Chemistry Worksheet

Topic: Aldehydes, Ketones And Carboxylic Acids

1. Name the following compounds according to *IUPAC* system of nomenclature:

a) $CH_3CH(CH_3)CH_2CH_2CHO$ b). $CH_3CH = CHCHO$ d). $OHCC_6H_4CHO$-*p*

c) $CH_3CH(CH_3)CH_2C(CH_3)_2COCH_3$ e). $CH_3CH_2COCH(C_2H_5)CH_2CH_2C\mathit{l}$

2. Name the following compounds according to *IUPAC* system of nomenclature:

a) $CH_3COCH_2COCH_3$ b) $(CH_3)_3CCH_2COOH$ c) $(CH_3)_2CHCH(CH_3)COC\mathit{l}$

d) $[(CH_3)_2CHCH_2CO]_2O$ e) $C_6H_5CH_2CH_2COOCH(CH_3)_2$

3. Name the following compounds according to *IUPAC* system of nomenclature:

a) *m*- $BrC_6H_4CH_2COOCH_2CH_2CH_3$ b) $CH_3OOCCH_2CH_2COOCH_3$

c) $CH_3CH(CH_3)CONH_2$ d) $CH_3CH(Br)CH_2CONHCH_3$

4. a) How will you convert **:** (i) Benzoyl chloride to benzaldehyde (ii) Propanone to 2-propanol

(iii) Benzoic acid to m-nitrobenzene acid (Write the reaction and state the reaction conditions in each case.)

5. Write the names and structures of the products formed in the following reactions:

a) Reaction of semicarbazide ($NH_2CONHNH_2$) with formaldehyde.

b) Oxidation of ethyl benzene with alkaline $KMnO_4$.

6. Give reasons for the following:

i) Acetic acid is a weaker acid than chloroacetic acid

ii) During preparation of ammonia derivatives of aldehydes and ketones, *p*H of medium is controlled.

7. Carboxylic acid have higher boiling points than alcohols of comparable molecular masses. Explain why?

8. An organic compound (A), which has a characteristic odour, on treatment with NaOH forms two compounds (B) and (C). Compound (B) has molecular formula C_7H_8O which on oxidation gives back compound (A). Compound (C) is the sodium salt of an acid. (C) when heated with sodalime yields an aromatic hydrocarbon(D). Deduce the structures of (A), (B), (C) and (D).

9. Draw the structural formula of 1-phenyl propan-1-one molecule.

10. Give chemical test to distinguish between ethanol and propanal.

11. What is Tollen's reagent? Write one usefulness of this reagent.

12. Convert propanone to 2-methyl propan-2-ol.

13. HCHO reacts with HCN faster than CH_3CHO.

14. Give structures of A, B and C in the following:

$$CH_3COOH \xrightarrow{SOCl_2} A \xrightarrow[BaSO_4]{H_2/Pd} B \xrightarrow[heat]{HI/P_4\ red} C.$$

15. Why do carboxylic acids not give the characteristics reactions of a carbonyl group?

16. Illustrate the following name reactions giving a chemical equation in each case:

i) Clemmensen reaction

ii) Cannizzaro's reaction

iii) Hell-volhard Zelinsky reaction

iv) Wolff-Kishner reduction

17. How the following conversions are carried out:

i) Ethyl benzene to benzoic acid

ii) Bromobenzene to benzoic acid

iii) Ethylcyanide to ethanoic acid

iv) Butan-1-ol to butanoic acid

v) cyclohexanol to cyclohexane-1-one.

18. ***Identify X and Y and complete each of the following equations:***

(i) $CH_3COCl \xrightarrow{Cd(CH_3)_2} X \xrightarrow{PCl_5} Y$

(ii) $C_6H_5COOH \xrightarrow[Pyridine]{SO_2Cl_2} X \xrightarrow[aq.\ NaOH]{Y}$ Phenyl benzoate

(iii) $X \xrightarrow{CH_3I} (CH_3)_2\ CHOCH_3 \xrightarrow{HI}$ Y (major product)

(iv) $CH_3CH_2OH \xrightarrow[575\ K]{Cu} X \xrightarrow[\Delta]{Al\ (OC_2H_5)_3} Y$

(v) $CH_3COOH \xrightarrow{NH_4OH} X \xrightarrow[heat]{P_2O_5}$ **Y**