Name: Enrolment No:	

UPES

End Semester Examination, May 2023

Programme Name: B.Tech. (APEG) **Semester :** VI
Course Name : Unconventional Gas Resources **Time :** 3 Hrs.
Course Code : CHGS3002P **Max. Marks :** 100
Nos. of page(s) : 2

Instructions:
1. All questions are compulsory.
2. Assume any missing data, if any.

S. No.	Section - A (4Qx5M = 20)	Marks	CO
Q1	Differentiate between face cleat and butt cleat in a coal matrix.	**4**	**CO1**
Q2	Differentiate between conventional reservoir and unconventional reservoir.	**4**	**CO1**
Q3	List the factors that can be identified by logging in tight reservoirs.	**4**	**CO3**
Q4	Describe the normal ways of gas storage in gas shale.	**4**	**CO1**
Q5	Enumerate the characteristics of shale gas.	**4**	**CO2**
	Section - B (4Qx10M = 40)		
Q6	A 0.7 gravity gas is at 600 psia and 90^0F. To what value can the temperature be reduced without hydrate formation. Use hydrate equilibrium curve given in appendix 1.	**10**	**CO4**
Q7	Describe the characteristics of the various gas hydrate structures.	**10**	**CO4**
Q8	Discuss the additives commonly used in fracturing fluid and their functions.	**10**	**CO3**
Q9	Explain the process of fracturing in tight reservoir with the help of schematic diagram.	**10**	**CO3**
	Section - C (2Qx20M = 40)		
Q10	Calculate C, H, N, S % from the following observations for a sample of coal: a) 2.1 g of coal is burnt in combustion tube. The increase in weight of anhydrous $CaCl_2$ is 0.53 gm and increase in weight of KOH tube is 5.73 gm. b) 0.75 gm of coal in Kjeldahl's experiment released NH_3, which is passed in 50 ml 0.12 N HCl. The HCl requires 39 ml of 0.12 N NaOH to neutralize in back titration.	**20**	**CO4**

	c) Washings of bomb pot when 1.9 gm of the coal sample in bomb calorimeter experiment is treated with $BaCl_2$ solution to give 0.41 gm $BaSO_4$		
Q11	Discuss the following: a) Gas Shale vs Shale Gas (Marks - 6) b) Langmuir adsorption Isotherm vs Freundlich adsorption isotherm (Marks - 7) c) Industry challenges associated with exploration and exploitation of shale gas (Marks - 7)	**20**	**CO3**

Appendix 1 - Hydrate Equilibrium Curve