



**PERIYAR INSTITUTE OF DISTANCE EDUCATION
(PRIDE)**

PERIYAR UNIVERSITY

SALEM - 636 011.

**B.Sc. BOTANY
SECOND YEAR
ALLIED PRACTICAL – II : CHEMISTRY**

Prepared by :

A.N.S. VASUDEVAN

Department of Chemistry

Thiruvalluvar Govt. Arts College

Rasipuram

Namakkal Dt.,

NAME: :

CLASS :

ROLL.No :

S.No	Experiment	Observation	Inference
1	Colour of the substance	a)Brown or Red brown Solid or Liquid b)White Solid c)Colourless Liquid	a)Phenol or Amine may be present b)Carbohydrate or Amide or Acid Amine may be present c)Aldehydes or ketones Amine may be present
2	Odour of the substance	a)Phenolic odour b)Aniline like smell c)Smell of bitter Almonds d) No characteristic odour.	a)May be Phenol b) May be amines c) May be ketones d)Absence of Phenol, amine & ketones
3	Solubility Test: Solubility of the substance is	a)Soluble in Cold water b)Soluble in hot	a)Presence of Carbohydrate or aliphatic diamide b) Presence of Acid or

	tested in various solvents	water c)Soluble in NaOH d)Soluble in dil.HCl e)Soluble in alcohol	phenol c) Presence of Acid or Phenol d) Presence of Amine. e) Presence of aldehydes or ketone or aromatic amide
4	Litmus Test: A small amount of the substance is dissolved in water or alcohol and tested in a litmus paper.	a)Blue litmus turns Red. b)Red litmus turns Blue c)No Change	a) Presence of Acid or phenol b) Presence of Amine. c)Absence of Acid or phenol or amine
5.	Sodium Fusion Extract Test:		
	<p>A small amount of sodium is first fused in a fusion tube. To this a small amount of the substance (If the substance is a liquid 1 or 2 drops are added) is added. The mixture is heated gently at first and then strongly. The hot fusion tube is then immersed in a china dish containing about 5 ml. of distilled water. The contents are ground well and then boiled in a test tube. It is then filtered. This is called as Sodium fusion Extract. It is then tested for the following tests.</p>		

5a.	To 1 ml. of the extract add 1ml. Of freshly prepared FeSO₄ solution. To this add few drops of Conc.HCl.	a)Blue or Green precipitate or solution is obtained b)No Blue or Green precipitate or solution is obtained	a) Presence of Nitrogen b)Absence of Nitrogen
5b	To 1 ml. of the extract add 1ml. Lead Acetate solution	a)Black precipitate is obtained b)No black precipitate is obtained	a)Presence of Sulphur b) Absence of Sulphur

5c	To 1 ml. of the extract add 1ml. Of freshly prepared Sodium nitro Prusside solution	<p>a)Violet colour solution is obtained</p> <p>b)No Violet colour solution is obtained</p>	<p>a)Presence of Sulphur</p> <p>b) Absence of Sulphur</p>
5d	To 1 ml. of the extract add 1ml dil.HNO₃ and 1 mil of AgNO₃	<p>a)White precipitate is obtained. It is completely soluble in NH₄OH.</p> <p>b) Light yellow precipitate is obtained. It is partially soluble in NH₄OH.</p> <p>c)) Yellow precipitate is obtained. It immiscible in NH₄OH.</p> <p>d)No characteristic precipitate is obtained</p>	<p>a) Presence of Chlorine</p> <p>b) Presence of Bromine</p> <p>c) Presence of Iodine</p> <p>d) Absence of Chlorine, Bromine and Iodine</p>

Test For aliphatic or aromatic nature			
6	A small amount of the substance is ignited in a nickel spatula.	a) Burns with a smoky flame b) Burns with a non smoky flame	a) Presence of Aromatic compound b) Presence of Aliphatic compound
7	To a small amount of the substance add 1ml. of Con.HNO₃ and 1 ml. of Con.H₂SO₄, heat the mixture gently and cool and then pour in a beaker containing cold water.	a) A yellow colour solution or precipitate is obtained b) No yellow colour solution or precipitate is obtained	a) Presence of Aromatic compound b) Presence of Aliphatic compound
8	Test For Saturated or Unsaturated Nature		
	To small amount of the substance, 2 ml. of Bromine water is added and shaken	a) Bromine water decolourises. b) Decolourisation takes place with the formation of the	a) Presence of unsaturated compound b) Presence of Amines or Phenols

	well	precipitate. c)No Decolourisation takes place	c)) Presence of saturated compound
9	To small amount of the substance, 2 ml. of Bromine in CCl₄ is added and shaken well	a) Decolourisation takes place b)Decolourisation takes place with the with the evolution of red brown fumes. c)No decolourisation takes place	a) Presence of unsaturated compound b)Presence of Amines or Phenols c) Presence of saturated compound
10	To small amount of the substance dissolved in water or alcohol 1 ml. of 2% KMnO₄ is added drop by drop with constant stirring	a)Decolourisation takes place b) No decolourisation takes place	a)Presence of unsaturated compound or easily oxidisable substances such as aldehydes, phenol or amine. b) Presence of saturated compound
11	To small amount of the substance, 1ml.	a) Brisk effervescence takes place.	a) Presence of carboxylic acid

	of freshly prepared strong NaHCO₃ solution is added	b) No brisk effervescence takes place.	b) Absence of carboxylic acid
12	To small amount of the substance, 2 ml. of 10% NaOH solution is added and heated if necessary.	a) Dissolves in the cold condition and reappears on adding dil.HCl. b) On heating the solution it turns yellow. On further heating it turns brown and finally black. c) Ammonia is evolved. It gives dense white fumes with a glass rod dipped in Con.HCl.	a) Presence of carboxylic acid or phenol b) Presence of Carbohydrate c) Presence of amide
13	To small amount of the substance a pinch of soda lime is added and then heated strongly.	a))Ammonia is evolved b) Gas with the smell of Kerosene evolves. c) Gas with the smell of Phenolic odour evolves.	a) Presence of amide b) Presence of carboxylic acid c) a) Presence of phenol

