EXPT. NO. | NAME | Page No.: | Date: | YOUVA

M T W T F S S

Experiment 3[A]

Aim – To perform and observe the reaction between water and quick lime

Materials Required –

- Beakers
- Glass Rod
- Distilled water
- Quick lime (Calcium oxide, CaO)
- test tubes
- filtration set
- Red litmus paper

Procedure –

1. Take 40 mL of water in a beaker and touch its outer surface.
2. Add 4g quick lime and stir it with glass rod.
3. Touch outer surface of beaker after adding quick lime
4. Remove liquid from beaker using dropper and place its two drops on a red litmus paper
5. Filter the mixture – take 10 mL of filtrate and pass carbon dioxide through it by blowing air from your mouth.

$$[CaO_{(s)} + H_2O_{(l)} \rightarrow Ca(OH)_{2\,(aq)} + Heat]$$

Conclusion –

Water and calcium oxide directly combine to form calcium hydroxide which is basic in nature. This was a combination reaction.

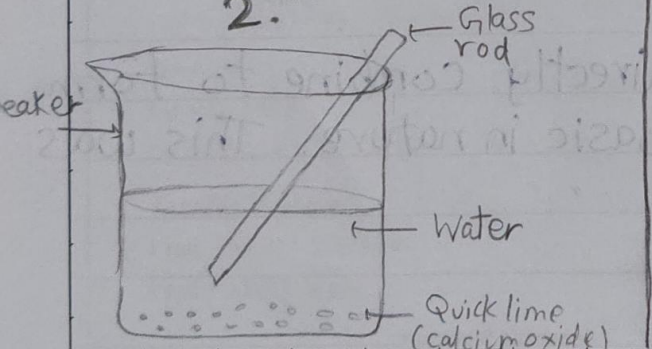
Teacher's Signature:

* Performed during procedure

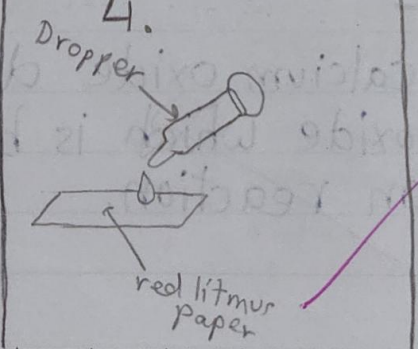
3[A]

Steps*	Observation	Inference
1.	Initially, the outer surface of beaker is neither very cold nor very hot.	Water in the beaker is at room temp.
2.	Reaction begins and a new substance is formed.	Water acts on quick lime to form slaked lime (calcium hydroxide).
3.	Then, the outer surface of beakers turns hot.	Heat is evolved due to action of water on quick lime
4.	Red litmus paper turns <u>blue</u>.	The new substance is <u>basic</u> in nature.
5.	Clear filtrate turns milky on passing CO_2 through it.	The new substance formed is calcium hydroxide (slaked lime).

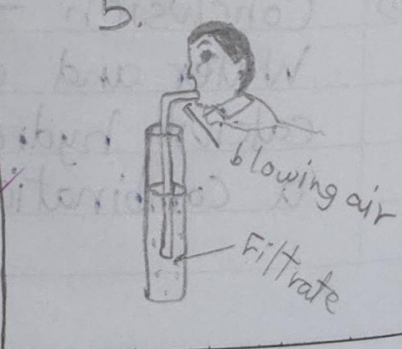
2.



4.



5.



Experiment 3[B]

Aim – To perform and observe the reaction when ferrous sulphate is heated.

Materials Required –

- Sample of solid ferrous sulphate
- test tubes and their holder
- blue litmus paper
- Acidified solution of potassium dichromate

Experiment, Observation and Inference [LHS behind]

Conclusion and Explanation

- When Ferrous sulphate is heated, first water molecules are detached, then anhydrous ferrous sulphate decomposes into ferric oxide and oxides of sulphur.

