

ORGANIC QUALITATIVE ANALYSIS FOR BENZALDEHYDE

S.No	Experiment	Observation	Inference
Preliminary tests			
1.	Odour: Note the Odour of the organic compound.	Bitter almond odour	May be benzaldehyde
2.	Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.	No colour change is noted	Absence of carboxylic acid , phenol and amine
3.	Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.	No brisk effervescence is obtained	Absence of a carboxylic acid
4.	Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.	yellow or orange or red precipitate	Presence of an aldehyde or ketone
5.	Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H ₂ SO ₄ to it, and heat the mixture.	No Charring takes place with smell of burnt sugar	Absence of carbohydrate
Tests for Aliphatic or Aromatic nature:			
6	Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.	Burns with sooty flame	Presence of an aromatic compound
Tests for an unsaturation:			
7	Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.	Orange - yellow colour of bromine water is decolourised	Substance is unsaturated.
8	Test with KMnO₄ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline KmnO ₄ solution and shake it well.	Pink colour of KmnO ₄ solution is decolourised	Substance is unsaturated.

S.No	Experiment	Observation	Inference
TEST FOR BENZALDEHYDE			
1.	<p>Tollen's reagent test:</p> <p>Take 2 ml of Tollen's reagent in a clean dry test tube. Add 3-4 drops of an organic compound (or 0.2 g of solid) to it, and warm the mixture on a water bath for about 5 minutes.</p>	Shining silver mirror is formed.	Presence of an aromatic aldehyde
2.	<p>Fehling's test:</p> <p>Take 1 ml each of Fehling's solution A and B are taken in a test tube. Add 4-5 drops of an organic compound (or 0.2g of solid) to it, and warm the mixture on a water bath for about 5 minutes.</p>	No red precipitate is formed.	Absence of an aromatic aldehyde

REASONING

Tollen's reagent test:

Aldehydes react with Tollen's reagent to form elemental silver, accumulated onto the inner surface of the test tube. Thus silver mirror is produced on the inner walls of the test tube.

Fehling's Test

Benzaldehyde may not give this test as the reaction is very slow.

Report:

The given organic compound contains /is

- (i) Aromatic (ii) unsaturated (iii) Aldehyde functional group

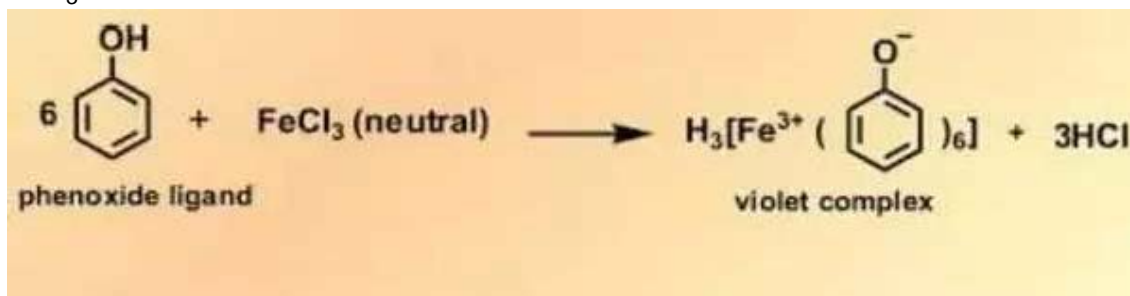
ORGANIC QUALITATIVE ANALYSIS FOR PHENOL

S.No	Experiment	Observation	Inference
Preliminary tests			
1.	Odour: Note the Odour of the organic compound.	Phenolic odour	May be phenol
2.	Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.	Blue litmus turns red	May be phenol
3.	Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.	No brisk effervescence is obtained	Absence of a carboxylic acid
4.	Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.	No yellow or orange or red precipitate	Absence of an aldehyde or ketone
5.	Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H_2SO_4 to it, and heat the mixture.	No Charring takes place with smell of burnt sugar	Absence of carbohydrate
Tests for Aliphatic or Aromatic nature:			
6	Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.	Burns with sooty flame	Presence of an aromatic compound
Tests for an unsaturation:			
7	Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.	Decolourisation with formation of white precipitate.	Presence of an aromatic phenol.
8	Test with $KMnO_4$ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline $KmnO_4$ solution and shake it well.	Pink colour of $KmnO_4$ solution is decolourised	Substance is unsaturated.