14	To small amount of the substance 1 ml. of Con.H₂SO₄ is added and heated gently	a) A white precipitate is obtained. It dissolves when shaken with water. b)The substance chars	a) a) Presence of amine b) Presence of Carbohydrate
-----------	---	---	--

15	A small amount of the substance dissolved in water or alcohol and 1ml. neutral FeCl₃ is added this.	a)Violet colour solution is obtained b)No Violet colour solution is obtained	a)Presence of Phenol b) Absence of Phenol
16	A small amount of the substance dissolved in water or alcohol. To this about 3 ml. of Tollen's reagent added.	a)A silver mirror or black precipitate is obtained	a)Presence of Carbohydrate or aldehyde. b) Absence of Carbohydrate or aldehyde.
	CONFIRMATION TESTS		
	CONFIRMATION TESTS FOR ACIDS		
1.	To small amount of the substance 2of alcohol and 1 ml. of Con.H₂SO₄ is added and heated	a) Fruity odour is obtained	a)Presence of Carboxylic acid

	gently. The reaction mixture is then poured in a beaker containing about 20 ml. of Na₂CO₃.	b)No fruity odour is obtained	b) Absence of Carboxylic acid
2.	To about 2 ml. of dilute NaOH a drop of Phenolphthalein is added. A pink colour is obtained. To this a pinch of the substance is added.	a) Pink colour disappears. b)Pink colour does not disappear	a)Presence of Carboxylic acid b) Absence of Carboxylic acid
3	To small amount of the substance a pinch of resorcinol and 1 ml. of Con.H₂SO₄ is added and heated gently. The reaction mixture is then poured in a beaker containing 20 ml. of water. To this 2 or 3 ml. of NaOH is added.	a) Greenish yellow Fluorescein is obtained. b)No greenish yellow Fluorescein is obtained	a)Presence of dicarboxylic acid b) Absence of dicarboxylic acid.

CONFIRMATION TESTS FOR PHENOL			
1.	<p>Liebermann Test:</p> <p>To small amount of the substance a few crystals of NaNO_2 and 1 ml. of $\text{Con.H}_2\text{SO}_4$ are added and heated gently. The reaction mixture is then poured in a beaker containing 20 ml. of water. To this 2 or 3 ml. of NaOH is added.</p>	<p>a) A red colour solution is obtained. On adding acetic acid it turns blue or Violet.</p> <p>b) A red colour solution is obtained.</p>	<p>a) Presence of Phenol.</p> <p>b) Absence of Phenol.</p>
2.	<p>Phthalein Fusion Test:</p> <p>To small amount of the substance a pinch of phthalic anhydride and 1 ml. of $\text{Con.H}_2\text{SO}_4$ is added and heated gently. The reaction mixture is then poured in a beaker containing 20 ml. of water. To this 2 or 3 ml. of NaOH is added.</p>	<p>a) A red colour solution is obtained.</p> <p>b) Greenish yellow Fluorescein is obtained.</p>	<p>a) Presence of Phenol.</p> <p>b) Presence of phenol such as Resorcinol</p>
3	<p>Azo Dye Test:</p> <p>A few drops of Aniline is dissolved in 2 ml. of dil.HCl. To this Con.</p>	<p>a) A red dye is obtained</p>	<p>a) Presence of phenol such as Resorcinol or Naphthol.</p>

	Solution of NaNO₂ is added cooling well in ice water. To this the compound dissolved in 10% NaOH solution is added and cooled.	b)No red dye is obtained	Absence of phenol such as Resorcinol or Naphthol.
--	--	--------------------------	---

CONFIRMATION TESTS FOR CARBOHYDRATE			
1	Molisch Test: To a small amount of the substance dissolved in water, add alcoholic solution of β naphthol. To this Con.H₂SO₄ is added drop wise along the walls of the test tube.	A violet ring is formed at the junction of the two liquids.	Presence of Carbohydrate.
2.	To a small amount of the substance a pinch of phenyl hydrazine hydrochloride and 3 times this amount of CH₃COONa are added to about 10ml. of water, shaken well and kept in a water bath for 15 minutes.	Bright yellow precipitate is obtained	Presence of Carbohydrate.
3	To a small amount of the substance a 1ml.of Fehling –A solution and 1ml.of Fehling –B solution are added, shaken well and kept in a water bath for 15 minutes.	Red or red brown precipitate is obtained	Presence of Carbohydrate.

CONFIRMATION TESTS FOR ALDEHYDE AND KETONE			
1	To a small amount of the substance dissolved in alcohol 2ml. of freshly prepared sodium bisulphate is added and shaken well	A white precipitate is obtained	Presence of Aldehyde or Ketone
2.	To a small amount of the substance dissolved in alcohol 2ml. Borsche's reagent and few drops of Con.HCl are added and shaken well and kept in a water bath for 15 minutes.	Orange or red orange precipitate is obtained	Presence of Aldehyde or Ketone
3	To a small amount of the substance dissolve in alcohol a pinch of phenyl hydrazine hydro chloride and 3 times this amount of CH₃COONa are added to about 10ml. of water, shaken well and kept in a water bath for 15 minutes.	A white precipitate is obtained	Presence of Aldehyde or Ketone

4	To a small amount of the substance 3 ml. Schiff's reagent is added and shaken well (The reaction mixture should not be heated)	A red or pink colour is obtained	Presence of Aldehyde
----------	--	----------------------------------	----------------------

