

B.Sc. (Part-II) Semester-IV Examination
PETROCHEMICAL SCIENCE

Time : 3 Hours]

[Maximum Marks : 80

Note :— (1) Question No.1 is compulsory.

 (2) Remaining six questions carry **12** marks each.

(3) Give chemical equations and draw diagrams wherever necessary.

1. (A) Fill in the blanks : $\frac{1}{2} \times 4 = 2$
 - (i) Direct chlorination of ethylene follows _____ mechanism.
 - (ii) _____ is obtained by hydrolysis of ethylene.
 - (iii) Isoprene is monomer of a _____.
 - (iv) Butadiene reacts with sulfur dioxide in liquid phase to give _____.
 - (B) Choose correct alternative : $\frac{1}{2} \times 4 = 2$
 - (i) The Cuprous Oxide is regenerated by _____.

(a) Nitrogen	(b) Carbon Monoxide
(c) Oxygen	(d) Carbon dioxide
 - (ii) The crude vinyl acetate absorbed in aq. acetic acid is recovered by _____.

(a) Simple distillation	(b) Extractive distillation
(c) Azeotropic distillation	(d) Destructive distillation
 - (iii) The yield of acetone from isopropyl alcohol is about _____.

(a) 78%	(b) 90%
(c) 98%	(d) 95%
 - (iv) _____ is obtained from benzene, toluene and phenol in chemical industry.
 - (C) Answer in one sentence : $1 \times 4 = 4$
 - (i) Name the catalyst used in Wacker's process.
 - (ii) Which process is utilized to purify the crude ethylene glycol ?
 - (iii) What is the solubility of propylene oxide in water ?
 - (iv) What is the boiling point of DMT ?
 2. (A) Why is integrated route used for production of vinyl chloride monomer ? Also give their advantages over old route. 6
 - (B) Describe Wacker process for manufacture of VAM with respect to their chemistry and process parameter. 6
- OR**
3. (P) Describe role of PdCl_2 and CuCl_2 catalyst in the production of acetaldehyde. Which operating conditions are needed for this ? 6
 - (Q) Indirect hydration of ethylene gives ethanol. Describe the chemistry ; process parameter involved with uses of ethanol. 6
 4. (A) Compare direct oxidation process Vs Chlorohydrin process for production of ethylene oxide. 6
 - (B) Describe hydrolysis process for production of ethylene glycol with respect to their chemistry and also give the uses of ethylene glycol. 6
- OR**

5. (P) Describe ethylene oxide manufacturing process by using metallic silver catalyst in detail. 6

(Q) Ethanol amine is a good solvent for chemical industries. Discuss the industrial production of same with respect to chemistry and process parameters involved. 6

6. (A) Why propylene cannot be easily oxidized to propylene oxide? Describe Chlorohydrin route for production of propylene oxide with respect to the chemistry involved and process parameter adopted. 6

(B) Describe in brief direct oxidation process for production of acetone. Now which route is more popular for acetone synthesis? Why? 6

OR

7. (P) Draw and discuss with label flow diagram for acrylonitrile synthesis process developed by Sohio with process parameter, chemistry involved. 8

(Q) Give the uses of following :

(i) Isopropyl alcohol 2

(ii) Propylene oxide. 2

8. (A) Describe chloroprene production from butadiene route in detail; write the advantages of this route over other. 6

(B) Give the chemistry and process parameter required for propylene dimerization route for production of isoprene in detail. 6

OR

9. (P) Discuss Isoprene production by using acetone-acetylene as raw material with respect to process flow in detail. 10

(Q) Sulpholane is one of the important derivatives of butadiene. Write the chemistry and operating parameters involved in this. 2

10. (A) Describe phenol production in brief by using Cumene route with chemistry involved. 6

(B) Caprolactum monomer is obtained in industry from three feed stocks : benzene, toluene and phenol by various processes. Describe benzene route for production of caprolactam. 6

OR

11. (P) Describe the ammonolysis of phenol for production of aniline with respect to their chemistry, process parameter and their uses. 6

(Q) Discuss vapor phase and liquid phase process for production of phenol through chlorobenzene with respect to their chemistry and process parameter required. 6

12. (A) Phthalic anhydride initially manufactured by oxidation of naphthalene. Describe this process with respect to their chemistry, process parameter and uses. 6

(B) Describe dimethyl terephthalate production with their chemistry and process parameter involved by using p-xylene as a feed. 6

OR

13. (P) Terephthalic acid is used for production of terylene. Describe Toray Industries process with respect to process flow and process parameter. 6

(Q) Discuss the recent developments in the : 6

(i) DMT Synthesis

(ii) TPA Synthesis.