

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

3RD YEAR

B.A./B.SC. SIXTH SEMESTER (January – June) 2013

Mid-Semester Examination, March 2013

Date : 05/03/2013

INDUSTRIAL CHEMISTRY (Honors)

Time : 12 noon – 2 pm

Paper: VII

Full Marks: 50

**[Use separate answer books for each group]**

## Group-A

### Unit-I

(Answer any two)

1. a) Describe briefly the method of manufacture of Sulphuric Acid by contact process. [6+4]  
Give chemical reactions, process flow sheet and its important uses.  
b) Explain the physico chemical principles involved in the above manufacturing process. Give the material of construction of the equipment.
2. a) Describe wet process of Phosphoric Acid manufacture, using Bird prayon tilting pan washing filter. [6+4]  
Give the chemical reactions, flow sheet of the process and uses of Phosphoric Acid.  
b) Give the method of recovering Uranium from Phosphate rock and how it is helping the energy economy of the industry?
3. a) What are the different types of electrolytic cells used for the production of caustic soda and chlorine. [6+4]  
Draw a sketch of the membrane cell and explain its operational mechanism.  
b) Explain the physico chemical principles for manufacturing caustic soda and chlorine by electrolysis of the brine.
4. Give an overview of the Indian chemical industry with special emphasis to the heavy Inorganic chemical segments. [10]

### Unit-II

(Answer any two)

5. Briefly describe the process with chemical reactions and process flow sheet for the manufacture of following chemicals. [2½+2½]  
i) Acrylonitrile from propylene.  
ii) Vinyl chloride via Acetylene and hydrochloride ronte.
6. How do you prepare the following chemicals from Methane. Give the chemical reactions and process flow sheet. [2½+2½]  
i) Methonal, ii) Formaldehyde.
7. Outlines the steps involved in the preparation of following chemicals from Ethylene. (Any two) [2½+2½]  
i) Ethylene glycol, ii) Acetaldehyde, iii) Ethylene oxide.
8. a) Draw a flow sheet showing petro chemical feed stock sources. [2½+2½]  
b) What are the different petrochemicals produced atarting from Propylene.

### Unit-III

(Answer any two)

9. a) Explain the term Antibiotic. [1+4]  
b) How chloromycetin is manufactured? Give the chemical reactions with process flow sheets. State its uses.
10. What are the meant by the terms Antipyretic and analgesic? How paracetamol is manufactured starting from Para Nitro chlorobenzene. Give the chemical reactions, process flow sheet and its uses. [1+4]
11. Give the current scenario of Indian pharmaceutical industry in India. [5]

### **Group-B**

(Answer *any two*)

12. Define the term— Pigment Volume concentration PVC [1+4]  
An ocean Blue Paint is having the following analysis, Percent, by volume :
- | <b>Pigments</b>            | <b>Extenders</b> | <b>Thinner</b>      | <b>Varnish</b>                    |
|----------------------------|------------------|---------------------|-----------------------------------|
| TiO <sub>2</sub> (R) – 3.0 | Barytes – 2.0    | Mineral Spirit – 26 | Dehydrated – 20.0                 |
| PhthalobBlue – 1.0         | Blane Fixe – 2.0 | Toluol – 10         | (castor oil Alkyl (50% in Xylene) |
| Carbon Black – 1.0         | Whiting – 2.0    | Xylol – 1.0         | Tungoil Phenolic Varnish – 20.0   |
| Prussian Blue – 1.0        |                  |                     | (50% in Mineral spirit)           |
| Pigment Blue – 1.0         |                  |                     |                                   |
| Ultramarine Blue – 1.0     |                  |                     |                                   |
- Calculate PVC and comment on quality of the Paint.  
(Hint : Semigloss Paint – 35-45%, Metal primer – 25-40%, Flat Paint – 50-75%)
13. Fill up the blank : [5]
- A lacquer dries by \_\_\_\_\_. Example of a resin used in lacquer is \_\_\_\_\_.
  - Castor oil is \_\_\_\_\_ oil but Tung oil is a \_\_\_\_\_ oil cobalt octoate is a paint \_\_\_\_\_.
  - Lithol Red is an \_\_\_\_\_ Pigment. Red Lead is an \_\_\_\_\_ Pigment.
  - Oleoresin varnishes contain \_\_\_\_\_, \_\_\_\_\_, and Thinner. Example of a common paint Thinner is \_\_\_\_\_.
  - Emulsion Paints can be diluted (Thinned) with \_\_\_\_\_ Example of a resin used in Emulsion Paint is \_\_\_\_\_.
14. Explain the mechanism of oxidative Polymerisation of Linseed oil (Linoleic acid triglyceride) in air giving chemical equations [2½+2½]  
Define the term — Insecticide.  
Give two examples of Plant insecticides.
15. Synthesize— [2½+2½]  
(i) BHC (ii) DDT  
State their major applications as insecticide and Pesticides.

