

AU-109

B.Sc. (Part—II) Semester—IV Examination
4S : PETROCHEMICAL SCIENCE

Time : Three Hours]

[Maximum Marks : 80

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

1. (A) Fill in the blanks :

- (i) Ethylene oxidation is done in the presence of _____ catalyst for the synthesis of ethylene oxide.
- (ii) O-xylene undergoes _____ reaction to form phthalic anhydride.
- (iii) Chloroprene is also known as _____.
- (iv) Adipic acid is commercially important as the key chemical for the production of _____.

 $\frac{1}{2} \times 4 = 2$

(B) Choose the correct alternative :

- (i) 2-methyl butadiene is also known as :

(a) Isoprene	(b) Chloroprene
(c) Styrene	(d) Cresol
- (ii) Catalytic dehydrogenation of isopropyl alcohol gives _____.

(a) Ethanol	(b) Acetone
(c) Acetic acid	(d) Formaldehyde
- (iii) Raw material used for synthesis of vinyl acetate is :

(a) Acetone	(b) Vinyl chloride monomer
(c) Ethylene	(d) Propylene
- (iv) Acrylonitrile is used as monomer for acrylic and _____.

(a) Plastic	(b) Modacrylic fibers
(c) Acrylic acid	(d) Propylene

 $\frac{1}{2} \times 4 = 2$

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

- (i) Which is the important route for the synthesis of Isoprene ?
- (ii) Which byproduct is obtained during the manufacture of phenol through cumene ?
- (iii) Which is the starting material for the synthesis of phenol by Dow process ?
- (iv) Name the catalyst used for the synthesis of adipic acid by using butadiene. $1 \times 4 = 4$

- 2. (A) Why integrated route gets importance for production of vinyl chloride monomer ? Describe with respect to their chemistry and process parameters involved. 8
- (B) Which feed stocks are used in production of vinyl acetate monomer ? Describe acetylene route in detail. 4

OR

- 3. (P) Describe role of PdCl_2 and CuCl_2 in Wacker process in manufacture of acetaldehyde. 8
- (Q) Which is application of Acetaldehyde, Vinyl Chloride and Vinyl Acetate ? 4
- 4. (A) Compare chlorohydrin process and direct oxidation process for production of ethylene oxide. 6
- (B) Describe hydrolysis process of ethylene oxide with respect to their chemistry and process parameters for production of ethylene glycol. 6

OR

- 5. (P) Ethanol amines used in detergent and solvent industry. How will we prepare ethanolamine ? Describe with respect to their chemistry. 6
- (Q) Describe oxidation process for manufacture of ethylene oxide with their chemistry and process parameters. 6
- 6. (A) Describe Hoechst-Uhde process for production of acetone with respect to their chemistry, process parameters and uses. 6
- (B) Why is indirect oxidation method employed for production of Propylene Oxide ? Explain this process in detail. 6

OR

- 7. (P) Describe indirect hydration of propylene involving chemistry, process parameters and uses for production of isopropyl alcohol. 6
- (Q) Acrylonitrile is used as monomer of various resins fibers and rubbers. Describe ammoxidation process for their manufacture in detail. 6

8. (A) Describe two step process for production of chloroprene by using feed stock butadiene with process parameter and chemistry involved. 6
- (B) Isoprene is the monomer of natural rubber. Describe synthesis of isoprene developed by Goodyear – Scientific design process in detail. 6

OR

9. (P) Adipic acid is key chemical for the production of nylons. Explain adipic acid production through cyclohexane through two step processes in detail. 6
- (Q) Describe dehydrogenation of t-amylenes for production of isoprene monomer with respect to their chemistry, process parameter and their applications. 6
10. (A) Describe cumene route for production of phenol in detail. 6
- (B) Describe nitration process for production of aniline with respect to their chemistry and process parameters. 6

OR

11. (P) Which feed stocks are used for production of caprolactam ? Explain conventional process for production of caprolactam in detail. 6
- (Q) Describe chlorination process for production of phenol with their chemistry, process parameters and their uses. 6
12. (A) Describe production of Phthalic anhydride by using O-xylene as raw material with respect to their chemistry, process parameter and advantages. 6
- (B) Compare dimethyl terephthalate and terephthalic acid route for production of monomer of polyethylene terephthalate. 6

OR

13. (P) Describe P-xylene route for production of terephthalic acid in detail. 6
- (Q) The process for manufacture of DMT from P-xylene by oxidation and esterification is divided into four steps. Name these steps and discuss in detail. 6

