Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH.(CHE)/SEM-6/CHE-602/2012

2012

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 × 1 = 10

i) Massecuite represents

a) mixture of syrup and crystals

b) london smog

c) Massachuset's weather

d) none of these.

ii) Calandria type evaporators are used in

a) Sugar industry

b) Fermentation industry

c) Hydrogenation of oil

d) Muitieffect evaporators.

iii) Starch aldehydes are used mainly in paper industry as

a) Wet strength additive b) Colouring material

c) Whitening agent d) none of these.

iv) Sterilization is a common practice in

a) Fermentation industry b) Sugar manufacture

c) Dextrin manufacture d) Pulp preparation.

v) Fats and oils are differentiated through

a) Absence or presence of olefinic double bonds

b) Presence of aldehyde group

c) Presence of ketonic group

d) Presence of aromatic group.

vi) DDT represents

a) Synthetic organic pesticides

b) Food preservatives

c) Oil additives

d) Raw materials of paper industry.

vii) Hydrogenation of oil produces

a) Fats b) Oil with fragrance

c) Laundry soaps d) Dot pen ink.

viii) Phthalic anhydride is produced by the oxidation of

a) Naphthalene b) Benzene

c) Toluene d) Aniline.

ix) Nylon 6, 6 is so named because

a) the average degree of the polymerization of the polymer is 1966

b) the number of the carbon atoms between two nitrogen atoms are 6

c) the number of nitrogen atoms between two carbon atoms are 6

d) the polymer was first synthesized in 1966.

x) Vulcanization of rubber

a) decreases its tensile strength

b) increases its oxygen reactivity

c) decreases its solvent resistance

d) converts its elasticity to plasticity.

xi) The organic acid monomer in Nylon 6, 6 is

a) Sebasic acid b) Terephthalic acid

c) Adipic acid d) Benzoic acid.

xii) The fluidized bed process for phthalic anhydride production is advantageous over the fixed bed proces as

a) No malic acid is produced

b) Malic acid is obtained as valuable by-product

c) Yield is higher

d) None of these.

xiii) ..... is a thermosetting plastic

a) PVC b) Polythene

c) Bakelite d) Polystyrene.

xiv) Nylon-6 as compared to Nylon-66 is

a) Harder

b) abrasion resistant

c) having higher melting point.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) What are the advantages of fluidized bed reactor over fixed bed reactor in the manufacturing process of phthalic anhydride ?

   b) Explain the differences between a thermosetting plastic and thermoplastic.

3. What are the chemical reactions involved in the manufacturing process of phenol-formaldehyde resin ? Give a brief description of the Commercial manufacturing methods.

4. Why is methanol converter made of copper lined steel reactor ? Every time when the plant is taken shut down, the reactor is purged with nitrogen. Why ?

5. What is a detergent ? Discuss the functional aspects of different ingredients in detergents with different classes of detergents.

6. Discuss the major engineering problem associated with the manufacturing ethylene oxide.

7. What is meant by inversion of sugar ? Recommend any method to overcome the problem of inversion and describe it.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. 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 ?

9. a) What do you mean by rubber compounding ?

   b) With the help of a neat flow sheet, describe the production of pure butadiene from crude butadiene containing a mixture of butadiene and butene.

   c) What is the basic difference between nylon 6,6 and nylon 6 ? Write down their chemical structure. 3 + 9 + 3

10. Describe the manufacturing process of methanol with the help of a flow sheet explaining the engineering problems associated with the process.

11. Write about the manufacturing of vinyl chloride monomer through the ethylene route and acetylene route. Discuss about their advantages and disadvantages.

12. a) With the help of a neat diagram, describe the manufacturing of benzenemonosulfonate by partial pressure distillation method.

    b) Describe the manufacture of nitrobenzene in the vapour phase including purification process with the help of a process flow diagram.

13. Write short notes on any *two* of the following : $2 \times 7\frac{1}{2} = 15$

    a) Emulsion polymerization

    b) Synthetic fibres

    c) Phenol

    d) Polyvinyl chloride.