5	<p>To a small amount of the substance dissolved in alcohol 1ml.of Fehling –A solution and 1ml.of Fehling –B solution are added, shaken well and kept in a water bath for 15 minutes.</p>	<p>A red brown precipitate is obtained</p>	<p>Presence of Aldehyde (Aromatic aldehydes do not answer this test)</p>
6a	<p>To a small amount of the substance dissolved in alcohol 2ml.of freshly prepared solution of Sodium Nitro Prusside is added. To this mixture 1 ml. of 10% NaOH solution is added</p>	<p>A red colour solution is obtained.</p>	<p>Presence of Ketone</p>
6b	<p>To the above mixture add dilute solution of CH₃COOH.</p>	<p>The solution turns Blue in colour.</p>	<p>Presence of aromatic Ketone</p>

CONFIRMATION TESTS FOR AMIDES			
1	To small amount of the substance, 2 ml. of 10% NaOH solution is added and heated	a) Ammonia is evolved. It gives dense white fumes with a glass rod dipped in Con. HCl.	a) Presence of amide
	The above reaction mixture after boiling well is cooled. To this a few drops of Con. HCl is added.	a) A white precipitate is obtained b) No white precipitate is obtained	Presence of aromatic amide b) Presence of aliphatic amide
2	BIURET TEST: A small amount of the substance is heated strongly in a DRY TEST TUBE. The test tube is cooled well and about 2 ml. of distilled water is added and shaken well. To this a few drops of very dilute CuSO₄ is added. To this a few drops of 10% NaOH is added.	a) A violet colour solution is obtained b) No violet colour solution is obtained	a) Presence of aliphatic diamide like urea b) Absence of aliphatic diamide like urea

CONFIRMATION TESTS FOR AMINES			
1	<p>DYE TEST:</p> <p>A small amount of the substance is dissolved in about 3 ml. of dil. HCl. To this about 2 ml. of NaNO₂ is added and shaken well until effervescence ceases.</p>	a) A clear solution is obtained.	a) Presence of aromatic primary amines
	<p>To the above solution add about 1ml. of β naphthol solution dissolved in 10% NaOH, cooling the reaction mixture in ice cold water.</p>	a) A scarlet red dye is obtained	a) Presence of aromatic primary amines
2	<p>CARBYL AMINE TEST:</p> <p>To a small amount of the substance a few drops of CHCl₃ and about 2ml. of 10% NaOH are added and gently warmed</p>	An offensive smell {of isocyanate} is obtained.	a) Presence of aromatic primary amines

RESULT:

The given organic compound contains

- A) Elements ----- Nitrogen / No Nitrogen, Sulphur,
Halogens**
- B) Aromatic or Aliphatic ----- Aromatic / Aliphatic**
- C) Saturated or Unsaturated ----- Saturated / Unsaturated**
- D) Functional Group Present -----**

NAME :

CLASS :

ROLL No :

èKñŠ ð†ðP ð°Šð£œ¼ - «öFJò™ ¶¬íŠð£ì<

	«ê£î¬ù	è£†ð¶	ÜPð¶
1	^a ð£¼Oj Gø<	1.ð¿Š¹ (Ü) ^a ê<ð¿Š¹ Gø^ F†ñ< (Ü) cñ< 2. ^a ð†¬ñò£ù F†ñ< 3. Gøñÿø cñ<	1.dù£™ (Ü) Üej P¼,èð£< 2.è£~«ð£¬ý†«ó†(Ü) Ü¬ñ´ (Ü) Ülô< P¼,èð£< 3.Ý™®¬ý´ (Ü) W†«i£j (Ü P¼,èð£<
2	^a ð£¼Oj ñí<	1.dù£Lj ñí< 2.ÜQhQj ñí< 3.èèŠð£ù ð£¶¬ñ â†¬íJj ñí< 4.PQò ñí°¬ò cñ< 5.°PŠHîî,è ñíl™¬ô.	1.dù£™ P¼,èð£< 2.Üej P¼,èð£< 3.Ý™®¬ý´ P¼,èð£< 4.W†«i£j (Ü P¼,èð£< 5.è£~«ð£¬ý†«ó†(Ü) Ü¬ñ´ (Ü) Ülô< P¼,èð£<

3	<p>è-øFøj «êî-ù</p>	<p>1. O~%î cK™ è-óAø¶ 2. Åî£ù cK™ è-óAø¶ 3. NaOH - ™ è-óAø¶ 4. c~î HCl-™ è-óAø¶ 5. Ý™ èý£L™ ñ†´ è-óAø¶</p>	<p>1. è£~«ð£-ý†«ó† (Ü) ÜLð£†®, -iÜ-ñ´ P¼, èð£ 2. Üîð (Ü) dù£™ P¼, èð£ 3. Üîð (Ü) dù£™ P¼, èð£ 4. Üeî P¼, Aø¶ 5. Ý™@-ý´ (Ü) W†«ì£î (Ý) Ü«ó£«ñ†®, Ü-ñ´ P¼, èð£</p>
4	<p>L†ñv «êî-ù CPî÷¾ «ê~ñ c~ (Ü) Ý™ èý£L™ è-ó¶ L†ñv «êî-ù, ° à†ð´îšð´Aø¶ ¶.</p>	<p>1. cô L†ñv Cðš¹ Gøñ£è ñ£ÁAø¶ 2. Cðš¹ L†ñv cô Gøñ£è ñ£ÁAø¶ 3. ášMî ñ£ÿø¶™-ð.</p>	<p>1. Üîð (Ü) dù£™ P¼, èð£ 2. Üeî P¼, Aø¶. 3. Ý™@-ý´ (Ü) W†«ì£î (Ü) Ü-ñ´ (Ü) è£~«ð£-ý†«ó† P¼, èð£</p>
5	<p>«ê£ðò à¼°, è£Á «êî-ù CPî÷¾ «ê£ðò à¼° à¼°, °ø£J™ P†´ îï° à¼°, èš ð´Aø¶. P¶îî CPî÷¾ «ê~ñ (c~ññ£è P¼šHî Cò ¶¶) «ê~¶ 1;êî ²îK™ °îL™ añî-ñð£è¾, Hîù ðî-ñð£è¾ Á´ aèCEòšð´Aø¶. P%î Åî£ù à¼°, °ø£CE ²ñ£~ 5 IL. ð£-ðð@c~ aè£†î Yù îèNJ™ «ê~¶ à-î%î è†í@¶ ¶†-è-÷ îï° Ü-ó¶, Hîù á¼ «êî-ù, °ø£J™ îï° aè£F, è -ð, èš ð´Aø¶. Hîù P, è-óê™ ð@è†îšð´Aø¶. P, è-óê™ «ê£ðò à¼°, è£Á àùšð´. P¶ W>è†î</p>		

