

**Assignment\_2020**  
**4<sup>th</sup> Semester (Chemistry)**  
**Paper E 401**

1. Answer the following questions.
  - (a) Give an example of mixed ether with IUPAC names.
  - (b) Draw the structures of two aromatic alcohols.
  - (c) Name an aldehyde and carboxylic acid that are available in nature.
  - (d) What is the common hetero atom present in the functional group in alcohols and ethers?
  - (e) What is a Lucas reagent?
  - (f) What is the major difference between aliphatic alcohols and aromatic alcohols?
  
2. Answer the following questions.
  - (a) How you can prepare three different alcohols by using a single reaction?
  - (b) Mention different types of amines with their structures.
  - (c) Mention different steps involved in Victor Mayer process in detection of different alcohols.
  - (d) What do you mean by Satzef's rule? Apply this rule to a secondary alcohol.
  - (e) Obtain an expression for the calculation of rate constant of a first order reaction.
  - (f) Show that the half life of a first order reaction is independent of the initial concentration of the reactant.
  - (g) Draw the structure of all isomeric alcohols of molecular formula  $C_5H_{12}O$  and give their IUPAC names.
  
3. Arrange the following:
  - (a) Pentan-1-ol, butan-1-ol, butan-2-ol, ethanol, propan-1-ol, methanol (*increasing order of boiling point*)
  - (b) Propan-1-ol, 2,4,6-trinitrophenol, 4-nitrophenol, 3-nitrophenol, 3,5-dinitrophenol, phenol (*increasing order of acid strength*)
  - (c) 2- Butanol, 1-butanol, 2-methyl-2-propanol (*increasing order of reactivity with Lucas reagent*)
  - (d)  $CH_3OH$ ,  $H_2O$ ,  $C_6H_5OH$  (*decreasing order of acid strength*)
  - (e)  $CH_3CH_2CH_2CHO$ ,  $CH_3CH_2CH_2CH_2OH$ ,  $C_2H_5OC_2H_5$ ,  $CH_3CH_2CH_2CH_2CH_3$  (*increasing order of boiling point*)
  - (f)  $C_6H_5COOH$ ,  $FCH_2COOH$ ,  $NO_2CH_2COOH$  (*decreasing order of acid strength*)
  - (g)  $C_6H_5NH_2$ ,  $C_2H_5NH_2$ ,  $(C_2H_5)_2NH$ ,  $NH_3$  (*decreasing order of basic strength*)

4. Explain why?
- (a) Alcohols are more soluble in water than hydrocarbons of similar masses.
  - (b) Aldehydes are more reactive than ketones.
  - (c) Benzaldehyde reduces Tollen's reagent but not Fehling solution.
  - (d) Dipole moments of aldehydes and ketones are higher than those of alcohols.
  - (e) Ethylamine is soluble in water whereas aniline is not.
  - (f) Aniline does not show Friedel-Crafts reaction.
  - (g) The average life period for first order reaction is  $1.44 \times t_{1/2}$
5. Convert the following:
- (a) Propane to propan-2-ol.
  - (b) Propan-1-ol to 1-propoxypropane.
  - (c) Butan-1-ol to butanoic acid.
  - (d) Butanal to butanoic acid.
  - (e) Benzene to aniline.
  - (f) Propanoic acid to ethanoic acid.
6. Write short notes on the following:
- (a) Williamson's ether synthesis.
  - (b) Cannizzaro reaction.
  - (c) Lucas test.
  - (d) Carbylamine test.
  - (e) Ostwald dilution law.
  - (f) Order and molecularity.
7. A first order reaction is 75% complete in 60 minutes. Find the half-life of the reaction.
8. A first order reaction is 15% complete in 20 minutes. How long it take to be 60% complete?
9. The half-life period of a first order reaction is 60 minutes. What percentage will be left after 240 minutes?
10. Show that in case of first order reaction, the time required for 99.9% of the reaction to take place is about ten times that required for half the reaction.

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