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
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> 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 percentage of methane in natural gas is
          (a) 0 – 15%   (b) 0 – 0.5%
          (c) 64 – 99%   (d) 50 - 70%.

   (ii)   Which catalyst is used during Fischer-Tropsch synthesis method?
          (a) Cobalt   (b) Zinc alumina
          (c) Aluminium chloride   (d) Ferric oxide.

   (iii) Example of liquid absorber is
          (a) Lithium chloride   (b) Ethylene glycol
          (c) Silica gel   (d) Acetone.

   (iv)   Linear alkyl benzene sulfonate is an example of
          (a) Paraffin   (b) Olefin
          (c) Soft detergent   (d) Hard detergent.

   (v)   The raw material of Nylon 6 is
          (a) Hexamethylene diamine   (b) Gas oil
          (c) Caprolactam   (d) FCC lights.

   (vi)   Dowtherm is a mixture of
          (a) Biphenyl and diphenyl oxide
          (b) Triphenyl and biphenyl oxide
          (c) Ester and fatty acid
          (d) Paraffin and olefin.

   (vii) Unit of liquid hourly space velocity is
          (a) m/s   (b) kg/s   (c) h^{-1} (d) h.

   (viii) The objective of LTS is
          (a) Conversion of naptha into ethane
          (b) Conversion of CO into CO_2
          (c) Removal of H_2S
          (d) Separation of CO_2.

   (ix)   HSD is generally used as a
          (a) Detergent additive   (b) Transportation fuel
          (c) Catalyst   (d) Promoter.

   (x)   The manufacture of PVC is
          (a) Linear Polymerization   (b) Suspension Polymerization
          (c) Branched Polymerization   (d) Cross linked Polymerization.

Group – B

2. (a)   Give an overview of petrochemical feedstock.

   (b)   Give an overview of petroleum refinery operations.
                                                            4 + 8 = 12

3. (a)   What are the natural gas (NG) compositions? What are the impurities present in NG?

   (b)   Explain the production of methanol from syngas with a neat flow sheet.

   (c)   Name two petrochemical Industries in India.
                                                      (2 + 2) + 7 + 1 = 12

Group – C

4. (a)   Discuss the manufacturing process of glycerine (acrolein route) with flow diagram.

   (b)   Why is the compressor used before the stripper section during the ethylene oxide production?
                                                            10 + 2 = 12

5. (a)   Write the reactions involved in propylene oxide production.

   (b)   What are the advantages of fluidised bed when compared to packed bed reactor?

   (c)   Discuss the manufacturing process of ethylene dichloride with a neat flow sheet.
                                                         3 + 2 + 7 = 12

Group – D

6. (a) Explain the manufacturing process of keryl benzene sulfonate with block diagram.

   (b) Why is fluidized bed used during phthalic anhydride production from naphthalene?

   10 + 2 = 12

7. (a) Explain the process variables of catalytic cracking.

   (b) Explain the recovery process of aromatics from reformate with flow sheet.

   (c) Write the reactions involved in styrene production.

   4 + 6 + 2 = 12

Group – E

8. Discuss the manufacturing process of phenol-formaldehyde resin with a neat flow sheet.

   12

9. Describe any three of the following: **(4 × 3) = 12**
   (i) Classification of synthetic detergent
   (ii) Natural gas processing
   (iii)Production of PP
   (iv)Manufacturing process of VCM.