



<b>Name:</b>	
<b>Enrolment No:</b>	

**UPES**  
**End Semester Examination, Dec 2024**

**Course:** Unconventional Gas Resources  
**Program:** B.Tech. (APEG)  
**Course Code:** CHGS4008

**Semester :** VII  
**Time :** 3 Hrs.  
**Max. Marks :** 100

**Instructions:**

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

**SECTION - A**  
**(5Qx4M= 20 Marks)**

S. No.	Question	Marks	CO
Q1	Specify reserve quality for the assessment of unconventional resources.	4	CO1
Q2	Define 1P, 2P and 3P reserves	4	CO1
Q3	Explain the main characteristics of unconventional resources.	4	CO2
Q4	Discuss various inhibition techniques of hydrate formation.	4	CO2
Q5	Examine the main properties which are affecting the gas adsorption capacity of coal.	4	CO3

**SECTION - B**  
**(4Qx10M= 40 Marks)**

Q6	Explain the Langmuir Isotherm and elaborate on its potential applications.	10	CO2
Q7	Discuss any five chemical additives used in fracturing fluid along with their functions and example	10	CO2
Q8	Interpret the challenges associated with the development of gas hydrates.	10	CO3
Q9	A shale formation was characterized to assess the gas generation potential using Rock Eval Pyrolysis. Where the free gas released at initial temperature 410 <sup>0</sup> C, S1 is 4 mg/g HC, pyrolyzed gas released is 2 mg/g HC, S3 is 1.2 mg CO <sub>2</sub> /g Rock, TOC =5 %, T <sub>max</sub> is 478 <sup>0</sup> C, Calculate the following: a) Hydrogen Index b) Oxygen Index	10	CO4

**SECTION - C**  
**(2Qx20M= 40 Marks)**

Q10	Examine gas shales according to the following topics: a) Resources	20	CO3
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	b) Global distribution c) Best Examples d) Main Technologies		
<b>Q11</b>	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 $\text{CaCl}_2$ 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 $\text{NH}_3$ , 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. c) Washings of bomb pot when 1.9 gm of the coal sample in bomb calorimeter experiment is treated with $\text{BaCl}_2$ solution to give 0.41 gm $\text{BaSO}_4$	<b>20</b>	<b>CO4</b>