CHEMICAL PROCESS TECHNOLOGY II
(CHEN 3203)

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 saturated fatty acid radical, present in edible vegetable oil is
(a) oleic (b) stearic
(c) linoleic (d) linolenic.

(ii) Sodium silicate is used in detergent
(a) as brightener (b) to improve cleaning power
(b) to avoid corrosion (d) to extend foaming.

(iii) The manufacturing of styrene butadiene rubber is done by
(a) suspension polymerization (b) bulk polymerization
(c) emulsion polymerization (d) solution polymerization.

(iv) Nylon 66 is so named because
(a) the average degree of polymerization of polymer is 1966
(b) the number of carbon atoms between two nitrogen atoms is 6
(c) the number of nitrogen atoms between two carbon atoms is 6
(d) the polymer was first synthesised in 1966.

(v) Which one is a thermosetting plastic?
(a) Polyvinyl Chloride (b) Polyethene
(c) Polypropylene (d) Polystyrene.

(vi) Ethylene oxide is manufactured by the oxidation of ethylene at
(a) 1 atm and 100°C (b) 5 atm and 275°C
(c) 100 atm and 500°C (d) 50 atm and 1000°C.

(vii) Solvent used for extraction of oil is
(a) methyl ethyl ketone (b) hexane
(c) glycol (d) furfural.

(viii) Parathion is a
(a) pesticide (b) polyester
(c) polyamide (d) polycarbonate.

(ix) The flocculating agent used in the manufacturing of sugar is
(a) ferric chloride (b) high magnesia lime
(c) zinc sulphate (d) sulphur dioxide.

(x) The steel reactor in the manufacturing process of methanol from synthesis gas is lined with copper to avoid
(a) the formation of iron carbonyl
(b) the poisoning of the catalyst
(c) corrosion
(d) sintering.

Group – B

2. Write in brief the following related to hydrogenation of edible vegetable oil:
(i) Basic reactions
(ii) Catalyst preparation
(iii) Operating conditions
(iv) Major Engineering problems.

2 + 2 + 3 + 5 = 12

3. (a) (i) With example, classify different types of detergents.
(ii) Give an example of detergent builder and state its use.

(b) Mention salient features related to manufacture of an anionic detergent.

(c) State industrial uses of glycerine.

(d) Give one example of essential oil. Why is it so called?

(3 + 1) + 4 + 2 + 2 = 12

Group – C

4. (a) Discuss the manufacturing process of industrial alcohol from molasses with the help of neat flow sheet.

(b) (i) Mention the first organic insecticide produced in India. Name one pesticide producer in India.
(ii) What are the drawbacks of using polychlorinated insecticides over organophosphorus compounds, used as insecticides. Give examples of each type.

8 + (1 + 3) = 12

5. (a) (i) What are the major engineering problems associated with the production of sugar?
   (ii) Which types of environmental problems are faced by sugar industry?
   (iii) Write short note on sorbitol.

   (b) Write down (with chemical reaction) the salient features for production of parathion.

(4 + 2 + 2) + 4 = 12

Group – D

6. (a) Describe the production process of vinyl chloride from ethylene dichloride with the help of a neat flow sheet.

   (b) Write down the chemical reactions involved in the manufacturing of isopropanol from hydration of propylene via sulfation and hydrolysis.

   (c) What are the different nitrating agents used for different types of organic compounds as substrate?

6 + 4 + 2 = 12

7. (a) Describe the manufacturing process of aniline form nitrobenzene (Bechamp reduction method) with the help of a neat flow sheet.

   (b) Explain the purification process of butadiene.

   (c) Write a short note on sulphonation reaction.

8 + 2 + 2 = 12

Group – E

8. (a) (i) What are the differences between thermosets and elastomer?
   (ii) Mention the chemical reactions involved in the manufacturing process of 6-nylon.

   (b) Write short notes on *any three* of the following:
   (i) Emulsion polymerization
   (ii) Bulk polymerization
   (iii) Condensation polymerization
   (iv) Suspension polymerization.

(1 + 2) + (3 × 3) = 12

9. (a) Mention different types of ingredients generally used for compounding a natural rubber.

   (b) Discuss in detail the production process of low density polyethylene with the help of a neat diagram. What are the major engineering problems associated with this process?

4 + 8 = 12