Name: **Enrolment No:**	

UPES

End Semester Examination, December 2024

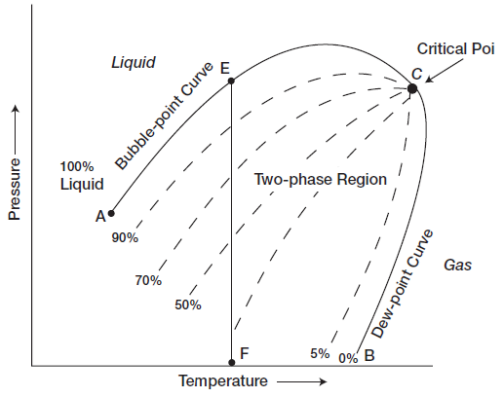
Course: Reservoir Engineering — **Semester: I**

Program: MTech, Petroleum Engineering — **Time : 03 hrs.**

Course Code: PEAU 7002 — **Max. Marks: 100**

Instructions: Assume rw=0.25 ft wherever required

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Define Gas solubility with characteristics graph	**4**	**CO1**
Q 2	Define the term "Viscosity", its unit SI, field with conversion factor, also provide the viscosity of water.	**4**	**CO1**
Q 3	Identify and define various crucial points mentioned in the given picture. 	**4**	**CO2**
Q 4	Define "extensive and intensive properties" with examples.	**4**	**CO1**
Q 5	Highlight the purpose of conducting the "constant composition expansion test."	**4**	**CO2**

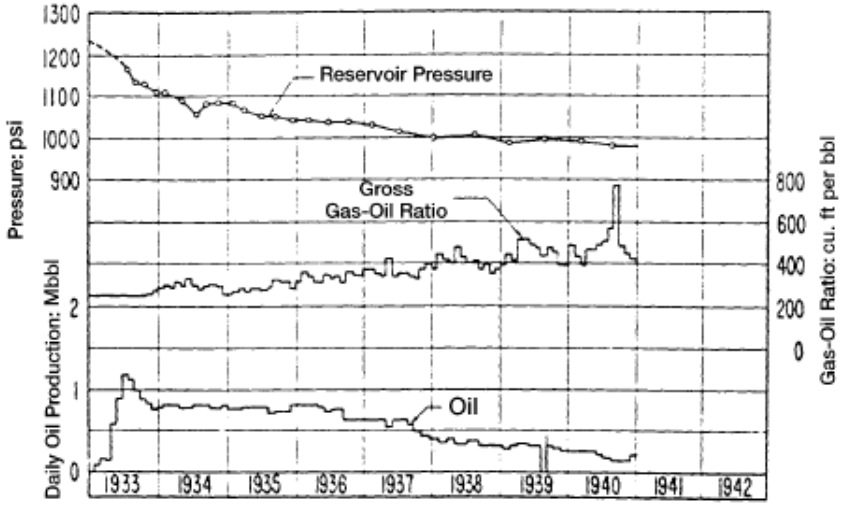
SECTION B
(4Qx10M= 40 Marks)

Q 6	A hydrocarbon reservoir is characterized by five distinct formation segments that are connected in series. Each segment has the same formation thickness. The length and permeability of each section of the five-bed reservoir are given below: Calculate the average permeability of the reservoir by assuming Linear Flow System	**10**	**CO3**

Length, ft	Permeability, md
150	80
200	50
300	30
500	20
200	10

Q 7	Given the following core data, estimate the geometric average permeability:		**10**	**CO3**

Sample	h_i, ft	k_i, md
1	1.0	10
2	1.0	30
3	0.5	100
4	1.5	40
5	2.0	80
6	1.5	70
7	1.0	15
8	1.0	50
9	1.5	35
10	0.5	20

Q 8	Derive the equation for the weighted average permeability for the linear flow.	**10**	**CO4**
Q 9	Identify and analyze the behavior of the drive mechanism based on the given characteristics curve and discuss various important points. 	**10**	**CO5**

<table>
<tr><th colspan="4">SECTION-C (Attempt only 2)
(2Qx20M=40 Marks)</th></tr>
<tr><td>Q 10</td><td>Explain the characteristics of the various oil reservoir based on the composition, GOR, P-T relationship also provide the phase envelopes.</td><td>20</td><td>CO5</td></tr>
<tr><td>Q 11</td><td>A laboratory capillary pressure test was conducted on a core sample taken from the Nameless Field. The core has a porosity and permeability of 12% and 60 md, respectively. The capillary pressure-saturation data are given as follows:
The interfacial tension is measured at 45 dynes/cm.
Further reservoir engineering analysis indicated that the reservoir is better described at a porosity value of 20% and an absolute permeability of 150 md. Generate the capillary pressure data for the reservoir.
<table><tr><th>S_w</th><th>p_c, psi</th></tr><tr><td>1.0</td><td>0.50</td></tr><tr><td>0.8</td><td>0.60</td></tr><tr><td>0.6</td><td>0.75</td></tr><tr><td>0.4</td><td>1.05</td></tr><tr><td>0.2</td><td>1.75</td></tr></table></td><td>20</td><td>CO3</td></tr>
<tr><td>Q 12</td><td>Describe in detail the concept of two-phase relative permeability with the characteristic curve and various important point associated with it.</td><td>20</td><td>CO4</td></tr>
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