Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(CHE)/NEW/SEM-6/CHE-603/2013

2013
CHEMICAL PROCESS TECHNOLOGY – II

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) The process of hydrogenation is an
      a) endothermic
      b) exothermic
      c) exothermic and endothermic both
      d) none of these.

   ii) The generic chemical name of commercial polymer Nylon 6 is known as
      a) Polyhexmeth b) Polyester
      c) Polycaprolactum d) None of these.

   iii) Ethylene oxide is manufactured commercially by the oxidation of ethylene in presence of Ag_2O as catalyst at
      a) 1 atm & 100° C b) 5 atm & 275° C
      c) 100 atm & 500° C d) 50 atm & 1000° C.

iv) The monomer of natural rubber is
   a) Butadiene b) Styrene
   c) Isoprene d) Chloroprene.

v) The manufaturing of high purity styrene-butadiene rubber is done by
   a) Emulsion polymerization
   b) Solution polymerization
   c) Suspension polymerization
   d) Bulk polymerization.

vi) Zeigler process uses
   a) high pressure & low temperature
   b) low pressure and high temperature
   c) high pressure & high temperature
   d) low pressure & low temperature.

vii) IRRATHENE, AGILENE-HT are
   a) irradiates of polyethylene
   b) irradiates of polypropylene
   c) irradiates of polyvinyl chloride
   d) all of these.

viii) Butadiene and Styrene are co-polymerised by
   a) condensation polymerization
   b) emulsion polymerization
   c) suspension polymerization
   d) solution polymerization.

ix) SO_2 is added as ..... in the steep tank during the production of starch.
   a) Bacteriostatic b) Decolorizer
   c) Coagulating agent d) Softeener.

x) In a sugar industry ..... per cent of cane crushed would yield into bagasse.
   a) 42 b) 35
   c) 40 d) 38.

xi) ..... is used to improve the soil and dirt suspension during soap production.

a) Sodium carboxy cellulose

b) Dyes

c) Zeolites

d) Sodium silicate.

xii) The catalyst used during the production of soap is

a) NaOH b) H_2SO_4

c) ZnO d) HCl.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Analyze the major engineering problems of the process of hydrogenation of vegetable oils.

3. Mention the optimum operating conditions of reactor for production of Butadiene by Houndry Process. How is catalyst bed regenerated ? 3 + 2

4. What are the various byproducts of sugar industry ? How can they be recovered ?

5. What are the advantages of using less concentrated H_2SO_4 for the production of Isopropyl alcohol from Propylene ?

6. Compare Suspension Polymerization & Emulsion Polymerization with respect to their mode of polymer growth.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) With a neat flow diagram, explain the manufacturing process of starch from maize. 12

b) What does it mean by detergent builders ? 3

8. a) Explain the role of H_2SO_4 in nitration of benzene ? How is it expressed ? What factors are to be taken into consideration during commercial nitration ? 3 + 2

   b) Describe the process of Phenol manufacturing in two steps from cumene showing specific unit operations involved. 10

9. a) Why does Polyvinyl chloride (PVC) show self-extinguishing characteristics and why is it thermally unstable ? "Technically PVC is graded not by Melt Flow Index (MFI) but by solution viscosity parameter known by *K*-value". Justify the statement. 3 + 2

   b) Mentioning a typical recipe, briefly explain PVC manufcaturing process through emulsion polymerization with a neat sketch. 10

10. a) How is natural rubber cured ? What is the significance of maximum curing time ? 3 + 2

    b) Mention different kinds of ingredients generally used for compounding of natural rubber with their specific roles. 6

    c) Mention different steps of chain growth polymerization with a suitable example. 4

11. Write short notes on any *three* of the following : 3 × 5

    i) Nylon

    ii) DDT

    iii) Phenol Formaldehyde resin

    iv) Chemistry of Soap formation

    v) Pesticides and Fungicides.