PETROCHEMICAL TECHNOLOGY
(CHEN 3132)

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) LABS is an example of
(a) solvent (b) bio-degradable Detergent
(c) raw feed of cumene production (d) detergent additives.

(ii) The objective of catalytic reforming is
(a) increase pour point (b) increase cetane number
(c) increase octane number (d) increase viscosity index.

(iii) Which type of catalyst is used in high pressure technology during methanol production from syn gas?
(a) Zinc oxide (b) Zinc oxide-chromium oxide
(c) Zinc oxide-aluminium oxide (d) Titanium oxide.

(iv) The raw material of Nylon 6 is
(a) Hexamethylene diamine (b) Caprolactum
(c) Napthalene (d) Syngas.

(v) The manufacture of HDPE is a
(a) suspension polymerization (b) condensation polymerization
(c) bulk polymerization (d) cross linked polymerization.

(vi) In naptha steam cracker unit very short residence time is maintained to avoid
(a) decoking (b) undesirable cracking
(c) explosions (d) catalyst losses.

(vii) Which reactor is used during KBS production?
(a) PFR (b) CSTR
(c) Packed bed (d) Fluidised bed.

(viii) Ziegler - Nata catalyst is a mixture of
(a) titanium chloride and aluminium chloride
(b) palladium and Nickel
(c) titanium tetrachloride and alkyl aluminium
(d) aluminium chloride and hydrogen fluoride.

(ix) Dowtherm is used to
(a) control the reaction temperature
(b) avoid the production of undesirable compound
(c) suppress the catalyst losses
(d) resist the explosion.

(x) Extruder is used during Nylon 66 production
(a) to transform the melted polymer in to ribbon
(b) to maintain the reaction temperature
(c) to avoid the formation of other undesirable product
(d) to cut the polymer in to small chip.

Group – B

2. Write short notes on any *three* of the followings: **(3 × 4) = 12**
(i) Petrochemical feedstock
(ii) Natural gas processing (block diagram)
(iii) Ammonia production from natural gas (block diagram)
(iv) Shift converter of steam reforming of naptha.

3. (a) Briefly describe the manufacturing process of methanol production from syngas with the help of a neat flow sheet.

(b) Write short note on Fischer Tropsch synthesis method.

(c) Name any two petrochemical Industries in India.

6 + 4 + 2 = 12

Group – C

4. (a) Discuss the manufacturing process of Vinyl chloride production from ethylene chloride with a neat flow diagram.

(b) What is stabilization of vinyl chloride?

(c) Why quencher is used before the vinyl still during vinyl chloride production?

8 + 2 + 2 = 12

5. (a) Write the chemical reactions involved in the production of glycerol from propylene via acrolein route.

(b) Why refrigerated brine is used during isopropanol production?

(c) Explain the manufacturing process of propylene oxide production with a help of a neat flow sheet.

4 + 2 + 6 = 12

Group – D

6. Attempt any *three* of the followings: **(3 × 4) = 12**
   (i) Explain the BTX recovery process with help of a flow sheet?
   (ii) Discuss the effects of process variables on catalytic reforming process.
   (iii) Write short notes on dehydrogenation, isomerisation and dehydrocylization of naphtenes and paraffins?
   (iv) Give brief ideas on detergent additives.

7. (a) Explain the manufacturing process of phenol production from propylene via cumene route with the help of a neat sketch.

   (b) Why vacuum is applied in last three columns during phenol production?

   (c) What are the advantages of fluidised bed compared to fixed bed during phthalic anhydride production?

8 + 2 + 2 = 12

Group – E

8. (a) Write the chemical reactions involved in phenol formaldehyde resin production.

   (b) Describe the manufacturing process of Nylon 66 production with the help of a neat sketch.

4 + 8 = 12

9. (a) What is suspension polymerization?

   (b) What is rubber compounding?

   (c) Discuss the major engineering problems associated with low density polyethylene production.

2 + 4 + 6 = 12