

Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech/(CHE-OLD)/SEM-6/CHE-602/2013**

**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) Epoxidation of ethylene oxide occurs at a temperature range of
- a)  $50^{\circ}\text{C} - 100^{\circ}\text{C}$                       b)  $100^{\circ}\text{C} - 200^{\circ}\text{C}$
- c)  $200^{\circ}\text{C} - 300^{\circ}\text{C}$                       d)  $300^{\circ}\text{C} - 400^{\circ}\text{C}$
- ii) Major by-product produced in fixed bed converter during Phthalic Anhydride production is
- a) Phenol                                      b) Maleic anhydride
- c) Toluene                                      d) None of these.



iii) Terephthalic acid is a major raw material of

- a) Nylon fibre
- b) Rayon fibre
- c) Acrylic fibre
- d) Polyester fibre.

iv) The ratio of CO & H<sub>2</sub> is required for Methanol production from Synthesis Gas is

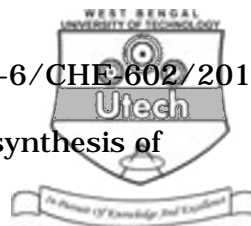
- a) 1 : 3
- b) 1 : 2
- c) 1 : 5
- d) 2 : 3.

v) Solvent extraction of vegetable oil gives yield

- a) 80% – 85%
- b) 85% – 90%
- c) 90% – 95%
- d) 95% – 99%.

vi) Heat of reaction for hydrogenation of oils is

- a) highly exothermic
- b) mildly exothermic
- c) highly endothermic
- d) mildly endothermic.



vii) Ziegler-Natta catalyst is used for the synthesis of

- a) stereo regular polymer
- b) condensation polymer
- c) thermosetting polymer
- d) none of these.

viii) Main catalyst used for Phthalic Anhydride synthesis from Naphthalene is

- a)  $\text{Fe}_2\text{O}_3$
- b)  $\text{P}_2\text{O}_5$
- c)  $\text{V}_2\text{O}_5$
- d) none of these.

ix) Inversion of sucrose produces

- a) Fructose
- b) Glucose
- c) both (a) and (b)
- d) none of these.

x) Esterification reaction

- a) produces soap
- b) is reversible
- c) is a reaction between an alcohol and an organic acid
- d) all of these.



xi) Phenol-Formaldehyde polymer is a

- a) Thermosetting resin
- b) Thermoplastic plastic
- c) conducting plastic
- d) none of these.

xii) Glycerin is a by-product of ..... industry.

- a) Soap
- b) Detergent
- c) Oil hydrogenation
- d) Paint.

**GROUP – B**  
**( Short Answer Type Questions )**

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

2. What are the major Engineering problems occur during methanol production from Synthesis gas ?



3. What are the differences between soap and detergent and how do they work ?
4. Explain the role of Emulsifier in Emulsion polymerization.
5. What are the importance of nutrients in fermentation process to produce ethyl alcohol ? Suggest a process to prepare 100% ethyl alcohol.
6. Write a short note on pesticides.

**GROUP - C**

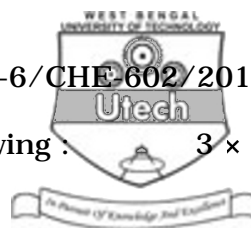
**( Long Answer Type Questions )**

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

7. What is the favorable composition of synthesis gas used as the precursor of Methanol production & how is it maintained ? Why is 100 atm. Pressure route is found advantageous over 50 atm. pressure method with respect to the different selective catalyst systems ? With a neat flow sheet, briefly explain the process of methanol production indicating the functions of different unit operation.  $3 + 3 + 9$



8. a) Differentiate between Nylon-6 & Nylon-66 with respect to their structure and raw materials used. 5
- b) Give a brief process description for the production of Nylon-6 with a flow diagram. 10
9. a) With a net process flow sheet discuss the extraction of sucrose from sugarcane process and associated engineering problems. 8
- b) Write the starch preparation process with a net flow sheet and the application of starch and its byproducts. 7
10. a) Write the process flow sheet of ethyl alcohol by fermentation and the major engineering problems. 10
- b) Explain about the selection of raw material for parathion manufacturing. 5



11. Write short notes on any *three* of the following :  $3 \times 5$

- a) Nitration of aromatics
- b) Herbicides
- c) Thermosetting plastic
- d) Synthetic detergent
- e) Nylon-6.

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