$$FeSO_4 \cdot 7H_2O\,(s) \xrightarrow{Heat} FeSO_4\,(s) + 7H_2O\,(g)$$

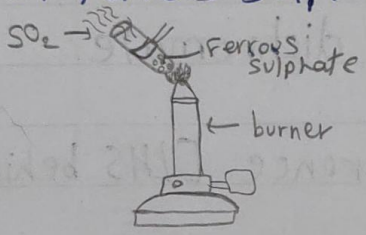
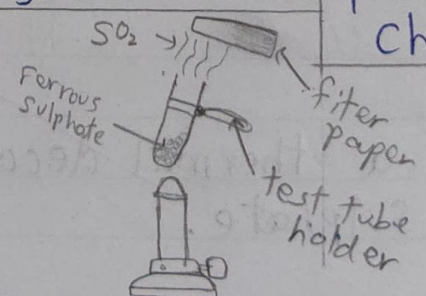
$$2FeSO_4\,(s) \longrightarrow Fe_2O_3\,(s) + SO_2\,(g) + SO_3\,(g)$$

- The gas is a mixture of sulphur dioxide and sulphur trioxide which reduces an acidified solution of potassium dichromate.

$$K_2Cr_2O_7\,(aq) + H_2SO_4\,(aq) + 3SO_2\,(g) \longrightarrow Cr_2(SO_4)_3\,(aq) + K_2SO_4\,(aq) + H_2O\,(l)$$

This is a thermal decomposition reaction of ferrous sulphate.

Teacher's Signature: _____

No.	Experiment	Observation	Inference
1.	Take 2g of ferrous sulphate in a test tube and note its colour.	The sample is light green.	The colour of ferrous sulphate is light green.
2.	Heat the sample of ferrous sulphate 	Water vapour and colourless gas are formed and brown yellow solid is left in test tube.	Ferrous sulphate decomposes on heating to give H_2O, SO_2, SO_3 and Fe_2O_3.
3.	Test the smell of gas liberated.	The gas has irritating smell like burning sulphur.	The gases are oxides of sulphur.
4.	Bring a wet blue litmus paper in contact with the gas.	Wet blue litmus paper turns red.	Oxides of sulphur have acidic nature.
5.	Bring a strip of filter paper soaked with an acified solution of potassium dichromate above the mouth of test tube 	The orange colour turns green.	Sulphur dioxide reduces acidified potassium di-chromate.

EXPT. NO. | NAME | Page No.: | Date: | YOUVA

Experiment 3 [c]

Aim – To perform and observe the reaction between iron nails and copper sulphate solution.

Materials Required –

- Iron nails
- Sand paper
- test tubes
- solution of copper sulphate
- Stand
- Thread

Procedure –

- Take two iron nails. Clean each one by rubbing with sand paper.
- Take 10 mL of a copper sulphate solution in test tube 'A'.
- Take 10 mL of copper sulphate solution in test tube 'B' for comparison.
- Tie one iron nail with thread and immerse it in the copper sulphate solution, in test tube A.
- Keep second iron nail on clean sheet of paper for comparison.
- After 20 min., look at the color of the solution and coating on the iron nail.
- Compare the colour of the two nails and solutions.

Conclusion. – It is a displacement reaction

- The brown coating on iron nail shows copper metal is deposited on iron nail. Iron is more reactive than copper and displaced it.

