Registration No: | | | | | | | | | | |

Total Number of Pages: 02

M.TECH
P2CHBC01

2nd Semester Regular Examination 2016-17
PETROLEUM REFINERY ENGINEERING
BRANCH: CHEMICAL ENGINEERING
Time: 3 Hours
Max Marks: 100
Q.CODE:Z379

Answer Question No.1 which is compulsory and any FOUR from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: ***Short answer type*** **(2 x 10)**

a) How crude oil is classified according to Characterization Factor and Correlation Index?

b) What is the elemental composition of crude oil and How crude oil is classified as per their hydrocarbon content?

c) Write down the important characteristics of solvent used for solvent deoiling process.

d) Describe the process of hydro-finishing and What are the advantages of hydro-finishing process over conventional process?

e) Why entrainment occurs in distillation? What are the factors it depends?

f) What is the principle of operation of fluid catalytic cracking?

g) What are the advantages of bimetallic catalysts over monometallic catalyst?

h) Write down the process variables affecting the economics of sulphuric acid alkylation?

i) How catalyst is regenerated after use?

j) What are the impurities present in crude oil?

Q2 **a)** With the process flow sheet describe the solvent deasphalting process along with the process variables, operating conditions and product quality. **(10)**

b) Write down different treatment techniques of lube oil processing. **(10)**

Q3 **a)** Why solvent dewaxing process is followed? What are the advantages of dilchilldewaxing process is followed? Describe with net sketch. **(10)**

b) What is thermal and catalytic reforming? Discuss about various factors that affects reforming process. **(10)**

Q4 **a)** Describe atmospheric and vacuum distillation of crude oil with flow diagram. **(10)**

b) What are the important sweetening processes? Write down the chemical reactions involved in the sweetening process? Discuss Solutizer sweetening process with block diagram. **(10)**

Q5 **a)** What is polymer gasoline? What are the feed stocks and common catalysts used for the production of polymer gasoline? Using a process flow diagram, describe the production of polymer gasoline mentioning all the operating conditions employed. **(10)**

b) What are the major contaminants of petroleum distillates and their effects? What are the process variables of visbreaking operation? **(10)**

Q6 **a)** Write down the application of hydrotreating process along with the process variables, catalyst used for distillate desulphurization process with the chemical reaction involved. **(10)**

b) Describe different theories of origin of crude oil and how crude oil is classified? **(10)**

Q7 **a)** In a fractionating column unit a light fraction boiling range of 225 to 325 ^{o}C is to be separated from a high waxy distillate (405-425 ^{o}C) using a steam distillation technique. If the distillation temperature should not exceed 200 ^{o}C, find the number of moles of steam required for equimolal mixture of the stock. Pressure of the system remains at 760 mm. Vapourpresssure of light component at 200 ^{o}C is 650 mm. Vapor pressure of heavy component at 200 ^{o}C is 35 mm. Mol. Wt. of light fraction is 225, cp = 0.47. Mol. Wt. of heavy fraction is 435, cp=0.42. **(10)**

b) Discuss with the help of flow diagram the process of desalting and dehydration of crude oil processing. **(10)**