UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Programme Name: B.Tech., APE Gas   **Semester** : VIII
Course Name : Enhanced Oil Recovery   **Time** : 03 hrs
Course Code : CHGS 3104P   **Max. Marks :** 100
Nos. of page(s) : 1

Instructions: Assume any data missing.

SNo	SECTION A (6*5=30M)	Marks	CO
Q 1	Define conductance ratio and mention its significance.	5	CO1
Q 2	Classify various operations available for water treatment for its application in flooding.	5	CO2
Q 3	Define critical micelle concentration (CMC) and mention its significance.	5	CO3
Q 4	Classify various steam based thermal EOR methods.	5	CO4
Q 5	List various thermal method modifications proposed to obtain the highest recovery for the lowest expenditure of thermal energy.	5	CO4
Q 6	Classify various In-situ combustion thermal EOR methods.	5	CO4
	SECTION B (5*10=50M)		
Q 7	Explain various injection well patterns available for flooding operations	10	CO1
Q 8	A layered reservoir with no contact between the layers (as in figure) is subjected to water flooding. The displacement of fluids in layers is piston-like and the breakthrough is observed in j^{th} layer with permeability of k_j. Then, derive the following expression given by Stile for the fractional flow of water (f_w) in the reservoir. $$f_w = \frac{M\,C_j}{M\,C_j + (C_t - C_j)}$$ where, $M = \frac{k_{rw}}{k_{ro}}\frac{\mu_o}{\mu_w}$; C_t is the total kh of the formation; C_j is the cumulative kh up to j^{th} layer	10	CO2
Q 9	Demonstrate with a neat diagram the working of a miscible gas flood.	10	CO3
Q10	Illustrate with a neat diagram the working of air injection based thermal EOR method.	10	CO4
Q11	Explain the process of microbial enhanced oil recovery with its screening criteria.	10	CO4
	SECTION-C (1*20=20M)		
Q12	Classify various chemical enhanced oil recovery methods and elaborate with a neat diagram the various phase environments encountered in miscellar flooding operations.	20	CO3