	«êĭġ-ùèÀ,°Š	ðòĭ	ð'ġİŠð'Aøġ.
5A	<p>å¼IL êĒÁĭ ħĒ~ 1IL 1FġĒè ġòĒK,è Šðġġ è-óê™FeSO₄ «ê~ġŠ Hĭ Cò ġO Üġ HCl «ê~,èŠð'Aøġ.</p>	<p>cô< (Ü) ð,,-ê Gø ġð®¼ «ġġÁAøġ</p> <p>cô< (Ü) ð,,-ê Gø ġð®¼ «ġġøM™-ò</p>	<p>1.Nitrogen àœ÷ġ</p> <p>2.Nitrogen ġ™-ò.</p>
5B	<p>å¼ IL êĒÁĭ ħĒ~ 1IL ðòġ ÜC«ġġ è-óê™ «ê~,èŠð'Aøġ.</p>	<p>1.è¼Gø ġð®¼ «ġġÁAøġ</p> <p>2.è¼Aø ġð®¼ «ġġøM™-ò</p>	<p>1.ê™ð~ àœ÷ġ</p> <p>2.ê™ð~ ġ™-ò.</p>
5C	<p>å¼ IL êĒÁĭ ħĒ~ 1IL 1FġĒè ġòĒK,è Šðġġ è-óê™ Sodium nitro prusside è-óê™ «ê~,èŠð'Aøġ.</p>	<p>Violet Gø, è-óê™ «ġġÁAøġ</p> <p>Violet Gø, è-óê™ «ġġøM™-ò</p>	<p>1.ê™ð~ àœ÷ġ</p> <p>2.ê™ð~ ġ™-ò.</p>

5D	<p>á¼IL êÁì; ²ñ£~ 1IL HNO₃ è¬óê½¼ 1 IL AgNO₃ è¬óê½¼ «ê~,èŠ ð´Aø¶¶.</p>	<p>1.ªõ±¬ñò£ù ìð®¾ «î£ìÁAø¶¶. Þ¶ NH₄OH-TM °¿¬ñò£è, è¬óAø¶¶.</p> <p>2.«òê£ù ñ...êœ Gø ìð®¾ «î£ìÁAø¶¶. Þ¶ NH₄OH -TM °¿¬ñò£è, è¬óøFTM¬ò.</p> <p>3.ñ...êœ Gø ìð®¾ «î£ìÁAø¶¶. Þ¶ NH₄OH -TM °¿¬ñò£è, è¬óAø¶¶.</p> <p>4. âšMî ìð®¾¼ «î£ìøMTM¬ò.</p>	<p>1.º«÷£Kì àœ÷¶¶.</p> <p>2.¹«ó£ì àœ÷¶¶.</p> <p>3.Û«ò£®ì àœ÷¶¶.</p> <p>4.º«÷£Kì ¹«ó£ì, Û«ò£®ì ÞTM¬ò.</p>
6	<p>ÛLð£†®, (Û) Û«ó£«ñ†®, ì¬ñ¬ò, è±ìPìTM</p>		
	<p>CPî÷¾ «ê~ñ¼ á¼ G,èTM èó±®JL†´ ¹êì ²ìKTM ªè£À~îŠð´Aø¶¶.</p>	<p>1.¹¬è»ì áKAø¶¶. 2.¹¬èJìP áKAø¶¶.</p>	<p>1.Û«ó£«ñ†®, «ê~ñ¼ àœ÷¶¶.</p> <p>2.ÛLð£†®, «ê~ñ¼ àœ÷¶¶.</p>
7	<p>CPî÷¾ «ê~ñ¶¶ì 1IL HNO₃ + 1 IL H₂SO₄ «ê~¶¶ á¼ «ê£ì¬ù, °ð£JTM ªñì¬ñò£è,, Á«ìÝP Hìù~ ²ñ£~ 20IL c~ ÛìfAò á¼</p>	<p>1.ñ...êœ Gø, è¬óêTM (Û) ìð®¾ à±ì£Aø¶¶.</p> <p>2..ñ...êœ Gø, è¬óê«ò£ (Û) ìð®«ò£ à±ì£èMTM¬ò.</p>	<p>1.Û«ó£«ñ†®, «ê~ñ¼ àœ÷¶¶.</p> <p>2.ÛLð£†®, «ê~ñ¼ àœ÷¶¶.</p>

