PETROCHEMICAL TECHNOLOGY
(CHEN 3131)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) The carbon content of crude oil is
(a) 60 – 70% (b) 85 – 90% (c) 30 – 50% (d) 50 – 60%

(ii) H_2S is removed from naptha in absorption column by using
(a) Caustic soda solution (b) Diethyl amine solution
(c) Methyl solution (d) Sulphuric acid solution

(iii) Butadiene production favours at
(a) High pressure low temperature (b) High pressure high temperature
(c) Low pressure low temperature (d) Low pressure high temperature

(iv) In order to minimize the polymerization of acrolein which one is used as a stabilizer agent?
(a) Hydroquinone (b) Peprazine
(c) Hydrogen peroxide (d) Caustic soda

(v) Cold propane is used to control the stream temperature during the production of
(a) Cumene (b) Isopropanol
(c) Synthetic detergent (d) Phenol

(vi) Sodium tripolyphosphate is an example of
(a) Builder (b) Brightener
(c) Whitening agent (d) Suspension agent

(vii) The temperature in the reactor is maintained at 200^0C during LDPE production to avoid
(a) Dissociation (b) Further polymerization
(c) Vaporization (d) Crystallization formation

(viii) In extrusion moulding, to soften the plastic
(a) Vacuum pressure is applied (b) Air pressure is applied
(c) High heat is applied (d) Cold water is applied

(ix) Raw materials of Nylon 6 production are
(a) Adipic acid and hexamethyl diamine (b) Adipic acid and caprolactam
(c) Hexamethyl diamine and water (d) Caprolactam and water

(x) Ziegler-Nutta catalyst is a mixture of
(a) $TiCl_4$and alkyl aluminium (b)$TiCl_4$and alkyl chloride
(c) Aluminium halideand alkyl aluminium (d) alkyl aluminium and pd

Group- B

2. Write short notes on any *three* of the followings: **(3 × 4) =12**
(a) Atmospheric distillation unit
(b) Hydro finishing unit
(c) Visbreaking unit
(d) Natural gas processing (Block diagram). [(CO4) (Understand/LOCQ)]

3. (a) Briefly describe the hydrogen manufacturing process from naptha through steam reforming operation with the help of neat flow sheet.
[(CO2) (Remember/LOCQ)]

(b) Write the main and side reactions occurring during the methanol production from synthesis gas. [(CO3) (Understand/LOCQ)]

10 + 2 = 12

Group - C

4. (a) Briefly describe the manufacturing process of vinyl chloride production with a help of a neat flow sheet. [(CO2) (Remember/LOCQ)]

(b) Write the reaction occurs during isopropanol productions.
[(CO2) (Remember/LOCQ)]

(c) What is the chemical formula of glycerine? [(CO2) (Remember/LOCQ)]

7 + 4 + 1= 12

5. (a) Discuss the manufacturing process of glycerine production with a help of neat flow sheet. [(CO2) (Understand/LOCQ)]

(b) How the ammoniated cuprous ammonium acetate solution is generated during butadiene production? [(CO2)(Analyze/IOCQ)]

(c) What is Dowtherm fluid and where it is used? [(CO2)(Analyze/IOCQ)]

8 + 2 + 2 = 12

Group - D

6. (a) Explain the following parameters effects on catalytic reforming reactions.
   (i) Space velocity
   (ii) Reactor temperature
   (iii) Hydrogen to hydrocarbon molar ratio. [(CO4) (Understand/LOCQ)]

   (b) Draw the manufacturing flow sheet of phthalic anhydride.
   [(CO1)(Remember/LOCQ)]
   (2 × 3) + 6 = 12

7. Write short notes on any *three* of the followings [(CO3) (Analyze/IOCQ)]
   (a) BTX recovery from reformer
   (b) Desirable platforming reactions
   (c) Synthetic detergent
   (d) Purification units of phenol production.
   (3 × 4) = 12

Group - E

8. (a) Briefly discuss the manufacturing process of HDPE production with the help of a neat flow sheet. [(CO4) (Remember/LOCQ)]

   (b) Discuss the major problems associated with LDPE and HDPE productions.
   [(CO3) (Understand/HOCQ)]
   6 + 6 = 12

9. (a) Discuss the manufacturing process of Nylon 6, 6 production with a help of a neat flow sheet. [(CO4) (Remember/LOCQ)]

   (b) Write the mass polymerization process conditions of polystyrene production.
   [(CO4) (Understand/LOCQ)
   10 + 2 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	75.0	25.0	0.0

Course Outcome (CO):

After the completion of the course students will be able to

1. Students will be able to classify the variety of petrochemical feedstocks, petroleum refinery products and categorize the synthesis gas productions feedstocks.
2. Students will be able to interpret the steam cracking operation of naptha and discuss theproduction mechanism of petrochemical complexes like EDC, VCM, VAM, EO, EA, ACN,PO, Isopropanol etc.

3. Students will be to classify the catalytic reforming operation of naptha and interpret theproduction mechanism of synthetic detergent.
4. Students will be able to compare and contrast major polymerization processes in industry anddescribe various process technologies for Fibers, Elastomers and resins etc.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

Department & Section	Submission Link
CHE	https://classroom.google.com/c/NDA2Nzk4MTUyODUz/a/NDYzODgxMDUwMDk4/details