S.No	Experiment	Observation	Inference
TEST FOR PHENOL			
1.	<p>Neutral FeCl₃ test:</p> <p>Take 1 ml of neutral ferric chloride solution is taken in a dry clean test tube. Add 2 or 3 drops (or a pinch of solid) of organic compound to it. If no colouration occurs add 3 or 4 drops of alcohol.</p>	Violet colouration is seen	Presence of phenol

REASONING

Neutral FeCl₃ test: Phenol reacts with ferric ions to form violet coloured complex.



Aqueous solution Naphthols do not give any characteristic colour with neutral ferric chloride. But alcoholic solution of α and β naphthols give blue-violet and green colouration respectively due to the formation of binaphthols.

Report:

The given organic compound contains /is

- (i) Aromatic (ii) unsaturated (iii) Phenol functional group

ORGANIC QUALITATIVE ANALYSIS FOR AMINE

S.No	Experiment	Observation	Inference
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Preliminary tests

1.	<p>Odour: Note the Odour of the organic compound.</p>	Fish odour	May be an amine
2.	<p>Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.</p>	Red litmus turns blue	May be an amine
3.	<p>Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.</p>	No brisk effervescence is obtained	Absence of a carboxylic acid
4.	<p>Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.</p>	No yellow or orange or red precipitate	Absence of an aldehyde or ketone
5.	<p>Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H₂SO₄ to it, and heat the mixture.</p>	No Charring takes place with smell of burnt sugar	Absence of carbohydrate

Tests for Aliphatic or Aromatic nature:

6	<p>Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.</p>	Burns with sooty flame	Presence of an aromatic compound
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Tests for an unsaturation:

7	<p>Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.</p>	Decolourisation with formation of white precipitate.	Substance is unsaturated.
8	<p>Test with KMnO₄ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline KmnO₄ solution and shake it well.</p>	Pink colour of KmnO ₄ solution is decolourised	Substance is unsaturated.

S.No	Experiment	Observation	Inference
Test for an amine.			
1.	<p>Dye test:</p> <p>Take A small amount of an organic substance in a clean test tube, add 2 ml of HCl to dissolve it. Add few crystals of NaNO_2, and cool the mixture in ice bath. Then add 2 ml of ice cold solution of β-naphtholin NaOH.</p>	Scarlet red dye is obtained	Presence of an aromatic primary amine

REASONING

Azo-Dye Test

This test is given by aromatic primary amines. Aromatic primary amines react with nitrous acid to form diazonium salts. These diazonium salts undergo coupling reaction with α -naphthol to form orange coloured azo dye.

Report:

The given organic compound contains /is

- (i) Aromatic (ii) unsaturated (iii) Amine functional group

ORGANIC QUALITATIVE ANALYSIS FOR CARBOXYLIC ACID

S.No	Experiment	Observation	Inference
Preliminary tests			
1.	<p>Odour: Note the Odour of the organic compound.</p>	pungent odour	May be Carboxylic acid
2.	<p>Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.</p>	Blue litmus turns red	May be a carboxylic acid
3.	<p>Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.</p>	brisk effervescence is obtained	Presence of a carboxylic acid
4.	<p>Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.</p>	No yellow or orange or red precipitate	Absence of an aldehyde or ketone
5.	<p>Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H_2SO_4 to it, and heat the mixture.</p>	No Charring takes place with smell of burnt sugar	Absence of carbohydrate
Tests for Aliphatic or Aromatic nature:			
6	<p>Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.</p>	Burns with sooty flame	Presence of an aromatic compound
Tests for an unsaturation:			
7	<p>Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.</p>	Orange - yellow colour of bromine water is decolourised	Substance is unsaturated.
8	<p>Test with $KMnO_4$ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline $KmnO_4$ solution and shake it well.</p>	Pink colour of $KmnO_4$ solution is decolourised	Substance is unsaturated.