	°è-òJ™ áÿøšđ´Aø¶.		
	G-ø³⁄₄ÿø (Ü) G-ø³⁄₄ø£ˆ î-ñ-ò, èþiPí™		
8	CPí÷³⁄₄ «ê~ñˆ¶i; ²ñ£~ 2 IL ¹«ó£i c~ ĩi° èô,A, ºè£‡«i «ê~,èšđ´Aø¶.	1.Gø< cf°Aø¶ 2.Gølöˆi«ô£i;P ºð‡-ñò£ù i>ð@³⁄₄< A-ì,Aø¶. 3.Gø< cf°øF™-ò	1.G-ø³⁄₄ø£,, «ê~ñ< àœ÷¶ 2.Üei (Ü) dù£™ P¹⁄₄,èð£< 3.G-ø³⁄₄ÿø «ê~ñ<.
9	CPí÷³⁄₄ «ê~ñˆ¶i; ²ñ£~ 1 IL CCl₄ è-óˆı¹«ó£i; ĩi° èô,A, ºè£‡«i «ê~,èš đ´Aø¶.	1.Gø< cf°Aø¶ 2.Gølöˆi«ô£i;P Üi~%oı ºê<ð¿š¹ Gø ð£» àþi£Aø¶. 3.Gø< cf°øF™-ò	1.G-ø³⁄₄ø£,, «ê~ñ< àœ÷¶ 2.Üei (Ü) dù£™ P¹⁄₄,èð£< 3.G-ø³⁄₄ÿø «ê~ñ<.
10	NaHCO₃ «êfi-ù CPí÷³⁄₄ «ê~ñˆ¶i; ²ñ£~ 1 IL Üi~ NaHCO₃ è-óê™ «ê~,èš đ´Aø¶.	1.bMón£èè , -ó,Aø¶ 2., -ó,èM™-ò.	1.è£~ð£,CL, Üiô< àœ÷¶ 2.è£~ð£,CL, Üiô< P™-ò.

11	<p>CPí÷¾ «êñ¶i; ²ñ£ 2 IL Üi~ NaOH è-óê™ «ê~,èŠ ð´Aø¶. «í-õŠð®; Á´ð´iŠð´Aø¶.</p>	<p>1. °O%oí G-ôJ™ è-ó%o¶ c~i HCl è-óê™ «ê~i¾i; eþ´ «í£jÁAø¶.</p> <p>2. è-óê-ò Á´ ¢êœi¾i; ñ...êœ Gø< Ü-iAø¶. õj-ñò£è Á«iYø ð¿Š¹ Gø< «í£jÁAø¶.</p> <p>3. Ü«ñ£Qò£ õ£» ¢OŠð´Aø¶. Þ¶ Ü«ñ£Qò£M™ i-ùi èþí£®, °,C»i; Üi%oí ¢þ ¹-è-ò^ i¼Aø¶.</p>	<p>1. è£~ð£,CL, Üið< (Ü) dù£™ Þ¼,èð£<</p> <p>2. è£~«ð£-ý †«ó† àœ÷¶.</p> <p>3. Ü-ñ´ àœ÷¶</p>
12	<p>CPí÷¾ «êñ¶i; 2 èóþ® «ê£i£ ²þí£<¹ «ê~¶ i;° Á´ ¢êœòŠð´Aø¶.</p>	<p>1. Ü«ñ£Qò£ õ£» ¢OŠð´Aø¶.</p> <p>2. ñþí£iþí£j; ñi°-ìò õ£» ¢O«òÁAø¶</p> <p>3. dù£Lj; ñi°-ìò õ£»</p>	<p>1. Ü-ñ´ Þ¼,èð£<</p> <p>2. 1è£~ð£,C L, Üið< Þ¼,èð£<</p> <p>3. dù£™ Þ¼,èð£<</p>
13	<p>CPí÷¾ «êñ¶i; ²ñ£ 2 IL Üi~ H₂SO₄ «ê~¶ ¢ñj-ñò£è Á´ ¢êœòŠð´Aø¶.</p>	<p>1. ¢þ-ñò£ù ið®¾ àþí£Aø¶. Þ¶i c~ «ê~¶ °½,è ið®¾ è-óAø¶.</p> <p>2. «êññ è¼°Aø¶.</p>	<p>1. Üe; àœ÷¶.</p> <p>2. è£~«ð£-ý †«ó† àœ÷¶.</p>

14	<p>CPí÷¾ «êññîî c̃ Ü™δ¶ Ý™èý£L™ è¬ó¶ ²ñ£ 1 IL ï'G¬ô FeCl₃ è¬óê™ «ê~,èŠđ'Aø¶</p>	<p>1.áí£ Gÿ, è¬óê™ «í£;ÁAø¶ 2.áí£ Gÿ, è¬óê™ «í£;øM™¬ô</p>	<p>1.dù£™ àœ÷¶ 2.dù£™ Þ™¬ô.</p>
15	<p>CPí÷¾ «êññîî c̃ Ü™δ¶ Ý™èý£L™ è¬ó¶ 3IL ì£ô; èóE «ê~¶ á¼ áè£F c̃ áí£†øJ™ ²ñ£ 15 IGìfèœ ¬ð,èŠđ'Aø¶.</p>	<p>1.ªœœO Ý® (Ü) è¼Aø ìð®¾ «í£;ÁAø¶. 2.ªœœO Ý® (Ü) è¼Aø ìð®¾ «í£;øM™¬ô.</p>	<p>1.è£~«ð£¬ý †«ót (Ü) Ý™®¬ý' Þ¼,èð£ 2. 1.è£~«ð£¬ý †«ót , Ý™®¬ý' Þ™¬ô.</p>
<p>ì£ô; èóE îð£Kî™: ²ñ£ 2 IL AgNO₃ è¬óê½; «ôê£ù è¼Aø ìð®¾ à†í£° ¬ó NaOH è¬óê™ ¶O¶Oð£è «ê~,èŠđ'Aø¶. Þ%î ìð®¾ °ÿP½ è¬ó» ¬ó Üï NH₄OH è¬óê™ ¶O¶Oð£è ï;° èð,A, áè£†«ì «ê~,èŠđ'Aø¶. Þ¶«ö ì£ô; èóE á;Šđ'.</p>			

