1. Answer any three of the following: 18
   (a) Differentiate Unit processes and unit operations. Name the different nitrating agents and discuss industrially important chemicals obtained by nitration from benzene.
   (b) Name different halogenating agents. Discuss industrial chemicals obtained from benzene naphthalene and anthracene by chlorination.
   (c) Discuss how industrially important chemicals obtained from xylene.
   (d) Define alkylation and enlist different alkylating agents. Discuss about industrial importance of these compounds.

2. Answer any three of the following: 18
   (a) Discuss how industrially chemicals obtained by aromatics and C1 cut. Give their applications.
   (b) Discuss the industrial manufacturing and uses of polyvinylchloride and elastomers.
   (c) What are polymers? How are they classified? Name the techniques of polymerization. Discuss any one of them in detail.
   (d) What are petrochemicals? Discuss industrially important products obtained from acetylene.”
3 Give the industrial production and uses of following with diagram: (any three)
   (a) Vitamin C
   (b) Ethyleneglycol
   (c) Acetone
   (d) Ethanolamines.

4 Answers any four of the following:
   (a) Give a brief account of techniques of polymerization.
   (b) Give the mechanism of aromatic sulphonation. Explain briefly an industrial production of chemicals by sulphonation of benzene and naphthalene.
   (c) Give the industrial production and uses of Penicillin with diagram.
   (d) “Petroleum products have been the most vital raw material for chemical industry” justify this statement with reference to propylene.
   (e) What is hydroxylation? Discuss about industrial important hydroxyl compounds derived by various routes.