B.Sc. Part–II Semester–IV Examination
PETROCHEMICAL SCIENCE

Time : Three Hours] [Maximum Marks : 80

Note :— (1) Question No. **1** is compulsory.
(2) Diagrams and chemical equations should be given wherever necessary.
(3) Discuss the reaction mechanism wherever necessary.

1. (A) Fill in the blanks :
   (i) Acrylonitrile is used as monomer for acrylic and _____.
   (ii) Chloroprene is also known as _____.
   (iii) The natural source of phenol is _____.
   (iv) Aniline is mainly manufactured by nitration of _____. ½×4=2

   (B) Choose correct alternative :
   (i) Acetone is synthesized by catalytic dehydrogenation of _____.
   (a) Ethanol (b) Isopropyl alcohol
   (c) Acetic acid (d) Acetaldehyde
   (ii) Phthalic anhydride is formerly produced by _____ of naphthalene.
   (a) Hydrogenation (b) Polymerization
   (c) Oxidation (d) Nitration
   (iii) Benzene is alkylated with propylene to give _____.
   (a) Phenol (b) Aniline
   (c) Cumene (d) Xylene
   (iv) Ammoxidation process for acrylonitrile synthesis is developed by _____.
   (a) Standard Oil Company (b) IPCL
   (c) ICI (d) API ½×4–2

   (C) Answer in **one** sentence each :
   (i) What is the starting material for synthesis of phenol by Dow process ?
   (ii) Name the advance catalyst used in acetaldehyde production technology.
   (iii) Name the main constituent present in the catalyst used for phthalic anhydride synthesis.
   (iv) Which is the important route for isoprene synthesis ? 1×4=4

2. (A) Describe acetaldehyde production with respect to their process parameter, chemistry, process flow and process description. 8

   (B) Describe process parameter and chemistry of liquid phase chlorination for production of vinyl chloride monomer. 4

OR

3. (P) Describe Wacker process of manufacture of VAM with respect to their chemistry and process parameter. 6

   (Q) Draw flow diagram of Acetaldehyde production and explain in detail. 6

4. (A) Draw block diagram for integrated route for production of ethylene oxide. Explain in detail. 6

(B) Why ratio of ethylene oxide and water is maintained in production of ethylene glycol production ? Explain with their chemical reaction. 6

OR

5. (P) Describe advantages and disadvantages of direct oxidation and chlorohydrin process for production of ethylene oxide. 6

(Q) Describe ethyle oxide manufacture through chlorohydrin process with respect to their chemistry and uses. 6

6. (A) Draw a well labelled diagram for acrylonitrile production by Sohio. Discuss process flow chemistry and process parameter involved in this process. 6

(B) Describe hydroperoxidation process for production of propylene oxide with respect to their chemistry, process parameter, disadvantages and market for propylene oxide. 6

OR

7. (P) Which processes are utilised in manufacturing of isopropyl alcohol ? Explain any one of them in detail with uses of isopropyl alcohol. 6

(Q) Describe extension of Wacker reaction in production of acetone in detail. 6

8. (A) Describe production of isoprene monomer through dehydrogenation of CS steam with their chemistry, process parameter and their uses. 6

(B) Describe choloroprene production by using acetylene as a raw material with respect to their chemistry, process parameter and disadvantages. 6

OR

9. (P) Which different routes are adopted for production of isoprene ? Explain acetone-acetylene route in detail. 6

(Q) In which isoprene production process dimerization, isomerization and pyrolysis steps are involved ? Discuss with their chemistry. 6

10. (A) Draw a well labelled diagram for manufacture of phenol through chlorination of benzene with respect to their chemistry, process parameter and process description. 10

(B) Give the market of phenol in detail. 2

OR

11. (P) Which are various processes for production of caprolactam ? Discuss Du Pont route in detail. 6

(Q) Aniline is mainly manufactured from benzene via nitrobenzene. Describe chemistry and process parameter in detail. 6

12. (A) Compare naphthalene and oxylene route for production of phthalic anhydride and also give the market of phthalic anhydride. 6

(B) Terephthalic acid is an important part in polyester industries. Explain TPA production by using P-xylene as a raw material. 6

OR

13. (P) Focus on the recent developments in the dimethyl terephthalate process technology. 6

(Q) Describe fixed bed high velocity process developed by BASF for production of phthalic anhydride. 6