No. of Printed Pages: 3

(38)

SARDAR PATEL UNIVERSITY
B. Sc. Semester - III Examination
Monday, 26th November 2012
INDUSTRIAL CHEMISTRY (Vocational)
US03CICV01
Subject: Unit Processes

Time: 10.30am to 1.30pm **Total Marks: 70**

Q.1: Answer the following questions. **(10)**

1) Which one of the unit process?

(a) Distillation (b) Alkylation (c) Mixing (d) None of these

2) Conversion of picric acid from benzene is _____ process.

(a) Nitration (b) Oxidation (c) Oxynitration (d) None of these

3) Amines can be produced by reduction of _____ group.

(a) Nitro (b) Nitroso (c) Azo (d) All of these

4) Introduction of $RNHSO_2ONa$ is termed as

(a) N-Sulfonate (b) Sulfoxidation (c) Sulfochlorination (d) None of these

5) In Barbet process mole of benzene per mole of sulfuric acid is

(a) 6-8 moles (b) 10-11 moles (c) 1-2 moles (d) 3moles

6) The usual form of oxidation with dichromate is in the presence of

(a) Acetic acid (b) Hydrochloric acid (c) Sulfuric acid (d) All of these

7) ____ is used as catalyst in the preparation of monochloroacetic acid.

(a) Phosphorous trichloride (b) $AlCl_3$ (c) $FeCl_3$ (d) None of these

8) _____ is the most commonly used catalyst in oil hardening.

(a) Ni (b) Cu (c) Al (d) Hg

(9)_____ is not Hydrolyzing agent.

(a) Benzene (b) Water (c) Water & alkali (d) Water & acid

10) Ingold has proposed _____ possible mechanism for ester hydrolysis.

(a) 08 (b) 06 (c) 04 (d) 01

Q.2: Answer the following questions in brief. (Any Ten) **(20)**

1) Outline the function of H_2SO_4 in mixed acid.
2) Give the advantages of the batch process over continuous process for Nitration.
3) Enlist the methods generally used for the preparation of primary amines.
4) State the principal Salfonating and Sulfating agents.
5) Enlist the various peroxide used as an Oxidizing agent.
6) Giving suitable examples enlist any two types of Oxidation reaction.
7) Define term Hydrogenation and write the effect of solvent in it.
8) Enlist the catalysts used for Hydrogenation reaction.
9) Giving suitable reactions, write about Iodination reaction?
10) Define term Trans esterification.
11) Enlist various examples of Hydrolysis reactions.
12) Give mechanism of Hydrolysis type BAc2 / AAc2.

Q.3: Explain various chemical and physical factors affecting Bechamp reduction. **(10)**

OR

Q.3: Explain manufacturing of Aniline and p- nitro acetanilide. **(10)**

Q.4 (A): Discuss the commercial manufacturing of Benzene sulfonic acid by Barbet process in detail. **(6)**

(B): Write notes on Permanganates as oxidizing agent. **(4)**

OR

Q.4 (A): Describe the commercial manufacturing of Acetic acid in detail. **(6)**

(B): Discuss the commercial manufacturing of Benzoic acid from toluene. **(4)**

Q.5 (A): Write explanatory note on methods for chlorination reactions. **(6)**

(B): Write short note on Hardening of vegetable oil. **(4)**

OR

Q.5 (A): Describe the commercial manufacturing of Chlorobenzene in detail. **(6)**

(B): Write note on Hydrogenation of acid and ester to alcohol. **(4)**

Q.6 (A): Giving flow diagram, discuss the manufacturing of Ethyl acetate. **(6)**

(B): Discuss the types of hydrolyzing agents. **(4)**

OR

Q.6 (A): Write note on Esterification of carboxylic acid derivatives. **(6)**

(B): Write short note on Catalytic esterification. **(4)**

Q2. Answer **ANY TEN** of the following. **[20**

1. Write assumption of Bernoulli equation.
2. State and explain continuity equation.
3. List properties of fluid.
4. Give classification of pumps.
5. What are foot valves? State their function.
6. List factor influencing choice of pump.
7. Sketch globe valve design.
8. Write the statement of Fourier's law.
9. What are heat insulators? Give examples.
10. What do you mean by steady state heat flow?
11. Sketch design of finned tube.
12. List various heat transfer equipment.
13. Why finned tube are used in heat exchanger.

Q3. (a). Discuss Reynolds experiment. **[06]**
(b). Explain friction factor and friction head. **[04]**

OR

Q3. (a). State and derive the equation of Bernoulli theorem. **[06]**
(b). Discuss about Non-Newtonian fluid. **[04]**

Q4. (a). Write short notes on pipe fittings. **[06]**
(b). Give comparison between centrifugal pump & reciprocating pump. **[04]**

OR

Q4. (a). Discuss construction and working of Centrifugal pump. **[05]**
(b). Discuss about piston pump. **[05]**

Q5. (a). Derive an equation for heat transfer by conduction through a plane wall. **[07]**
(b). Calculate the rate of heat loss Q, through a wall of red brick [k= 0.70 W/(m.K)] **[03]**
5 m in length, 4 m in height and 250 mm in thickness, if the wall surfaces are maintained at 373 K (100 ^{0}C) and 303 K (30 ^{0}C) respectively.

OR

Q5. (a). Write a note on thermal conductivity. **[07]**
(b). Explain modes of heat transfer giving suitable examples. **[03]**

Q6. Discuss about shell and tube heat exchanger. **[10]**

OR

Q6. Discuss about double pipe heat exchanger and finned tube heat exchanger **[10]**