<p style="text-align: center;">è£~ð£,CL, ÜIô^FYèèù àÁFSð´¶¶ «è£î¬ùèœ</p>			
1	<p>CPî÷¾¾ «è~ñ^¶¶i 2 ¶¶O Ý™èý£½¿, 2¶¶O Üi~ H₂SO₄ «è~¶¶ añj¬ñò£è Á´ aèœèòŠð´Aø¶¶.</p>	<p>1.ÞQò ððñí« «î£jÁAø¶¶</p> <p>2.ÞQò ððñí« «î£jøM™¬ò</p>	<p>1.è£~ð£,CL, ÜIô« àœ÷¶¶</p> <p>2.è£~ð£,CL, ÜIô« Þ™¬ò</p>
2	<p>²ñ£~ 2 IL c~î NaOH ài á¼ aè£†´ Hù£™Šihj Gøfè£†® «è~,è Šð´Aø¶¶. Þ÷...CðŠ¹ Gø« «î£jÁAø¶¶. Þ¶¶i CPî÷¾¾ «è~ñ^¬î c~ Ü™ø¶¶ Ý™èý£L™è¬ó¶¶ ¶¶O^è÷£è,, «è~,èŠð´Aø¶¶.</p>	<p>1.Þ÷...CðŠ¹ Gø« ñ¬øAø¶¶</p> <p>2.Þ÷...CðŠ¹ Gø« ñ¬¬øòM™¬ò</p>	<p>1.è£~ð£,CL, ÜIô« àœ÷¶¶</p> <p>2.è£~ð£,CL, ÜIô« Þ™¬ò</p>
3	<p>ŠÜóYj «è£î¬ù: CPî÷¾¾ «è~ñ^¶¶i, CPî÷¾¾ Kè£~Cù£™ ñYÁ« Cò¶¶O H₂SO₄ ÜIô« «è~¶¶ añj¬ñò£è Á´ aèœèòŠð´Aø¶¶.Hjù~ Þî¬ù c¼œ÷ °è¬òJ™ áYÞ i° èò,A, aè£†«i ---- è¬óè™ «è~,èŠð´Aø¶¶.</p>	<p>1.Üi~%oî ð,,¬è èð%oî ñ...êœ Gø ŠÜóYj A¬i,Aø¶¶.</p> <p>2.Üi~%oî ð,,¬è èð%oî ñ...êœ Gø ŠÜóYj A¬i,èM™¬ò.</p>	<p>1.¬i è£~ð£,CL, ÜIô« àœ÷¶¶</p> <p>2.¬i è£~ð£,CL, ÜIô« Þ™¬ò</p>

	dù£™ ^{af£°F} , è£ù à ÁŠĐ´ « ê£î-ùèœ		
	<p>Lõñ£j «ê£î-ù CPî÷¾ «êñ CPî÷¾ NaNO₂ 3 Ü™ô¶ 4 ¶Oèœ Üî H₂SO₄ Üîôœ «ê ^{añj-ñò£è Á´} ^{âêœòŠđ´Aø¶.} Hjù~ Pî-ù c¼œ÷ òè-õJ™ áŸP ïj° èô,A, ^{âè£‡}«CH₃COOH è-óê™ «ê,èŠđ´Aø¶.</p>	<p>1. CõŠ¹ Gø, è-óê™ A-ì, Aø¶. CH₃COOH è-óê™ «ê còœ Ü™ô¶ đ,,-ê Gøñ£è ñ£ÁAø¶.</p> <p>2. CõŠ¹ Gø, è-óê™ A-ì, èM™-ò.</p>	<p>1. dù£™ ^{af£°F} àœ÷¶</p> <p>2. dù£™ ^{af£°F} P™-ò.</p>
2	<p>î£Lj à¼,°, «ê£î-ù: CPî÷¾ «êñ, P¼ ñif° î£L, cKL, 3 Ü™ô¶ 4 ¶Oèœ Üî H₂SO₄ Üîôœ «ê ^{añj-ñò£è Á´} ^{âêœòŠđ´Aø¶.} Hjù~ Pî-ù c¼œ÷ òè-õJ™ áŸP ïj° èô,A, ^{âè£‡}«NaOH è-óê™ «ê,èŠđ´Aø¶.</p>	<p>1. P÷...CõŠ¹ Gø, è-óê™ A-ì, Aø¶.</p> <p>2. Üî%oî đ,,-ê èð%oî ñ...êœ Gø ŠÙóYj A-ì, Aø¶.</p> <p>3. °PŠHîî, è ñ£Ÿœœ P™-ò</p>	<p>1. dù£™ ^{af£°F} àœ÷¶</p> <p>2. Kê£~C ù£™ «ð£jð dù£™ àœ÷¶.</p> <p>3. dù£™ ^{af£°F} P™-ò.</p>
3	<p>Ü«ê£ ê£ò,, «ê£î-ù Cò¶O ÜQh-ù, 5 IL c~î HCl™ è-ó¶, Ü¶îj 5 IL Üî NaNO₂ è-óê-ò ¶Oè÷£è èô,A, ^{âè£‡}«i</p>	<p>1. CõŠ¹ Gø,, ê£òœ à‡i£Aø¶.</p> <p>2. CõŠ¹ Gø,, ê£òœ</p>	<p>1. Kê£~C ù£™, î£Šî£™ «ð£jð dù£™</p>

