B.Tech. Fifth Semester (Che.Tech. (Food, P & P, O & P and Petro.) (CGS)

USC - 11031 : Petrochemical Technology - II (Special Technology - II)

Paper - 5 PC 04

P. Pages : 2 **AW - 3161**

Time : Three Hours * 0 1 5 7 * Max. Marks : 80

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Diagrams and chemical equations should be given wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.
4. Discuss the reaction, mechanism wherever necessary.
5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) What are the various factors that promote the use of many different processing plans in the refinery? **2**

b) Refining operations must, in aggregate, reduce the carbon-hydrogen ratio of the crude oil and intermediate streams that they process. How this can be accomplished in the refinery? **4**

c) High conversion refinery includes not only catalytic cracking and/or hydrocracking to convert gas oil fractions, but also coking unit. Draw the neat sketch of typical high conversion refinery. **8**

OR

2. a) Why distillation of high boiling residue is carried out under reduced pressure? **2**

b) How crude oil and other hydrocarbons are converted into finished petroleum products. **4**

c) "Conversion units form the essential core of modern refining operations". Explain. **8**

3. a) Based on which properties the quality of solvents is judged? **2**

b) As per BHARAT STAGE-IV (BS-IV) specifications what is the upper limit on olefin, aromatic and sulfur content of general and premium gasoline fuel? **4**

c) Any engine during service has to encounter different weather conditions. For smooth running of the vehicle under such circumstances, how octane rating of the fuel is adjusted? **7**

OR

4. a) Which properties of lubricants govern case of starting of an engine? **2**

b) Mention the molecular formula, boiling point and cetane number of n-cetane, 2, 2, 4, 4, 6, 8, 8-heptamethyl nonane and α-methyl naphthalene. **3**

c) Why diesel fuel specifications include an upper viscosity limit? **3**

d) What are the important tests and properties of gasoline? Mention the BHARAT STAGE-IV (BS-IV) distillation specifications prescribed for premium gasoline. **5**

5.	a)	Name the common emulsifying agents found in crude oil.	2
	b)	What is the order of difficulty of sulfur removal from petroleum fractions? Name these sulfur compounds with suitable example of each.	4
	c)	Discuss the effect of operating parameters on the performance of electrical desalter.	7

OR

6.	a)	Mention the chemistry involved in the Merox sweetening process.	3
	b)	Discuss the Turbo Expander natural gas liquefaction process in detail with neat sketch of flow diagram.	10

SECTION – B

7.		Discuss the propane deasphalting process in detail with neat sketch of flow diagram and the process parameters involved.	14

OR

8.		Modern refineries are practicing N-methyl-2-pyrolidone extraction for viscosity index improvement of lube oil base stock. Discuss this process in detail with neat sketch of flow diagram and process parameters involved.	14
9.	a)	The products formed in the catalytic cracking all the result of both primary and secondary reactions. How these primary reactions can be represented?	3
	b)	Maximizing the gasoline yield is the most common objective of a FCC and RFCC units. However, many units are designed to maximize the middle distillates or LPG including propylene and butylene. Discuss these three principal modes of operation in detail.	10

OR

10.		Hydrocracking has become a powerful tool to the refiner in the production of quality gasoline from the feeds of relatively refractory nature like cycle oils, coker distillates etc. Discuss the hydrocracking process in detail with neat sketch of flow diagram and process parameters involved.	13
11.		Discuss the continuous catalyst regeneration (CCR platforming) reforming process in detail with neat sketch of flow diagram and process parameters involved.	13

OR

12.		High quality blends of motor fuel can be obtained by alkylation process. Discuss the sulfuric acid process with feedstock, process parameters and chemistry involved, in detail.	13

****