Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Enhanced Oil Recovery **Semester: VIII**
Program: B. Tech. APE UP **Time 03 hrs.**
Course Code: PTEG: 427 **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	Define residual oil saturation, free water level, pour point and viscous fingering.	**4**	**CO1**
Q 2	Define Productivity Index, fluid pressure, hydrodynamic pressure and rock pressure.	**4**	**CO5**
Q 3	Write down the name of different simulators for different recovery processes.	**4**	**CO6**
Q 4	Explain the concept of EOR Method, What are the different parameters on which recovery efficiency depend?	**4**	**CO1**
Q 5	Write down the different screening criteria for N2 & Flue Gas Flooding, Hydrocarbon Miscible and CO2 Flooding.	**4**	**CO3**
	SECTION B		
Q 6	Define THAI, VAPEX, SAGD, CHOPS and CSS methods with suitable diagrams.	**10**	**CO3**
Q 7	Explain Surfactant Flooding and ASP Flooding Methods. Write down the case history of ONGC field where ASP flooding is successful.	**10**	**CO5**
Q 8	Explain WAG process. Write down the general criteria for WAG. Describe different types of WAG process with suitable example and Figure.	**10**	**CO2**
Q 9	Explain MEOR flooding methods. Write down the types of microbes cultured in laboratory. What are the need and major applications of MEOR methods? **OR** Explain Microbial products and Role of Metabolites for their contributions to Enhanced oil recovery. Write down the case study of Microbial EOR Method developed in India.	**10**	**CO4**

SECTION-C			
Q 10	10-a Describe different steps in Water Flooding Process. What are the utility of Temperature Survey, Flow meter Survey and Radioactive Survey during water Injection? What are the advances in EOR? **(10 Marks)** 10-b Explain water quality? Write down the major problems caused by water during oil operations. Write down the recommended parameters for injection water. Explain Relative Plugging Index. **(10 Marks)**	**20**	**CO2**
Q 11	11-a Describe different methods of Thermal Recovery. Explain In-Situ Combustion Method in detail with suitable Figure. What are the limitations and problems in In-Situ Combustion Method? **(10 Marks)** 11-b A Combustion test in confined pattern was conducted on a depleted oil Reservoir with a current oil recovery of 10 percent. Estimate the final oil Recovery expected after the commercial development of the in situ Combustion method given the following: Confined acre 1.25 acres Net thickness 45 ft Effective porosity 28% Irreducible water saturation 24% Oil formation volume factor Initial 1.20 Current 1.08 Cumulative oil production of the central Well P, as the effect of combustion ΔN_c=12,750 bbl **(10 Marks)** **OR**	**20**	**CO3**

	11-a Describe CO2 flooding? What are the screening criteria and limitations of CO2 flooding? Write down the most suitable Flooding Method for deep Reservoirs. **(10 Marks)** 11-b Calculate the CO_2 static wellhead pressure $P_{w,}$ when the static bottom hole pressure is the miscibility pressure of 2114 p_{sia}. The following additional information is available: Bottom Hole Temperature $T_R = 170^o$ F (76^o C) Surface Temperature $T_S = 70^o$ F (21^o C) CO_2 specific gravity SG=1.529 (air=1) CO_2 deviation factor Z = 0.56 is assumed to be practically Constant between reservoir pressure and temperature range Reservoir depth D = 4264 ft (1300 m) **(10 Marks)**		