Name:

Enrolment No:

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

Course: Unconventional Gas Resources –SET-1 **Semester: VI**
Programme: B.Tech (APE-GAS) **No of Pages:02**
Time: 03 hrs. **Max. Marks: 100**

Instructions: Answer all the questions from Section-A and Section-B, Answer any two questions from Section-C. Assume appropriate data if missing. Follow the sequence of questions. Answers should be specific and legible. Draw diagrams, graphs using pencil wherever necessary. The units mentioned in this question paper have specific meaning with respect to oil and gas industry.

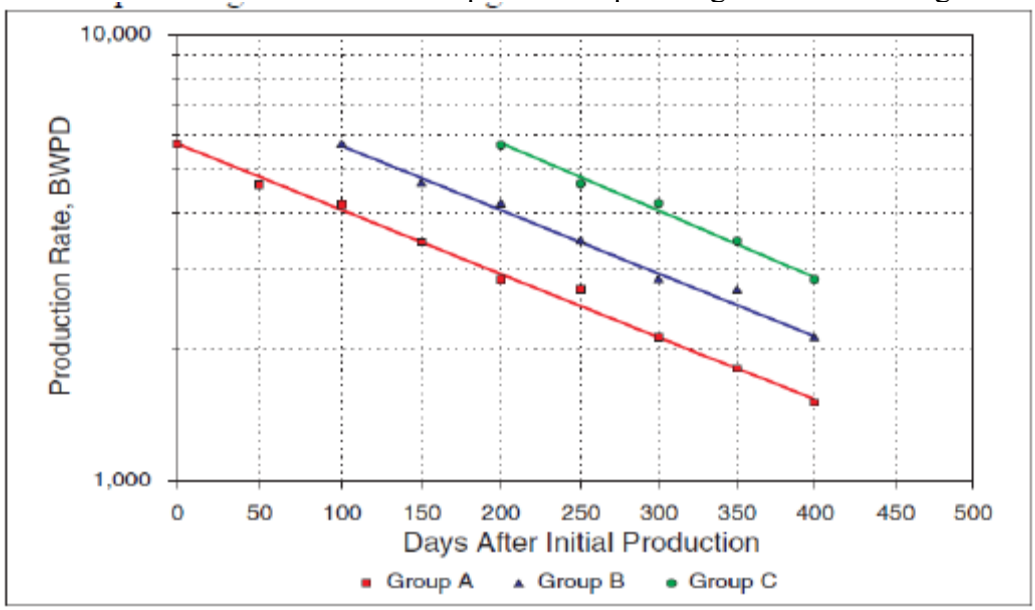
SECTION A

S. No.		Marks	CO
Q 1	**Define** shale oil and oil shale with suitable example.	**05**	**CO1**
Q 2	**Relate** various logging techniques for TOC evaluation of shale gas reservoir	**05**	**CO2**
Q 3	**How** do you estimate the thermal maturity of shale rock	**05**	**CO1**
Q 4	**Correlate** and **summarize** TTI, Ro, TAI	**05**	**CO2**

SECTION B

Q 5	**Remember** and **construct** a typical CBM reservoir production history curve and highlight the reservoir parameters	**10**	**CO1**
Q 6	**Demonstrate** the cyclic steam stimulation method to recover heavy oil. Write advantages and disadvantages	**10**	**CO3**
Q 7	**Describe** the conventional steam assisted gravity drainage process with schematic flow chart.	**10**	**CO3**
Q 8	**Determine** the dimensional less time. For the following tabular data. Assume, Porosity= 0.19(fraction), Viscosity= 0.02 cp, Compressibility = 0.002 psi^{-1}	**10**	**CO2**

Formation Permeability, md	Fracture Half length, ft	Start of linear flow(days)	End of linear flow(days)	Start of pseudo radial flow(days)
0.001	100 500 1000	341 8,523 34,091	1752 43,788 175,152	4545 113,636 454,545
0.01	100 500 1000	34 852 3,409	175 4379 17515	455 11,364 45,455
0.1	100 500 1000	3 85 341	18 438 1752	45 1136 4545
1	50 100 250	0.1 0.3 2.1	0.4 1.8 10.9	1.1 4.5 28.4

