Name:

Enrolment No:

UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2018

Programme Name: B.Tech CE+RP **Semester : VII**
Course Name : Petroleum Refining Technology **Time : 03 hrs.**
Course Code : CHEG 437 **Max. Marks: 100**
Nos. of page(s) : 3
Instructions: (1) Assume suitable Data wherever necessary

SECTION A (Attempt all Questions**)**

S. No.		Marks	CO
Q 1	Discuss about different tests and properties of aviation turbine fuel in brief.	**10M**	**CO2**
Q 2	Consider the following crude assay which has API =29 Volume % / TBP (°C): 0 / 216; 10 / 243; 30 / 268; 50 / 284; 70 / 304; 90 / 318; 95 / 327; 100 / 334 Plot the TBP data and calculate the volume average boiling point, mean average boiling point empirically and the characterization factor. Comment on the result.	**10M**	**CO3**
Q 3	A naphtha fraction has the following ASTM D86 distillation data: Volume % / Temperature (°C): 0.0 / 138.8; 10.0 / 149.6; 30.0 / 158.8; 50.0 / 165.8; 70.0 / 169.9; 90.0 / 178.1; 95.0 / 180.4 Obtain the TBP curve using Daubert method.	**10M**	**CO3**

Index number i	A_i	B_i
1	7.4012	0.6024
2	4.9004	0.7164
3	3.0305	0.8008
4	0.8718	1.0258
5	2.5282	0.8200
6	3.0419	0.7750
7	0.1180	1.6606

Q 4	Discuss the Isomerization of Light naphtha in detail?	**10M**	**CO4**
Q 5	Explain Visbreaking process with reference to the following points only with a suitable diagram. a) Feed stock b)Visbreaking Reactions c)Visbreaking Severity d) Kinetics of Visbreaking e) Product Yield and Properties	**10M**	**CO4**
Q 6	a)Find the catalyst volume needed for the desulphurization of VGO. The initial Sulphur content is 2.3 wt% and the final Sulphur content of the product is 0.1 wt%. The reaction rate constant (h^{-1}) can be expressed as : $k = 2.47\,x\,10^{10} \exp\left(\frac{-14,995}{T}\right)$ The reaction conditions are T=415°C and P=5.1 M Pa. The order of the reaction was found to be n=1.7. The feed flow rate is 167,500 kg/h and has a density of 910 kg/ m^3. b)What is the role of Hydrotreating in a refinery?	**10M**	**CO5**
SECTION B (Attempt any **TWO** questions)			
Q 7	a)Explain how vacuum is maintained in the vacuum distillation unit. **10M** b) Write a note on the auxiliary equipment used in ADU and VDU? **10M**	**20 M**	**CO3**
Q 8	a) With the help of a neat-labeled diagram, explain the working of a fluid catalytic cracking (FCC) unit. **10M** b) What are the chemical reactions involved in the catalytic alkylation and also write a note on the catalysts used? **10M**	**20 M**	**CO4**
Q 9	a)With the help neat process flow diagram, describe the propane deasphalting process?**10M** b)Discuss the method of phenol extraction used in treating of lubes.**10M**	**20 M**	**CO5**