Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2019

Programme Name: B.Tech: APE (Gas) **Semester : VIII**

Course Name : Air Fractionation & Gas Purification **Time : 03 hrs**

Course Code : CHGS 4002 **Max. Marks : 100**

Nos. of page(s) : 02

Instructions: Assume Suitable and necessary data if required and Justify

SECTION A -Answer ***all*** the questions

S. No.		Marks	CO
Q 1	How PSA is used in Industrial Gas production	**8**	**CO4**
Q 2	List out the industrial applications of all Rare Gases	**7**	**CO5**
Q 3	Discuss the Thermodynamic analysis of Oxyton Cycle	**8**	**CO3**
Q 4	Explain the concept of Exergy with equations	**7**	**CO3**
	SECTION B -Answer ***all*** the questions		
Q 5	Describe Methane wash recovery for CO production. Explain how this method can be simplified	**15**	**CO4**
Q 6	Explain Nitrogen recovery by membrane separation and compare it with cryogenic method of recovery.	**15**	**CO5**
Q 7	Describe with neat flow scheme the cryogenic method for recovery of Argon.	**15**	**CO2**

SECTION-C

Q 8.	Explain any one of the following, in detail, with a neat PFD. a) The recovery of Helium from Natural Gas OR b) The recovery of food grade CO2 from refinery off-gases.	**15**	**CO4**
Q 9.	a) Discuss the drawbacks of Adsorption for Industrial Gas Production. OR b) Discuss the advantages and limitations of membrane separation technique over conventional process	**10**	**CO5**

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SECTION A -Answer ***all*** the questions

S. No.		Marks	CO
Q 1	What are the Advantages & Disadvantages of Adsorption?	8	CO4
Q 2	Identify the factors necessary for optimum recovery of Argon	7	CO5
Q 3	Discuss Lachmann principle in terms of saving energy?	8	CO3
Q 4	Explain the concept of Exergy with equations	7	CO3
	SECTION B -Answer ***all*** the questions		
Q 5	Describe Methane wash recovery for CO production. Explain how this method can be simplified	15	CO4
Q 6	Compare various technologies used for Non Cryogenic air separation plants	15	CO5
Q 7	Explain with neat PFD the CO_2 recovery processes from Refinery off gases	15	CO2
	SECTION-C		
Q 8.	a) Describe Helium recovery from Natural Gas with neat PFD OR b) What are the sources of Hydrogen? Explain in detail the usage of Hydrogen in Refineries	15	CO4 CO5
Q 9.	c) Discuss the selection criteria for Adsorbents in separation of gases. OR	10	

	d) Discuss the advantages and limitations of membrane separation technique over conventional process		