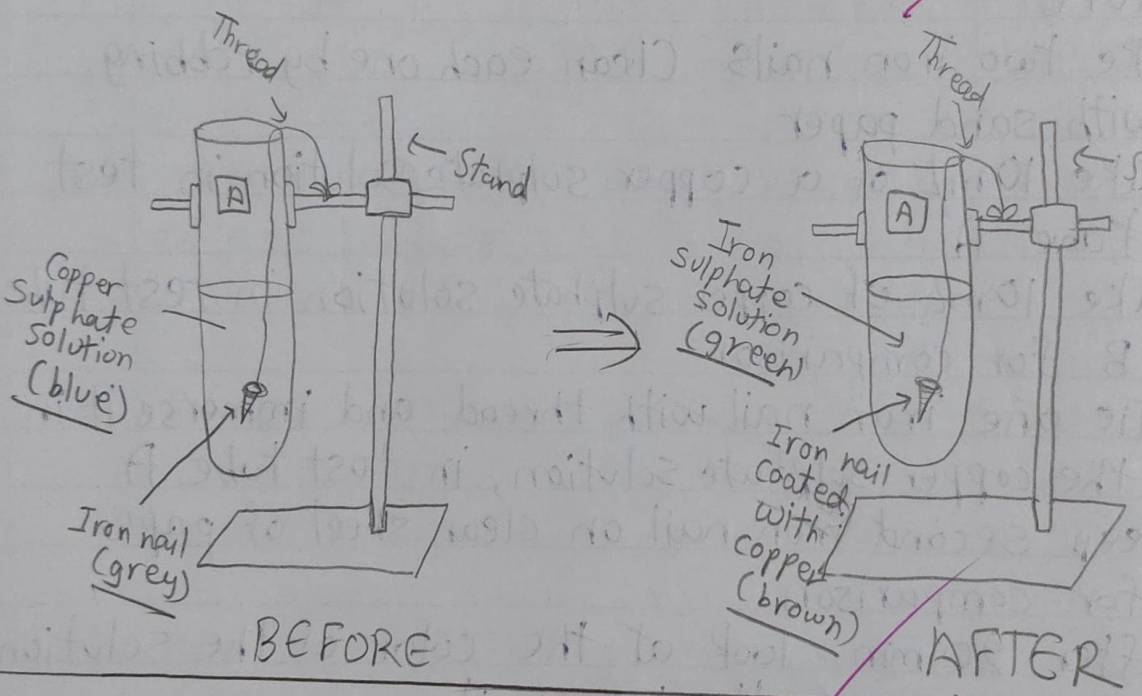
$Fe(s) + CuSO_4(aq) \longrightarrow Cu(s) + FeSO_4(aq)$

Teacher's Signature:

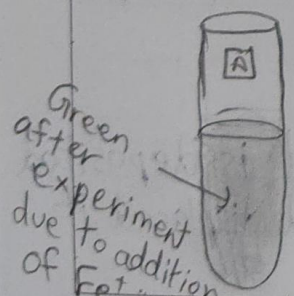
3 [c]

» Observations before Experiment
- Initial colour of copper sulphate solution was blue.
- Initial colour of iron nail was grey.

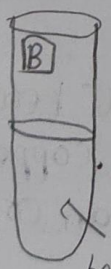
» Observations after the Experiment
- The solution of test tube A has turned light green, but the solution of test tube B is still blue, indicating presence of Fe^{+} ions in test tube A.
- There is a brown coating on iron nail which was dipped in the solution of test tube A, but the iron nail outside is still grey.

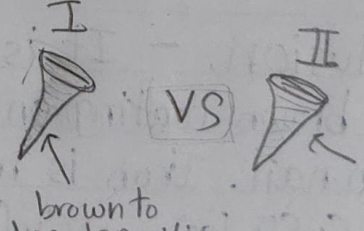


COMPARISON



VS





Experiment 3[D]

Aim – To perform and observe the reaction between Sodium sulphate and barium chloride in aq. solutions.

Material Required –

- Sodium sulphate sol.
- Barium sulphate sol.
- test tubes
- conical flask

Procedure –

- Take 10 mL solution of sodium sulphate (Na_2SO_4) in test tube marked 'A'.
- Take 10 mL solution of barium chloride ($BaCl_2$) in test tube marked 'B'.
- Mix solutions of test tubes A and B in conical flask.
- Stir the mixture and leave it undisturbed for some time
- Record your observations

Conclusions –

- When a solution of sodium sulphate is mixed with a solution of barium chloride, double displacement reaction takes place, a white precipitate of barium sulphate is formed and sodium chloride appears in the solution.

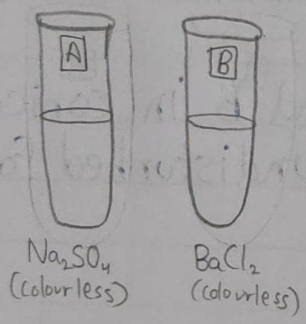
$$Na_2SO_4\,(aq) + BaCl_2\,(aq) \longrightarrow BaSO_4\,(s) + 2NaCl\,(aq)$$

