi^{-1}. The porosity measured at ambient conditions is 15% and the bulk volume of 100 cm^3. Calculate the porosity of the reservoir at a depth of 10000 ft TVD. The overburden pressure is 1 psi/ft. Comment on the validity of the approach. (5 Marks) b) A laboratory capillary pressure test was conducted on a core sample .The core has a porosity and permeability of 16% and 80 md, respectively. The capillary pressure-saturation data are given as follows: 	10	CO1

S_w	Capillary Pressure (psi)
1.0	0.50
0.8	0.60
0.6	0.75
0.4	1.05
0.2	1.75

	The interfacial tension is measured at 50 dynes/cm. Further reservoir engineering analysis indicated that the reservoir is better described at a porosity value of 19% and an absolute permeability of 120 md. Generate the capillary pressure data for the reservoir. (5 Marks)		
Q 2	a) A layered reservoir has the following properties 	Layer	Width (m)	Thickness (m)	Length (m)	Permeability (mD)
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1	1000	83	5000	132
2	1000	146	5000	62
3	1000	275	5000	27
4	1000	32	5000	425 | Calculate the average permeability of the reservoir? (5 Marks) b) Analyze the relation between Darcy's Law and Ohm's Law? (5 Marks)	10	CO2
Q 3	Discuss the applicability of different reservoir estimation techniques at different stages in life cycle of oil and gas field.	10	CO4
Q 4	Differentiate between the types of recovery methods and formulate a procedure in identifying the implementation of these stages during the lifetime of reservoir?	10	CO3

SECTION-C
(2Qx20M=40 Marks)

Q 1	Classify different types of oil reservoirs and illustrate the phase behaviour change for each types of oil reservoir with diagram?	20	CO3
Q 2	Formulate a pictorial representation of volumetric changes that occurs during the natural productive life of an oil reservoir and develop a material balance equation that includes all PVT and Rock properties?	20	CO4