	«ê,èŠđ'Aø¶. Þî-ù ðQ,è†® cK™°O~M¶, ªè£‡«ì, °jù«ó NaOH ™ è-óî «ê~ñ« «ê,èŠđ'Aø¶.	à†ì£èM™-ò.	àœ÷¶. 2.Kê£~C ù£™, ï£Šî£™ «ð£jø dù£™ Þ™-ò.
è£~«ð£-ý†«ó†',è£ù àÁFŠđ'¶« «ê£î-ùèœ			
1	CPî÷¾ «ê~ñ^¶i ²ñ£~1 IL çªðLf A èóE»«,1IL çªðLf B èóE»« «ê~¶ å¼ ªè£Fc~ª†£†®J™ ²ñ£~ 15 Gli fèœ -ò,èŠđ'Aø¶.	1.CðŠ¹ Ü™ð¶ ªê<ð¿Š¹ Gø i>ð®¾ «î£jÁAø¶. 2.CðŠ¹ Ü™ð¶ ªê<ð¿Š¹ Gø i>ð®¾ «î£jøM™-ò.	1.è£~«ð£-ý†«ó† àœ÷¶ 2.è£~«ð£-ý†«ó† Þ™-ò.
2	ñ£Lw «ê£î-ù: CPî÷¾ «ê~ñ^î cK™ è-ó¶, Ý™èý£L™ è-óî β ï£Šî£™ è-óê™ ²ñ£~ 1 IL «ê,èŠđ'Aø¶. Þ¶i Üi~ H₂SO₄ «ê£î-ù, °ö£Jj æófèO™ èò,è£ñ™ «ê,èŠđ'Aø¶.	1.Þó‡' cñ Ü',°èÀ< ê%øF,°< Þî^F™ áî£Gø ð-÷ò< «î£jÁAø¶. 2.Þó‡' cñ Ü',°èÀ< ê%øF,°< Þî^F™ áî£ Gø ð-÷ò< «î£jøM™-ò.	1.è£~«ð£-ý†«ó† àœ÷¶. 2.è£~«ð£-ý†«ó† Þ™-ò.

3	<p>CPí÷¾ «êñ~¶i, CPí÷¾ d-ù™ ñýtóYi ñý†«ó£ °«÷£¬ó´, ññ£~ 3 ðf° «ê£@ò< ÜC†«it´, c¼< «ê~¶ i j° °½,A , aè£Fc~ a£†@J™ ññ£~ 15 Glijèœ ¬õ,èŠð´Aø¶.</p>	<p>1.Hóè£êñ£ù ñ...êœGø i>ð@¾ «î£jÁAø¶. 2.Hóè£êñ£ù ñ...êœGø i>ð@¾ «î£jøM™¬õ.</p>	<p>1.è£~«ð£¬ý†«ót àœ÷¶. 2.è£~«ð£¬ý†«ót Þ™¬õ.</p>
---	---	--	---

<p style="text-align: center;">Ý™®-ý' ñŸÁ< W†«ì£;èÀ,è£ù àÁFŠð´¶« «è£î-ùèœ</p>			
1	<p>CPî÷¾ «è~ñ^î Ý™èý£L™ è-ó^¶ ²ñ£ 2 IL 'Fí£è îò£K,èŠð†i NaHSO₃ è-óè™ «è~¶ ì;° °½,èŠð´Aø¶.</p>	<p>1.ªð‡-ñò£ù ìð®¾ à†ì£Aø¶.</p> <p>2.ªð‡-ñò£ù ìð®¾ à†ì£èM™-ò.</p>	<p>1.Ý™®-ý' Ü™ø¶ W†«ì£; Þ¼,èò£<</p> <p>2.Ý™®-ý' Ü™ø¶ W†«ì£; Þ™-ò.</p>
2	<p>CPî÷¾ «è~ñ^î Ý™èý£L™ è-ó^¶ ²ñ£ 3 IL «ð£~«ú èóE», Cò ¶O Üî HCl Üìò, è-óè½ «è~¶ °½,A â¼ªè£Fc~ªí£†®J™ ²ñ£ 15 Gli£èœ -ò,èŠð´Aø¶.</p>	<p>1. ñ...èœ Ü™ø¶ CòŠ¹ Ýó...² Gø ìð®¾ «ì£;ÁAø¶.</p> <p>2.ñ...èœ Ü™ø¶ CòŠ¹ Ýó...² Gø ìð®¾ «ì£;øM™-ò.</p>	<p>1.Ý™®-ý' Ü™ø¶ W†«ì£; Þ¼,èò£<</p> <p>2.Ý™®-ý' Ü™ø¶ W†«ì£; Þ™-ò.</p>
3	<p>CPî÷¾ «è~ñ^î Ý™èý£L™ è-ó^¶ CPî÷¾ d-ù™ ¬ý†óY; ¬ý†«ó£ °«÷£-ó´, ²ñ£ 3 ðf° «è£®ò< ÜC†«ì†´, c¼ «è~¶ ì;° °½,A ,ªè£Fc~ªí£†®J™ ²ñ£ 15 Gli£èœ -ò,èŠð´Aø¶.</p>	<p>1.ªð‡-ñò£ù ìð®¾ «ì£;ÁAø¶.</p> <p>2.ªð‡-ñò£ù ìð®¾ «ì£;øM™-ò.</p>	<p>1.Ý™®-ý' Ü™ø¶ W†«ì£; Þ¼,èò£<</p> <p>2.Ý™®-ý' Ü™ø¶ W†«ì£; Þ™-ò.</p>