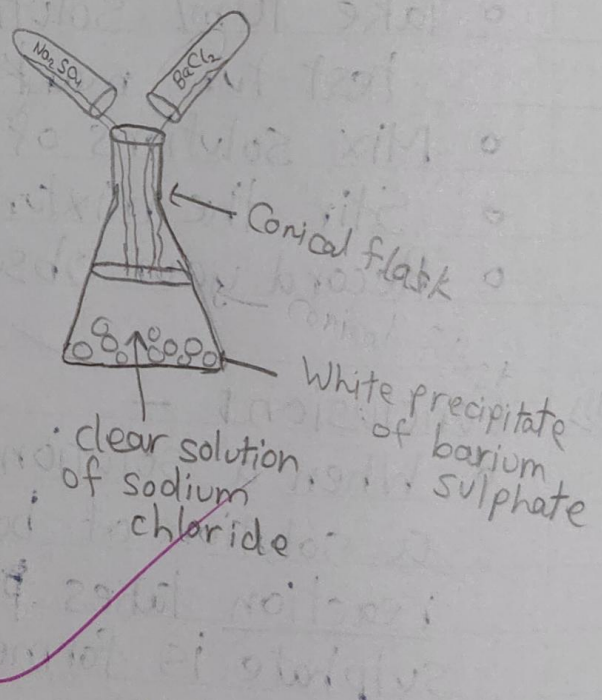
11/4/25

Teacher's Signature:

» Observation before Experiment
- Solution of Sodium sulphate is colourless and clear in test tube A.
- Solution of barium chloride is colourless and clear in test tube B.

» Observation After Experiment
- A white precipitate is formed and settles at the bottom of the conical flask.
- There is clear and colourless solution above the white solid in the conical flask.





