A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 59903

B.E./B.Tech. DEGREE EXAMINATION, NOV 2019

Elective

Chemical Engineering

15UCH903 - PETROLEUM REFINERY ENGINEERING

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Name the extraneous substances that are found in crude oil CO1 R

   (a) Water and gas (b) Hydrocarbons (c) Sulphur (d) Nitrogen

2. In elemental composition of crude oils the sulphur content in (wt%) range from CO1- R

   (a) 11.0 -14.0 (b) 0.0-0.14 (c) 0.02-1.70 (d) 0.06 – 8.00

3. Which of the following products contains maximum sulphur? CO2- R

   (a) LPG (b) ATF (c) LDO (d) Furnace oil

4. Cleveland method is applicable for determining flash point of lubricating oils and other oils flashing below CO2- R

   (a) 190 ^{o}F (b) 180 ^{o}F (c) 80 ^{o}F (d) 175^{o} F

5. For middle distillate production ,FCC reactors are usually operated between CO3- R

   (a) 175 ^{o}C and 185^{o}C (b) 900 ^{o}C and 950 ^{o}C

   (c) 100 ^{o}C and 110 ^{o}C (d) 470 ^{o}C and 490 ^{o}C

6. Which of the following solvents is used to extract aromatics from lube distillates and deasphalted oil? CO3- R

   (a) Methyl ethyl ketone (b) Methyl isobutyl ketone

   (c) Furural (d) Aluminium chloride

7. HF Alkylation units operate at CO4- R

(a) 4^{o} C (b) 180^{o} C (c) 480^{o} C (d) 37^{o} C

8. In alkylation processes, olefins react with CO4- R

(a) Normal paraffins (b) Isoparaffins

(c) Naphthenes (d) Aromatics

9. Which of the following has maximum hydrogen/carbon ratio (by weight)? CO5- R

(a) Naphtha (b) Gasoline (c) Diesel (d) Fuel oil

10. The effect of air pollutants in the refineries such as particulate matter comes from CO5- R

(a) Coking (b) Cracking (c) Reforming (d) Both (b) and (c)

PART – B (5 x 2= 10 Marks)

11. Give the classification of crude oil. CO1- R

12. What is octane number and how it is calculated for fuels? CO2- Ana

13. What is fluid catalytic cracking process? CO3- R

14. What is Merox process? CO4- U

15. List out any four pollution causing gases in refineries. CO5- R

PART – C (5 x 16= 80 Marks)

16. (a) Discuss in detail the hydrocarbons present in the crude oil. CO1- U (16)

Or

(b) Explain in detail the non hydrocarbons present in crude oil. CO1- U (16)

17. (a) Discuss in detail the importance of Octane number and Cetane number in analysis of crude oil. CO2- Ana (16)

Or

(b) Discuss in detail about ASTM method to analyse the pour point of the oil. CO2- Ana (16)

18.	(a)	Narrate the operating conditions, reaction and process description of thermal cracking process.	CO3- U	(16)
		Or		
	(b)	Discuss in detail the reactions, catalyst and process involved in hydro cracking process with a neat flow diagram.	CO3- U	(16)
19.	(a)	Discuss the importance of Edeleanu solvent extraction process in finishing process of crude oil.	CO4- U	(16)
		Or		
	(b)	Explain in detail the reactions, catalysts and process involved in catalytic reforming with a neat flow diagram.	CO4- U	(16)
20.	(a)	Explain the volatile organic compound and particulate emission control techniques used in the petroleum refineries.	CO5- U	(16)
		Or		
	(b)	Explain the various sources and causes of pollution in refineries. Enumerate any three pollution control techniques used in refinery operations.	CO5- U	(16)