Expt: 4

ANALYSIS OF ORGANIC COMPOUND
TESTS FOR FUNCTIONAL GROUPS

Materials Required:

Chemicals:

1. 10% $NaHCO_3$ (10 gm into 100 ml dist. Water)
2. 10% NaOH (10 gm into 100 ml dist. Water)
3. Conc. HCl
4. 2, 4 – DNP Solution.
5. Methanol
6. $CuSO_4$
7. H_2SO_4
8. Sodium Potassium Tartrate
9. $AgNo_3$
10. Sodium Nitroprusside
11. Neutral Ferric Chloride
12. 20% $NaNO_2$(20 gm into 100 ml dist. Water)
13. Alkaline β- naphthol

Glassware:

1. Test tube – 10No.
2. Test tube holder – 1No.
3. Glass rod – 1No.
4. Spatula – 1No.
5. Test tube Stand – 1No.

Experiment	Observation	Inference
(1.) Test for Acids: **a) $NaHCO_3$ test:** Sample + 1 ml of $NaHCO_3$ solution **b) NaOH test:** 0.1 g of substance (3drops) + 1 ml 10% NaOH solution. Shake well. All organic acids dissolve when shaken with NaOH.		
(2.) Test for Aldehydes and Ketones: **a) Borsche's test:** (2gm of 2,4-DNP in 100ml of methanol,+ 4ml of Conc H_2SO_4) Substance + ~1 ml Borsche's reagent, boil and add conc. HCl, cool, add ~1 ml water. **b) Fehling's Solution Test:** (A) (11.5466gm of $CuSO_4$ in H_2O + few drops of dil.H_2SO_4 and dil.to 200 ml.) (B) (24 gm of NaOH and 69.2gm of Sodium Potassium Tartrate in H_2O and dil. to 200ml. Keep the two solutions separately in tightly stoppered bottles and mix exactly equal volumes immediately.) (for Aliphatic Aldehydes only) Sample + ~1 ml each of Fehling's solutions "A" & "B". Heat to boiling.		
(3.) Tollen's Reagent test: (Solution -A): 3gm of $AgNO_3$ in 30ml H_2O. (Solution –B) : 3gm of NaOH in 30ml of H_2O mix equal volumes of A and B (1ml) and add dil. ammonia solution drop by drop until the silver oxide is just re-dissolved. Use this as the reagent.) **(Aldehyde only)** Sample + ~1 ml Tollen's reagent, heat the test tube in a water bath for 5-10 minutes.		

(4.) Legal's test: (1gm Sodium nitroprusside per 100ml H_2O.) **(for Ketones only)** Sample + 2 ml dist.water + 5 drops of Sodium nitroprusside solution + 5 drops NaOH + 5 drops CH_3COOH.		
(5.) Test for Phenol: *(1gm Ferric Chloride in 100ml H_2O.)* Sample + 1 ml of neutral Ferric chloride.		
(6.) Test for Amines: **a.) Solubility test:** (2M HCl : 33.33ml of HCl per 200ml of solution .) 0.1 g substance + ~1 ml dil HCl. Shake well. **b.) Dye test:** (40gm of $NaNO_2$ in 200ml of H_2O). **Alkaline β-naphthol :** (8gm NaOH in 200ml H2O and add 5gm of β- naphthol) Sample + ~3 ml dil. HCl, cool (in ice), add 1 ml $NaNO_2$ solution and 1 ml alkaline – β- naphthol		