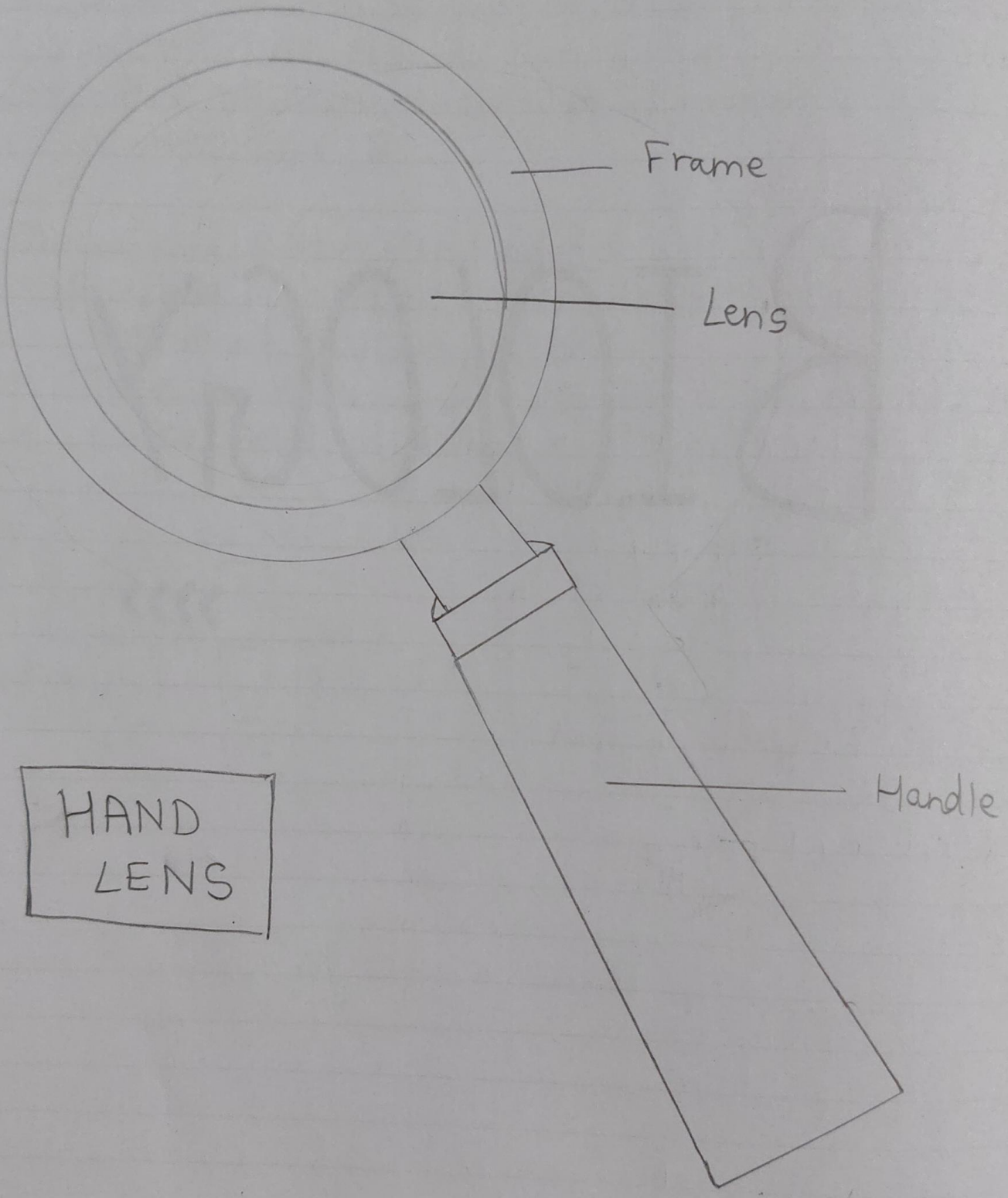
PT. NAME

Page No.:
Date:

YOUVA

BIOLOGY

»»»



HAND LENS

EXPT. NO. | NAME | Page No.: | Date: | YOUVA

APPENDIX : MICROSCOPES

I. SIMPLE MICROSCOPES

(a) Hand Lens

- consists of a biconvex lens
- different sizes and different magnifying powers like 2x, 3x, 5x or 10x.
