AS–1430

B.Sc. Part—II (Semester—IV) Examination

PETROCHEMICAL SCIENCE

Time : Three Hours] [Maximum Marks : 80

Note :— (i) Question No. **1** is compulsory and carries 8 marks.

(ii) Diagram and chemical equations should be given wherever necessary.

(iii) Discuss the reaction mechanism wherever necessary.

1. (A) Fill in the blanks :

(i) Aniline is mainly manufactured from _____ of benzene. ½

(ii) _____ is the monomer of natural rubber. ½

(iii) Boiling point of vinyl chloride monomer is _____. ½

(iv) In ICI process propylene is hydrated directly by water to form _____. ½

(B) Choose correct alternative :

(i) Goodyear-SD process for production of isoprene is based on _____.

(a) Dimerization of Propylene (b) Dimerization of Propane

(c) Dimerization of Butane (d) None of these. ½

(ii) Celanese Corporation, USA developed a process of oxidation of _____ for production of VAM.

(a) Butane (b) Butene

(c) Butadine (d) Isobutene ½

(iii) _____ is used as a monomer for acrylic and modacrylic fibers, various resins and rubbers.

(a) Allyl chloride (b) Acetonitrile

(c) AcrylonitrileVTM—13515 (d) Acetone ½

(iv) The natural source of phenol is _____.

(a) Naphtha (b) Coal tar

(c) Bitumene (d) Benzene ½

(C) Answer in **one** sentence :

(i) Why propylene cannot be easily oxidized by direct oxidation ? 1

(ii) Which by-product is obtained by cumene route for production of phenol ? 1

(iii) What is the main drawback of benzene route for production of caprolactum ? 1

(iv) Who developed dimerization of propylene for production of isoprene ? 1

2. (A) Describe the integrated balanced technology for production of vinyl chloride monomer with their chemistry and block diagram. 10

(B) What are the disadvantages of acetylene used as raw material in various processes ? 2

OR

3. (P) Describe Wacker process with process flow for production of acetaldehyde. 10

(Q) What are the uses of vinyl acetate monomer ? 2

4. (A) Describe ethylene oxide manufacture with respect to catalyst, process parameter, reaction involved in direct oxidation process. 6

(B) Discuss the hydrolysis process of ethylene oxide with respect to their reaction mechanism and process parameters involved. 6

OR

5. (P) Describe process parameter and chemistry of production of ethanol amine. 6

(Q) Which route is adopted for production of ethylene oxide ? Compare these routes with advantages and disadvantages. 6

6. (A) Indirect hydration of propylene gives isopropylalcohol. Give their chemistry and process parameters in detail. 6

(B) Describe ammoxidation of propylene for production of acrylonitrile with respect to their chemistry and process paramters. 6

OR

7. (P) Describe the Hoechst-Unde process for manufacture of acetone with their chemistry and process parameter. 6

(Q) Describe hydroperoxidation process for production of propylene oxide with respect to their chemistry, process paramter, disadvantages and uses of propylene oxide. 6

8. (A) Describe the role of oligomerization process in production of isoprene with respect to their chemistry and process parameters involved. 6

(B) Which route is economical for production of chloroprene ? Discuss with their chemistry and process parameters. 6

OR

9. (P) Describe isoprene manufacture by using acetone and acetylene with respect to their chemistry and process parameters. 6

(Q) Describe chlorophene production process which is developed by Carothers and Coworkers in detail. 6

10. (A) Describe hydrolysis route for manufacture of phenol in detail. 6

(B) Discuss the chemistry of Toyo Rayon photochemical process for manufacture of captolactum. 6

OR

11. (P) Describe aniline production through ammonolysis process with their chemistry and process parameters. 6

(Q) Give the uses of following :

(i) Aniline

(ii) Phenol

(iii) Caprolactam. 6

12. (A) Compare naphthalene and O-xylene route for production of phthalic anhydride with their advantages and disadvantages. 6

(B) Which route is used for production of terephthalic acid ? Describe ammoxidation process in detail. 6

OR

13. (P) Compare DMT and TPA route, for the production of monomer used in polyethylene terephthatate with their chemistry involved. 6

(Q) Describe dimethyl terephthalate synthesis by using P-xylene as raw material with respect to their chemistry. 6