S.No	Experiment	Observation	Inference
TEST FOR CARBOXYLIC ACIDS			
1.	<p>Esterification reaction:</p> <p>Take 1 ml (or a pinch of solid) of an organic compound in a clean test tube. Add 1 ml of ethyl alcohol and 4 to 5 drops of conc. sulphuric acid to it. Heat the reaction mixture strongly for about 5 minutes. Then pour the mixture into a beaker containing dil. Sodium carbonate solution and note the smell.</p>	A Pleasant fruity odour is noted.	Presence of carboxylic group

REASONING

Esterification test:

Alcohols react with carboxylic acids to form fruity smelling compounds called esters. This esterification is catalysed by an acid such as concentrated sulphuric acid.

Action with sodium bicarbonate:

Carboxylic acids react with sodium bicarbonate and liberate CO_2 . Evolution of carbon dioxide gives brisk effervescence.

Report:

The given organic compound contains /is

- (i) Aromatic (ii) unsaturated (iii) Carboxylic functional group

ORGANIC QUALITATIVE ANALYSIS FOR CARBOHYDRATE

S.No	Experiment	Observation	Inference
Preliminary tests			
1.	Odour: Note the Odour of the organic compound.	No characteristic odour	Absence of carboxylic acid , phenol and amine
2.	Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.	No colour change is noted	Absence of carboxylic acid , phenol and amine
3.	Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.	No brisk effervescence is obtained	Absence of a carboxylic acid
4.	Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.	No yellow or orange or red precipitate	Absence of an aldehyde or ketone
5.	Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H ₂ SO ₄ to it, and heat the mixture.	Charring takes place with smell of burnt sugar	presence of carbohydrate
Tests for Aliphatic or Aromatic nature:			
6	Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.	Burns with not-sooty flame	Presence of an aliphatic compound
Tests for an unsaturation:			
7	Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.	No Decolourisation takes place	Substance is saturated.
8	Test with KMnO ₄ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline KmnO ₄ solution and shake it well.	No Decolourisation takes place	Substance is saturated.

S.No	Experiment	Observation	Inference
Test for carbohydrates			
1.	<p>Molisch's test:</p> <p>Take A small amount of an organic compound in a test tube. It is dissolved in 2 ml of water. Add 3-4 drops of alpha naphthol to it. Then add conc H_2SO_4 through the sides of test tube carefully.</p>	Violet or purple ring is formed at the junction of the two liquids.	Presence of carbohydrate
2.	<p>Osazone test:</p> <p>Take A small amount of an organic compound in a test tube. Add 1 ml of phenyl hydrazine solution and heat the mixture for about 5 minutes on a boiling water bath.</p>	Yellow crystals are obtained	Presence of carbohydrate

REASONING

Charring test:

When carbohydrates are treated with concentrated sulphuric acid, dehydration of carbohydrates results in charring.

Osazone test:

Phenyl hydrazine in acetic acid, when boiled with reducing sugars forms Osazone. The first two carbon atoms are involved in this reaction. The sugars that differ in their configuration on these carbon atoms give the same type of Osazone. Thus glucose, fructose and mannose give the same needle type yellow crystals.