4	<p>CPí÷¾ «êñîj 3 IL SŠv èóG «êñî °½,èŠđ'Aø¶.</p> <p>(M-ù, èð-ð-ò Á'ð'î, Æì£¶.)</p>	<p>1. CõŠ¹ Gø, è-óê™ «ì£jÁAø¶.</p> <p>2. CõŠ¹ Gø, è-óê™ «ì£jøM™-ò.</p>	<p>1. Ý™®-ý' àœ÷¶</p> <p>2. W†«ì£j àœ÷¶</p>
5	<p>CPí÷¾ «êñîj ²ñ£~ 2IL çªðLf A èóE»×, 2IL çªðLf B- èóE»× «êñî à¼ªè£Fc~ à£†@J™ ²ñ£~ 15 Glìfèœ -ò,èŠđ'Aø¶.</p>	<p>1. CõŠ¹ Ü™ø¶ªèð¿Š¹ Gø ìð@¾ «ì£jÁAø¶.</p> <p>2. CõŠ¹ Ü™ø¶ªèð¿Š¹ Gø ìð@¾ «ì£jøM™-ò.</p>	<p>1. Ý™®-ý' àœ÷¶ (Ü«ó£«ñ†®, Ý™®-ý' Þ,,«ê£ì-ù-ò' î¼ðF™-ò)</p> <p>2. Ý™®-ý' Þ™-ò.</p>
6	<p>«ê£@ò< -ì†«ó£ 'ì-ê' «ê£ì-ù:</p> <p>1. CPí÷¾ «êñî-î Ý™èý£L™ è-óê™ ²ñ£~ 2 IL 'Fì£è' îð£K,èŠđ†ì «ê£@ò< -ì†«ó£ 'ì-ê' è-óê™ «êñ,èŠđ'Aø¶.</p>	<p>1. CõŠ¹ Gø, è-óê™ «ì£jÁAø¶.</p>	<p>1. W†«ì£j àœ÷¶.</p>
	<p>.«ñÿè†ì M-ù, èð-ðJ™ ²ñ£~ 1 IL 10% NaOH è-óê™ «êñ,èŠđ'Aø¶.</p> <p>3. Þ¶j c~î ÜC†®, Üíó, è-óê™ «êñ,èŠđ'Aø¶.</p>	<p>2. è-óê™ côGøñ£è ñ£ÁAø¶.</p>	<p>2. Ü«ó£«ñ†®, W†«ì£j àœ÷¶.</p>

Ü-ñ'èÀ,è£ù àÁFŠđ'¶« «ê£í-ùèœ			
1	1.CPî÷¾ «ê~ñ^¶¶i ²ñ£~ 2 IL 10% NaOH è-óê™ «ê~¶¶ i° Á'đ'~Š đ'Aø¶.	1.Ü««ñ£Qð£ ð£» °O«òÁAø¶.P¶ Üi~ HCl™ i-ù'î è†í£®, °„C»i; Üi~°oí °ø† 1-è-ò' i¼Aø¶.	1.Ü-ñ' àœ÷¶.
2	«ñÿè†i M-ù, èð-ð-ò, °O~M^¶, Üi~ HCl «ê~,èŠ đ'Aø¶.	1.°ø†-ñò£ù i>ð®¾ «í£;ÁAø¶. 2..°ø†-ñò£ù i>ð®¾ «í£;øM™-ò. è-óê™	1.Ü«ó£«ñ†®, Ü-ñ' àœ÷¶ 2.ÜL«ð†®, Ü-ñ' àœ÷¶
3	¬ð'ó† «ê£í-ù: 1.CPî÷¾ «ê~ñ^î á¼ àð~°oí «ê£í-ù, °ð£JL†' ði-ñò£è Á«iÿP, H; «ê£í-ù, °ð£-ò, °O~M^¶, P^¶¶i ²ñ£~ 2 IL c~ «ê~,èŠđ'Aø¶. H; Cò ¶¶O lè c~i CuSO4 è-óê½« Cò¶¶O 10% NaOH è-óê½« «ê~,èŠđ'Aø¶.	1.áí£Gø, è-óê™ «í£;ÁAø¶. 2.áí£Gø, è-óê™ «í£;øM™-ò.	1.ÍKð£ «ð£;ø ÜL«ð†®, -iÜ-ñ' àœ÷¶. 2.Ü«ó£«ñ†®, Ü-ñ' àœ÷¶.

Üe _j èÀ,è£ù àÁFŠð´´¶« «ê£î-ùèœ			
1	<p>1. CPî÷¾ «ê~ñ^î ²ñ£~ 2 IL c~î HCl™ è-ó¶ ²ñ£~ 2 IL Üî NaNO₂ è-óê™, ðQ,è†® cK™ °O~M¶, ºè£‡«ì «ê~,èŠð´Aø¶.</p> <p>2. «ñÿè‡ì ºiO%oî è-óê½ì ²ñ£~ 1 IL NaOH™ è-ó¶ ß - ÿ£Šî£™ ðQ,è†® cK™ °O~M¶, ºè£‡«ì «ê~,èŠð´Aø¶.</p>	<p>1. ºiO%oî è-óê™ «î£jÁAø¶.</p> <p>2. CðŠ¹ Gÿ,, è£ð« à‡ì£Aø¶.</p>	<p>1. Ü«ó£«ñ†®, æK-íò Üe_j àœ÷¶.</p> <p>1. Ü«ó£«ñ†®, æK-íò Üe_j àœ÷¶.</p>
2	<p>è£~ð™ Üe_j «ê£î-ù:</p> <p>1. CPî÷¾ «ê~ñ¶ì Cø¶O CHCl₃, ²ñ£~ 2 IL Ý™èý£™ èð%oî NaOH è-óê½« «ê~¶ ºñj-ñò£è,, À«ìÿððŠð´Aø¶.</p>	<p>1. Ü¼ºðÁ,è~ì,è (ä«ê£èð«ù†®j) ñí« à‡ì£Aø¶.</p>	<p>1. Ü«ó£«ñ†®, æK-íò Üe_j àœ÷¶.</p>

º®¾:

ºè£´,èŠð†´œ÷ «ê~ñ^F™ àœ÷

1. «ê~ñ^F½œ÷ îQñfèœ ----- **N, S, Halogen**
2. Ü«ó£«ñ†®, / ÜL«ð†®, -----
3. G-ð¾ÿø¶ / G-ð¾ø£ì¶. -----
4. ºèð™ð´ ºi£°F -----

