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

Time : Three Hours] [Maximum Marks : 80

Note :— (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) When a polymer is prepared by polymerizing only one monomer, it is called a _____.
(ii) _____ is the simplest of all and probably the most common method for the manufacture of polystyrene.
(iii) The higher heat resistance and impact strength is attained with a greater _____ content in the SAN polymer.
(iv) In suspension polymerization water plays an important role in _____ of polymerization efficiently and economically. $4\times\frac{1}{2}=2$

(b) Choose correct alternatives :
(i) Density of high density polythene is about _____ gm/cc.
(a) 0.95 (b) 1.18
(c) 1.05 (d) 0.99
(ii) Addition of stabilizer during PVC manufacture is done to _____.
(a) Improve its elasticity
(b) Improve its impact strength
(c) Reduce the melt viscosity and glass transition temperature
(d) Prevent its thermal degradation
(iii) _____ is a thermosetting plastic.
(a) Bakelite (b) Polythene
(c) PVC (d) Polystyrene
(iv) Which of the following is a biodegradable polymer ?
(a) Cellulose (b) PVC
(c) Polythene (d) Nylon-6 $4\times\frac{1}{2}=2$

(c) Answer in **one** sentence :
(i) On what factor largeness of a polymer molecule depends ?
(ii) What do you mean by a copolymer ?
(iii) What do you understand by ductility of bitumen ?
(iv) Why emulsifiers are used in emulsion polymerization ? $4\times1=4$

2. (a) Explain the general phenomena of bulk polymerization called as gel effect. 4
(b) Describe the chemistry of radical chain polymerization. 8

OR

3. (p) What are the advantages of suspension polymerization method ? 4
   (q) Discuss the chemistry of anionic polymerization of acrylonitrile catalyzed by amine. 8
4. (a) When and how ethylene was first polymerized to form LDPE ? 4
   (b) Discuss the development in the polymerization technology of propylene in detail. 8

OR

5. (p) Mention the process parameters and catalyst used in manufacturing of HDPE first time in USA. 4
   (q) What is the market for LDPE and HDPE ? 8
6. (a) How control of molecular weight is usually achieved while manufacturing polychloroprenes ? If not controlled, what will be the effect ? 4
   (b) Discuss the manufacture of Di-isobutylene in detail with the chemistry and process parameters involved. 8

OR

7. (p) It was found that polymerized isoprene is not identical to natural rubber. Why ? 4
   (q) Discuss the chemistry and process parameters involved in the manufacture of styrenebutadiene rubber. 8
8. (a) How acrylonitrile-butadiene-styrene co-polymer was earlier manufactured in the mill ? 4
   (b) How styrene-acrylonitrile copolymers are manufactured ? Also mention their commercial importance. 4
   (c) What are the uses of polyvinyl chloride ? Also mention its market share. 4

OR

9. (p) Which method is most extensively followed in industry for polymerization of styrene monomer ? 2
   (q) How hydrolysis of acetate group is prevented while manufacturing polyvinyl acetate polymer ? 2
   (r) Discuss the chemistry involved in the manufacture of acrylonitrile-butadiene-styrene copolymers. 8
10. (a) Mention the properties and uses of urea-formaldehyde resin. 4
    (b) Discuss the curing (cross linking) of the unsaturated polyester in detail with the chemistry involved. 8

OR

11. (p) Discuss the chemistry involved in the manufacture of Nylon-6. 4
    (q) Discuss the manufacture of Nylon-6,6 with the process parameters and chemistry involved in detail. 8
12. Discuss air blowing of bitumen in detail with the neat sketch of manufacturing process and process parameters involved. 12

OR

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