- Used to enlarge and magnify image of an object.

(b) Dissecting Microscope

Consists of the following parts

1. Base - It is bifurcated over which other parts are supported

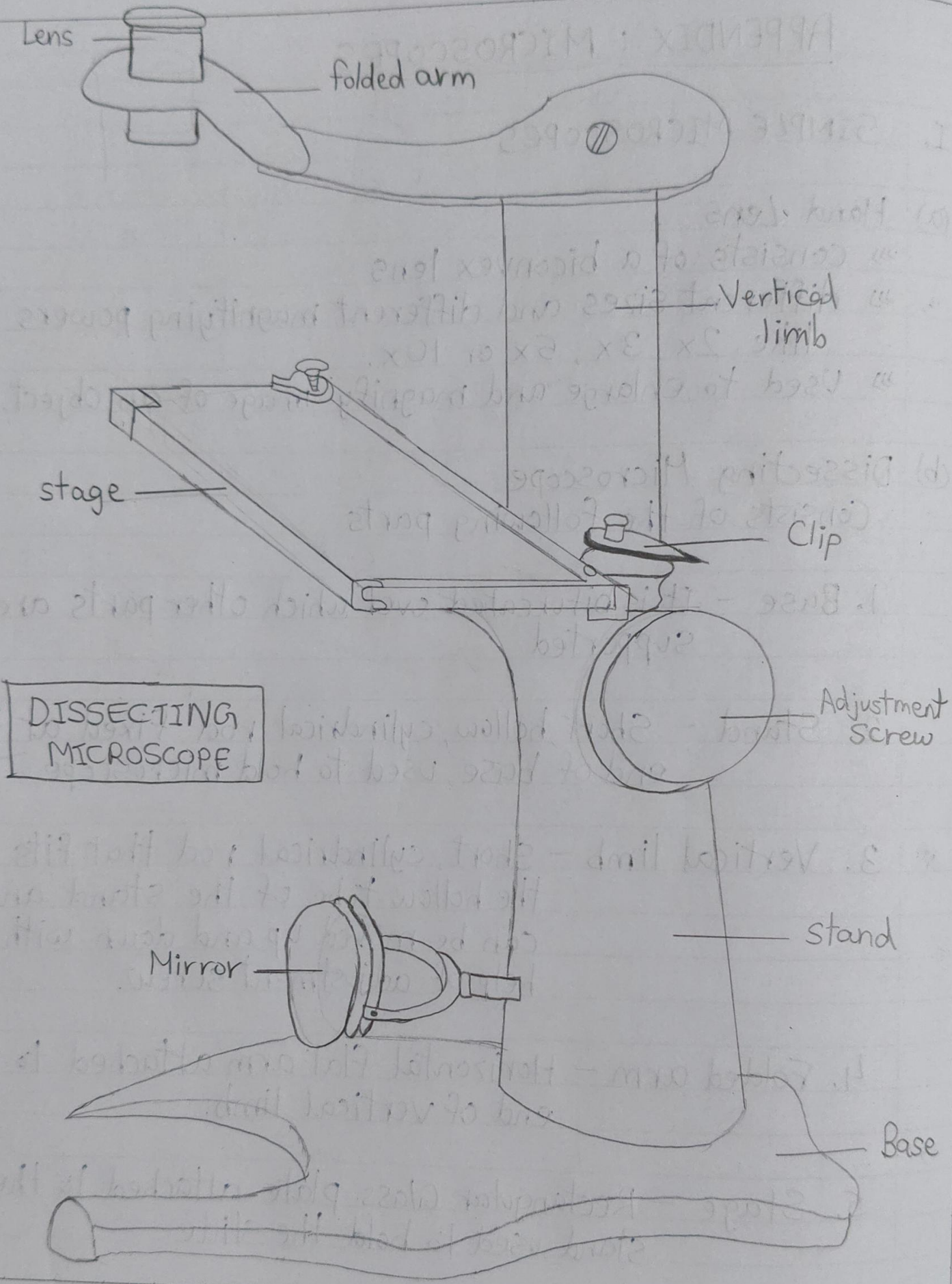
2. Stand - Short, hollow, cylindrical rod fixed at the end of base, used to hold microscope

