AR – 562

Fourth Semester B. Sc. (Part – II) Examination

PETROCHEMICAL SCIENCE

4 S

P. Pages : 7

Time : Three Hours] [Max. Marks : 80

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

1. (A) Fill in the blanks :—

(i) Adipic acid is commercially important as the key chemical for production of _____.

(ii) Terylene or Dacron is also known as _____.

(iii) Phthalic anhydride is formerly manufactured by _____ of Naphthalene.

(iv) The natural source of Phenol is _____.

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(B) Choose correct alternative :—

(i) Acetone is synthesised by catalytic dehydrogenation of _____.

(a) Ethanol

(b) Isopropyl alcohol

(c) Acetic acid

(d) Acetaldehyde

(ii) Propylene oxide is manufactured by _____ method.

(a) Indirect oxidation

(b) Direct oxidation

(c) Dehydration

(d) Hydrogenation

(iii) Raw material used for synthesis of Vinyl acetate is _____.

(a) Acetone

(b) Vinyl chloride monomer

(c) Ethylene

(d) Propylene

(ii) Union carbide process. 4

(iii) HPO process. 4

12. (A) Explain synthesis of dimethyl terephalate with the process flow. 8

(B) Give the uses of following :—

(i) Phthalic anhydride.

(ii) Dimethyl terephalate. 4

OR

13. (P) Describe Toray industries process for synthesis of TPA with process flow. 8

(Q) Compare Naphthalene and O–Xylene route for production of synthesis gas. 4

(B) Explain Isoprene synthesis through acetone and acetylene with respect to chemistry, process parameters involved. 6

OR

9. (P) Describe shell process for production of isoprene with respect to their process parameter, catalyst and raw materials used. 6

(Q) Explain synthesis of Adipic acid by using cyclohexane with its chemistry and process parameters involved. 6

10. (A) Why cumene route gaining the importance for manufacture of Phenol ? Explain with their chemistry and process parameters involved. 6

(B) Describe ammonolysis process for synthesis of Phenol. 6

OR

11. (P) Describe the following process for synthesis of Caprolactam with their chemistry, catalyst and process parameter :

(i) Dupont process. 4

(iv) For synthesis of Isoprene propylene dimerization involved three steps. Dimerization, _____ and Pyrolysis.

(a) Isomerization

(b) Dehydrogenation

(c) Hydrolysis

(d) Oxidation 2

(C) Answer in **one** sentence :—

(i) Which catalyst is used for synthesis of adipic acid by using butadiene ?

(ii) In Electrochemical process for production of Adipic acid which raw material was used ?

(iii) Advantages of sohio process for synthesis of acrylonitrile.

(iv) Why butadiene route gaining importance over Acetylene route for synthesis of chloroprene ? 4

2. (A) What is the importance of integrated Chlorination – Oxychlorination process for manufacture of V. C. M. ? Explain with chemistry and process parameters. 8

(B) Describe the application of following :—

(i) Acetaldehyde.

(ii) Ethenol. 4

OR

3. (P) Describe the manufacture process for Acetaldehyde from ethylene with chemistry and process parameters. Discuss the role of catalyst in this process. 8

(Q) Describe the advantages and disadvantages of direct and indirect hydration process for manufacture of Ethyl alcohol. 4

4. (A) Discuss the chlorohydrin process in brief for production of ethylene oxide with chemistry involved. 6

(B) Describe hydrolysis process for production of ethylene glycol with its chemistry and process parameters involved. 6

OR

5. (P) Describe direct oxidation process for manufacture of ethylene oxide with respect to chemistry and process parameters. 6

(Q) Compare direct oxidation and chlorohydrin process for production of ethylene oxide. 6

6. (A) Explain acrylonitrile synthesis process developed by Sohio Co. with their chemistry, process parameter. 6

(B) Describe direct hydration process for production of Isopropyl alcohol with respect to their chemistry and process parameters involved. 6

OR

7. (P) Explain the reaction involved in ammoxidation process for acrylonitrile production. 6

(Q) Describe the uses of following :—

(i) Propylene oxide.

(ii) Isopropyl alcohol.

(iii) Acrylonitrile. 6

8. (A) Discuss the butadiene route for synthesis of chloroprene with respect to its chemistry, process parameter and advantages. 6