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SARDAR PATEL UNIVERSITY

M. Sc. Semester - II Examination

Monday, 4th 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. $HCl:H_2O$ b. $HNO_3:H_2O$
   c. $H_2SO_4:H_2O$ d. $HCl:HNO_3$

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 $CO+H_2$ mixture?
   a. hydration b. alcoholysis
   c. hydroformylation d. esterification

VIII. The Catalyst $HRhCo(CO)_3(PR_3)_3$ 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 Halogination 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_2.	**[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.....