



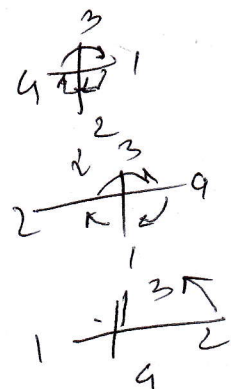
Part -A

1. a) Define stereospecific and stereoselective reaction with example of each. 3.0  
b) Draw stereochemical formulas for all the possible stereoisomers of 3,4-dibromo-3,4-dimethyl hexane. Label pairs of enantiomers, meso compound and give the R/S specification for each stereoisomers. 5.0  
c) "Synthesis of a chiral compound from achiral reactants always yields the racemic modification and optically inactive reactants yield optically inactive products" justify the statement with reaction mechanism. 4.0  
d) Describes two methods for the resolution of racemic modification. 3.5  
e) Why bond at equatorial position is more stable than that of axial position? 2.0
2. a) Discuss the reaction mechanism of S<sub>N</sub>1 & S<sub>N</sub>2 reaction. 5.0  
b) Define electrophilic addition reaction with example. 2.0  
c) Discuss the free radical addition reaction in presence of peroxide. 3.5  
d) Give the structures of compound A – C; 4.0  
$$\text{C}_6\text{H}_5\text{OCH}_2\text{Cl} + \text{Ph}_3\text{P}, \text{ then t-BuOK} \rightarrow \text{A (C}_{25}\text{H}_{21}\text{OP)}$$
$$\text{A} + \text{ethyl methyl ketone} \rightarrow \text{Ph}_3\text{PO} + \text{B (C}_{11}\text{H}_{14}\text{O)}$$
$$\text{B} + \text{dilute aqueous acid} \rightarrow \text{C (C}_5\text{H}_{10}\text{O)}$$

The above sequence offers a general route to what class of compounds?

e) Differentiate E1 & E2 reaction with example. 3.0

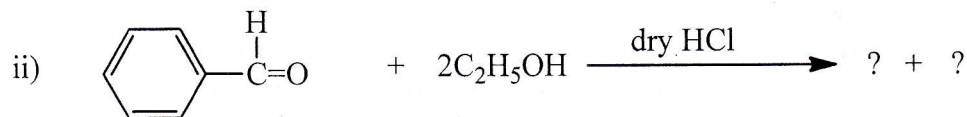
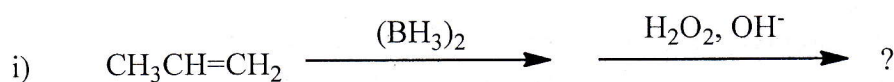
- 3. a) Outline the synthesis of pyrrole, furan and thiophene from the same compound. 3.0  
b) "In electrophilic substitution pyrroles is more reactive than benzene" justify the statement. 3.5  
c) Discuss the synthesis of simple phosphines. 4.0  
d) Predict the relative basicities of amines (RCH<sub>2</sub>NH<sub>2</sub>), immines (RCH=NH), and nitriles (RC≡N). 3.0  
e) Discuss the knorr pyrrole synthesis. Explain the basicity of pyrroles. 4.0



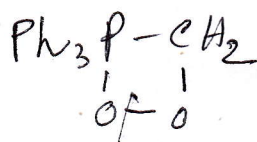
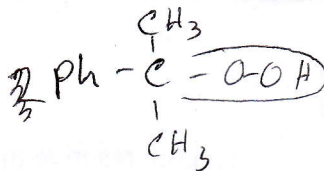
Part-B

4. a) Write down the two methods for the preparations of mercaptans. 3.0  
b) Give the structure of caffeine. Write down the chemical synthesis of caffeine. 3.5  
c) Define ylides. How phosphorous ylides are used in the synthesis of alkenes through witting reaction. 4.0  
d) On treatment of toluene with chlorosulphonic acid (ClSO<sub>3</sub>H) gives two products A and B, when A reacts with NH<sub>3</sub> gives C, which on treatment with zaiman oxygen ( [O] ) give product D. Give the structures of all products A, B, C and D with corresponding reaction. 4.0  
e) What happen? When; 3.0  
i) Phosphorous ylide is oxidized by a small amount of oxygen and by excess amount of oxygen.  
ii) Thiols are treated with raney nickel.  
iii) Trialkyl phosphine (R<sub>3</sub>P) is oxidized with nitric acid.

5. a) Outlines the steps involved in the mechanism of Claisen condensation reaction. 4.0  
 b) The treatment of cumene hydroperoxides (  $\text{Ph-C(CH}_3)_2\text{-O-OH}$  ) with aqueous acid yields phenol and acetone instead of methanol and acetophenone, show with mechanism and what conclusion do you draw about migratory aptitudes? 6.0  
 c) Why flavins are more versatile redox reagent than pyrimidine nucleotides? 2.5  
 d) What product could you expect from 2-methyl-2-butene upon cleavage by (i) ozonolysis, (ii)  $\text{NaIO}_4 / \text{KMnO}_4$  3.0  
 e) Complete the following reaction; 2.0



6. a) Define with example: (any two) 2.0  
       i) cofactor, ii) coenzyme & iii) holoenzyme  
 b) Give the list of PLP-dependent reaction with example. 5.0  
 c) Write down the coenzymic form of pyridoxal phosphate. Explain the mechanism of decarboxylation of aspartate. 3.5  
 d) Discuss the biological importance of lipoic acid with example. 3.0  
 e) Give the coenzymic form of thiamine & discuss the transketolase reaction. 4.0



HCHO

