

12th Science vacation homework. (Chemistry)

1. An organic compound (A) having molecular formula C_3H_7Cl on reaction with alcoholic solution of KCN gives compound B. The compound B on hydrolysis with dilute HCl gives compound C. C on reduction with H_2 / Ni gives 1-aminobutane. Identify A, B and C.
2. An alkyl halide X having molecular formula $C_6H_{13}Cl$ on treatment with potassium tert-butoxide gives two isomeric alkenes Y and Z but alkene Y is symmetrical. Both alkenes on hydrogenation give 2, 3-dimethylbutane. Identify X, Y and Z.
3. Haloalkanes undergo nucleophilic substitution reaction easily but haloarenes do not undergo nucleophilic substitution under ordinary conditions.
4. Explain the following reactions with suitable example : (i) Finkelstein reaction. (ii) Swarts reaction. (iii) Wurtz reaction. (iv) Wurtz-Fittig reaction (v) Friedel-Craft's alkylation reaction. (vi) Friedel-Craft's acylation reaction (vii) Sandmeyer reaction.
5. How will you bring about the following conversions? (i) benzene to 3-bromonitrobenzene (ii) ethanol to but-1-yne (iii) 1-bromopropane to 2-bromopropane (iv) benzene to 4-bromo-1-nitrobenzene (v) aniline to chlorobenzene
6. Describe the following reactions with example : (i) Hydroboration oxidation of alkenes (ii) Acid catalysed dehydration of alcohols at 443K. (iii) Williamson synthesis (iv) Reimer-Tiemann reaction.
7. 5. What happens when : (i) aluminium reacts with tert-butyl alcohol (ii) phenol is oxidised with chromic acid (iii) cumene is oxidised in the presence of air and the product formed is treated with dilute acid.
8. Arrange the following in the increasing order of property shown : (i) methanol, ethanol, diethylether, ethyleneglycol. (Boiling points) (ii) phenol, o-nitrophenol, m-nitrophenol, p-nitrophenol. (Acid strength) (iii) dimethylether, ethanol, phenol. (Solubility in water) (iv) n-butanol, 2-methylpropan-1-ol, 2-methylpropan-2-ol. (Acid strength)
9. An ether A ($C_5H_{12}O$) when heated with excess of hot concentrated HI produced two alkyl halides which on hydrolysis form compounds B and C.

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Oxidation of B gives an acid D whereas oxidation of C gave a ketone E.

Deduce the structures of A, B, C, D and E.

10. Give reason for the following : (i) The C–O–C bond angle in dimethyl ether is (111.7°) (ii) Alcohols have higher boiling points than ethers of comparable molecular masses.