Report:

The given organic compound contains /is

(i) Aliphatic (ii) saturated (iii) Carbohydrate (glucose)

ORGANIC QUALITATIVE ANALYSIS FOR KETONE

S.No	Experiment	Observation	Inference
Preliminary tests			
1.	<p>Odour: Note the Odour of the organic compound.</p>	like fruit odour (nail polish remover)	May be ketone
2.	<p>Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.</p>	No colour change is noted	absence of carboxylic acid , phenol and amine
3.	<p>Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.</p>	No brisk effervescence is obtained	Absence of a carboxylic acid
4.	<p>Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.</p>	yellow or orange or red precipitate	presence of ketone
5.	<p>Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H₂SO₄ to it, and heat the mixture.</p>	No Charring takes place with smell of burnt sugar	absence of carbohydrate
Tests for Aliphatic or Aromatic nature:			
6	<p>Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.</p>	Burns with not-sooty flame	Presence of an aliphatic compound
Tests for an unsaturation:			
7	<p>Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.</p>	No Decolourisation takes place	Substance is saturated.
8	<p>Test with KMnO₄ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline KmnO₄ solution and shake it well.</p>	No Decolourisation takes place	Substance is saturated.

S.No	Experiment	Observation	Inference
Test for ketone			
1.	Legal's test: A small amount of the substance is taken in a test tube. 1 ml sodium nitro prusside solution is added. Then sodium hydroxide solution is added dropwise.	Red colouration.	Presence of a ketone

REASONING

Sodium nitroprusside Test

The anion of the ketone formed by a alkali reacts with nitroprusside ion to form a red coloured complex.this test is not given by aldehydes.

Report:

The given organic compound contains /is

(i) Aliphatic (ii) saturated (iii) Aliphatic ketone

ORGANIC QUALITATIVE ANALYSIS FOR DIAMIDE (urea)

S.No	Experiment	Observation	Inference
Preliminary tests			
1.	<p>Odour: Note the Odour of the organic compound.</p>	No characteristic odour	absence of carboxylic acid , phenol and amine
2.	<p>Reaction with litmus paper: Touch the Moist litmus paper with an organic compound.</p>	No colour change is noted	absence of carboxylic acid , phenol and amine
3.	<p>Action with sodium bicarbonate: Take 2 ml of saturated sodium bi carbonate solution in a test tube. Add 2 or 3 drops (or a pinch of solid) of an organic compound to it.</p>	No brisk effervescence is obtained	Absence of a carboxylic acid
4.	<p>Action with Borsche's reagent: Take a small amount of an organic compound in a test tube. Add 3 ml of Borsche's reagent, 1 ml of Conc HCl to it, then warm the mixture gently and cool it.</p>	No yellow or orange or red precipitate	Absence of aldehyde & ketone
5.	<p>Charring test: Take a small amount of an organic compound in a dry test tube. Add 2 ml of conc H_2SO_4 to it, and heat the mixture.</p>	No Charring takes place with smell of burnt sugar	absence of carbohydrate
Tests for Aliphatic or Aromatic nature:			
6	<p>Ignition test: Take small amount of the organic compound in a Nickel spatula and burn it in Bunsen flame.</p>	Burns with not-sooty flame	Presence of an aliphatic compound
Tests for an unsaturation:			
7	<p>Test with bromine water: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of bromine water and shake it well.</p>	No Decolourisation takes place	Substance is saturated.
8	<p>Test with $KMnO_4$ solution: Take small amount of the organic compound in a test tube add 2 ml of distilled water to dissolve it. To this solution add few drops of very dilute alkaline $KmnO_4$ solution and shake it well.</p>	No Decolourisation takes place	Substance is saturated.

S.No	Experiment	Observation	Inference
Test for diamide			
1.	<p>Biuret test:</p> <p>Take A small amount of an organic compound in a test tube. Heat strongly and then allow to cool. Dissolve the residue with 2 ml of water. To this solution Add 1 ml of dilute copper sulphate solution and few drops of 10% NaOH solution drop by drop.</p>	Violet colour is appeared.	presence of a diamide

REASONING

Biuret test

On strong heating Diamide (like urea) form biuret, which forms a copper complex with Cu^{2+} ions from copper sulphate solution. This copper –biuret complex is deep violet coloured

Report:

The given organic compound contains /is

(i) Aliphatic (ii) saturated (iii) Aliphatic diamide (urea)