SECTION-C			
Q 9	**Develop** a material and energy balance equation of depressurization technique to produce methane from gas hydrate revoir.	**20**	**CO4**
Q 10	**Create** a plot and **analyze** for peak production of water in a CBM well for the following data. Determine, Peak production rate of water if the given well in the area of a planned CBM project will have the capacity to receive expected production waters throughout the first year from the wells without exceeding TDS limits of governmental regulations. Initially, 25 wells will be simultaneously brought on-stream on January 1. One hundred days later, a second group of 50 will be brought on-stream. Thereafter, in 100 days a third group of 25 wells will be brought on-stream. Assume each well follows the production pattern given in below Figure  **(OR)** **Apply** drill stem test and slug test procedures for unconventional wells and **Compare** the above two tests followed by **analysis.**	**20**	**CO5**

Name: **Enrolment No:**	UPES

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

Course: Unconventional Gas Resources- SET-2 **Semester: VI**
Programme: B.Tech (APE-GAS) **No.of Pages:02**
Time: 03 hrs. **Max. Marks: 100**

Instructions: Answer all the questions from Section-A and Section-B, Answer any two questions from Section-C. Assume appropriate data if missing. Follow the sequence of questions. Answers should be specific and legible. Draw diagrams, graphs using pencil wherever necessary. The units mentioned in this question paper have specific meaning with respect to oil and gas industry.

SECTION A

S. No.		Marks	CO
Q 1	**Define** formation fracture pressure and fracture conductivity	**05**	**CO1**
Q 2	**Draw** the three-dimensional fracture geometry of PKN model and mention all the notations.	**05**	**CO2**
Q 3	**Identify** and **discuss** four flow regimes that can occur in fractured reservoir	**05**	**CO1**
Q 4	**Correlate** and **summarize** TTI, Ro, TAI	**05**	**CO2**
	SECTION B		
Q 5	**How** do you dispose the water produced from CBM reservoir, **Discuss** any one process.	**10**	**CO1**
Q 6	**Demonstrate** the cyclic steam stimulation method to recover heavy oil. Write advantages and disadvantages	**10**	**CO3**
Q 7	**Describe** the conventional steam assisted gravity drainage process with schematic flow chart.	**10**	**CO3**
Q 8	**Illustrate** the Evaluation of TOC of shale gas reservoir	**10**	**CO2**
	SECTION-C		
Q 9	**Create** a **Summarized** table for the chemical inhibition, thermal stimulation and depressurization production techniques of gas hydrate reservoir.	**20**	**CO4**
Q 10	**Compare** and Plot the graphs for the parameters temperure, pressure, depth, mud specific weight, annular velocity of air gas drillling and mud drilling techniues . **(OR)** **Apply** the following well data on which a draw down test was conducted. Estimate the k, and S values and **analyze** the results. P_i = 3732 psia, T = 673^{0}R, h = 20 ft, Ø = 0.10, r_w = 0.29 ft, r_e = 2640 ft, Avg μ = 0.021 cp, γg = 0.68, Avg Z = 0.85, Ć = 2.24 ×10$^{-4\ psi-1}$ q_{sc} = 5.65 MMScfd Where ,$m=\frac{1637\,q_{sc}T\mu Z}{kh}$, $S' = 1.151\left[\frac{p_i^2 - p_1{}^2{}_{hr}}{m} - \log\frac{k}{\phi\bar{\mu}\bar{C}r_w{}^2} + 3.23\right]$.	**20**	**CO5**

time, hr	P_{wf} , psia
1.60	3729
2.67	3546
3.20	3509
5.07	3491
6.13	3481
8.00	3433
15.20	3388
20.00	3366
30.13	3354
40.00	3342
60.27	3323
80.00	3315
100.27	3306
120.23	3295