

[53]

**SARDAR PATEL UNIVERSITY****M. Sc. Semester - II Examination****Monday, 4<sup>th</sup> April 2016****INDUSTRIAL CHEMISTRY****Subject: Unit processes****Date: 04/04/2016****Course No. : PS02CICH07****Time: 10:30 a.m. to 01:30 p.m.****Marks: 70****Q. 1 Answer the following MCQ s (Attempt all) [08]**

- I. Which is the best method for synthesizing fluorinated aromatic compounds?
  - a. continuous process
  - b. electrochemical process
  - c. direct fluorination
  - d. diazo reaction
- II. The alkyl magnesium halides can be used to make \_\_\_\_\_.
  - a. alkyl phenol
  - b. alkyl benzene
  - c. alkyl halides
  - d. all of these
- III. DVS is ratio of \_\_\_\_\_.
  - a. HCl:H<sub>2</sub>O
  - b. HNO<sub>3</sub>:H<sub>2</sub>O
  - c. H<sub>2</sub>SO<sub>4</sub>:H<sub>2</sub>O
  - d. HCl:HNO<sub>3</sub>
- IV. Which catalyst is used for production of benzoic acid?
  - a. phenol
  - b. vanadium oxide
  - c. calcium chloride
  - d. vanadium sulfate
- V. Esterification catalysts are \_\_\_\_\_ in nature.
  - a. acidic
  - b. basic
  - c. neutral
  - d. all of these
- VI. Reaction between ethyl acetate and methanol forms \_\_\_\_\_ and ethanol.
  - a. isopropyl acetate
  - b. methyl acetate
  - c. sec-butyl acetate
  - d. tert-butyl acetate
- VII. Which process is carried out in CO+H<sub>2</sub> mixture?
  - a. hydration
  - b. alcoholysis
  - c. hydroformylation
  - d. esterification
- VIII. The Catalyst HRhCo(CO)<sub>3</sub>(PR<sub>3</sub>)<sub>3</sub> used in hydroformylation reaction at \_\_\_\_\_ pressure and temperature respectively.
  - a. 5-10 MPa & 150-200 °C
  - b. 0.7-2.5 MPa & 60-100 °C
  - c. 20-30 MPa & 110-160 °C
  - d. 2-3 MPa & 80-100 °C

**Q.2 Answer the following short question (Any seven) [14]**

- I Define Halogenation and Alkylation.
- II Draw labelled diagram of externally cooled batch chlorinator.
- III Define unit operation and unit process
- IV What is the role of sulfuric acid in the mixed acid used for nitration?
- V Give the disadvantage of nitric acid and nitrogen tetroxide as an oxidizing agent.
- VI Define sulfonation and sulfation.
- VII Enlist the the reactors used in esterification.
- VIII Enlist the properties of methanol.
- IX Draw the labelled diagram of tubular reactor for methanol synthesis.

**Q.3 (a) With the help of flow diagram explain manufacture of ethyl benzene. [06]****(b) Write explanatory note on chlorinating agent. [06]**

Or

**(b) With the help of labelled diagram explain manufacture of BHC. [06]**

- Q.4** (a) With the help of flow diagram explain continuous nitration of benzene. [06]  
(b) With the help of flow diagram explain manufacture of benzene sulfonic acid. [06]  
Or  
(b) Write explanatory note on types of oxidative reactions. [06]
- Q.5** (a) Write note on types of hydrolysis. [06]  
(b) With the help of flow diagram explain manufacture of ethyl acetate. [06]  
Or  
(b) With the help of flow diagram explain manufacture of ethanol. [06]
- Q.6** (a) With the help of flow diagram explain manufacture of methanol from CO and H<sub>2</sub>. [06]  
(b) Write note on reaction units and catalyst regeneration in oxosynthesis. [06]  
Or  
(b) With the help of flow diagram explain manufacture of butyl alcohol. [06]

**Best of Luck.....**