U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

August 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Chemical Engineering **Duration: 3 hrs.**
Course Code: 19CH5DELC1 **Max Marks: 100**
Course: Petroleum Refining

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) What is the significance of the following thermal properties in petroleum industries? **04**
(i) Specific heat
(ii) Heat of combustion
(iii) Spontaneous ignition temperature
(iv) Latent heat of vaporization

b) Calculate the UOP-k or Watson K factor for the following compounds. Comment on the effects of hydrocarbon chain type and length on the characterization factor. **08**

Compound	Average B.P. (°R)	specific gravity at 60 °F
n-pentane	556.6	0.626
n-hexane	615.7	0.664
2,2,4 trimethylpentane	670.2	0.692
Cyclohexane	636.9	0.779
Methylcyclohexane	673.5	0.769
Benzene	635.9	0.877
Toluene	691.0	0.866
m-xylene	742.4	0.86

c) Explain the process of TBP analysis with a schematic diagram of TBP apparatus. **08**

UNIT - II

2 a) Justify the need of following additives for gasoline. **06**
(i) Corrosion Inhibitors
(ii) Oxidation Inhibitors
(iii) Combustion aids

b) How is the ASTM distillation test for gasoline conducted? Highlight the characteristic features with ASTM distillation curve. **08**

c) Describe the flash point testing method for kerosene. **06**

UNIT - III

3 a) Enlist the types of impurities present in the petroleum crude. **04**

b) Explain the gasoline treatment by catalytic desulfurization process with process flow diagram. **08**

c) Describe the sweetening operation of gases by ethanolamine treatment process with process flow diagram. **08**

OR

4 a) Describe sweetening operation of gases by Stretford process with process flow diagram. **05**

b) Explain any one of the settling methods with schematic diagram. **05**

c) How is kerosene treatment by liquid SO_2 extraction of aromatics done? Explain with a process flow diagram. **10**

UNIT - IV

5 a) Describe the process of fluid catalytic cracking with separate transfer line designed by ESSO with schematic diagram. Comment on the profile of distance in the riser of fluid catalytic cracking (FCC). **10**

b) Explain the following with respect to catalytic processing. **10**
   (i) Catalysts for hydrocracking
   (ii) Reaction variables for catalytic reforming

OR

6 a) Differentiate between hydrocracking and catalytic cracking. **05**

b) Define catalytic reforming. Explain any five reactions with examples through which catalytic reforming is achieved. **07**

c) Describe naphtha cracking with process flow diagram. **08**

UNIT - V

7 a) Explain the delayed coking operation with process flow diagram. **10**

b) Describe Dubb's two coil process for vis breaking with process flow sheet. **10**

******