

- (q) Discuss the manufacture of phenol formaldehyde resin in detail with the process parameters and the chemistry involved. 10

12. (a) How is asphalt categorized into three distinct species? Also mention the necessary qualities of asphalts. 4

- (b) Discuss the effect of heat on asphalt in detail. 8

OR

13. Discuss the propane dewaxing process in detail with the neat sketch of flow diagram and process parameters involved. 12

AP-493

B.Sc. Part-III (Semester-V) Examination
5S : PETROCHEMICAL SCIENCE

Time : Three Hours]

[Maximum Marks : 80

- N.B. :—** (1) Question No. 1 is compulsory.
(2) Diagrams and chemical equations should be given wherever necessary.
(3) Discuss the reaction mechanism wherever necessary.
(4) Due credit will be given to neatness.

1. (A) Fill in the blanks :

- (i) Nylon-6 is manufactured from _____.
(ii) The simple small molecule which is the building block of the giant polymer molecule is called the _____.
(iii) Bitumen must possess good _____, when it is used in surface application.
(iv) The monomer of polyvinyl chloride is _____.
 $4 \times \frac{1}{2} = 2$

(B) Choose correct alternatives.

(i) The word 'polymer' meant for material made from ____.

- (a) Single entity
- (b) Two entities
- (c) Multiple entities
- (d) Any entity

(ii) The starting material for the preparation of styrene is ____.

- (a) Ethane
- (b) Ethene
- (c) Ethyl Benzene
- (d) Vinyl Chloride

(iii) Which is a naturally occurring polymer ?

- (a) Polyethene
- (b) Acetic acid
- (c) PVC
- (d) Protein

(q) Discuss the manufacture of di-isobutylene in detail with the chemistry and the process parameters involved. 8

8. (a) What are the different uses of polystyrene ? Mention its market share for different applications. 4

(b) Discuss the chemistry involved in the manufacture of acrylonitrile-butadiene-styrene co-polymers. 8

OR

9. (p) What are the uses of polyvinyl chloride ? Also mention its market share. 4

(q) What do you understand by impact polystyrene ? Explain with the chemistry involved. 8

10. (a) What is the typical formulation for the preparation of unsaturated polyester ? 2

(b) What is the most important example of saturated polyester ? Discuss the chemistry involved in the manufacture of this saturated polyester, along with the process parameters involved. 10

OR

11. (p) What makes nylon-12 a very successful material for the construction of gears, wheels and other mechanical equipments ? 2

(iv) Condensation product of caprolactum is ____.

(a) Nylon-6

(b) Nylon-12

(c) Nylon-6,6

(d) Nylon-6,10

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

(C) Answer the following question in **one** sentence :

(i) What is the greatest limitation of bulk polymerization ?

(ii) What may be a chain carrier in chain polymerization process ?

(iii) Name the emulsifiers that are used as emulsifiers in emulsion polymerization.

(iv) What do you mean by cutback bitumen ?

$4 \times 1 = 4$

2. (a) Why choice of solvent is very important in solution polymerization ?

4

(b) Compare thermoplastics with thermosets. Also mention two examples of each.

8

OR

3. (p) Why solution polymerization is unsuitable for making dry polymers ? Mention for what it is best suitable ? 4
- (q) Discuss the mechanism of free radical polymerization in detail with suitable examples. 8
4. Discuss the production of HDPE by Solvay process in detail with neat sketch of flow diagram and the process parameters involved. 12

OR

5. Discuss the production of polypropylene in detail with neat sketch of process flow diagram and the process parameters involved. 12
6. (a) Polymerization for butyl rubber as well as polyisobutylene is carried out in almost the same way. What is the major difference between these two polymers ? 4
- (b) Discuss the manufacture of acrylonitrile-butadiene copolymer with the chemistry involved in detail. Also mention their major property. 8

OR

7. (p) It was found that polymerized isoprene is not identical to natural rubber, why ? 4