3. Vertical limb - Short, cylindrical rod that fits into the hollow tube of the stand and can be moved up and down with the help of adjustment screw.

4. Folded arm - Horizontal flat arm attached to the end of vertical limb.

5. Stage - Rectangular Glass plate attached to the stand, used to hold the slide

Teacher's Signature:


Lens
folded arm
Vertical limb
stage
Clip
DISSECTING MICROSCOPE
Adjustment Screw
Stand
Mirror
Base

6. Mirror – Concave mirror attached to lower end of the stand, used for reflecting light rays on the stage.

7. Lens – Lens is normally of the power 5x, 10x or 20x

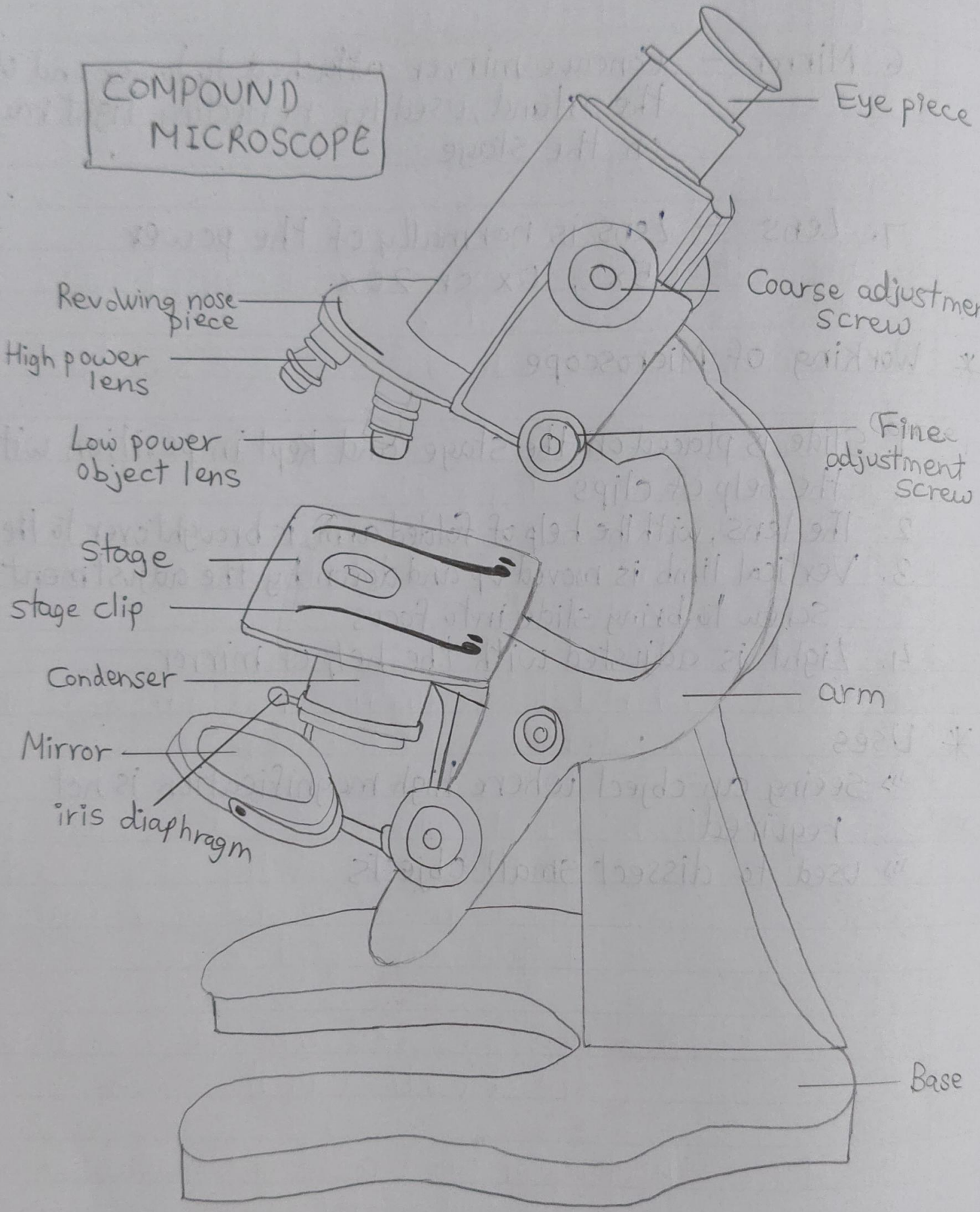
* Working of Microscope

1. Slide is placed on the stage and kept in position with the help of clips
2. The lens, with the help of folded arm, is brought over to the slide.
3. Vertical limb is moved up and down by the adjustment screw to bring slide into focus
4. Light is adjusted with the help of mirror.

* Uses

» Seeing an object where high magnification is not required
» used to dissect small objects

COMPOUND MICROSCOPE



II. Compound Microscope

* Mechanical Parts

1. Base – Horse-shoe shaped structure to provide support

2. Pillar – Small vertical projection from the base

3. Arm – Curved, used for handling the instrument

4. Inclination joint – At this joint, the arm is attached to the pillar. The microscope can be tilted at this joint.

5. Stage – Rectangular flat plate attached to the stage ~~to hold~~

6. Clips – Two clips attached to the stage to hold slides

7. Diaphragm – Attached to the base of stage to regulate the amount of light entering

8. Body tube – Tubular hollow part attached to the upper part of arm, can be moved using screw

>>>>>>

Teacher's Signature

9. Nose piece – Circular metallic structure attached below body tube. Three different objective lenses can be fitted into it.

10. Coarse adjustment screw – Bigger-sized screw to move body tube up and down

11. Fine adjustment screw – Smaller-sized screw for very slow movements needed for fine and sharp focusing

* Optical Parts

1. Mirror – A plane and a concave to reflect light rays into the microscope

2. Objective lenses – Two lenses attached to nose piece with magnification 10x and 45x.

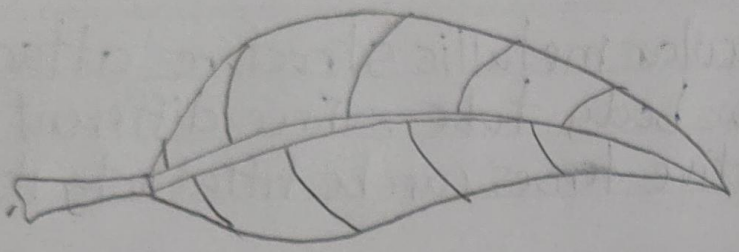
3. Eyepiece lens – Fitted at top of body tube to see magnification of 10x or 15x.

* Uses

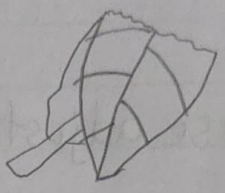
» enlarging and magnifying image of an object which is not see by the naked eyes.

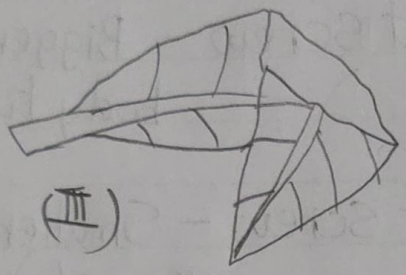
Teacher's Signature:

(I)

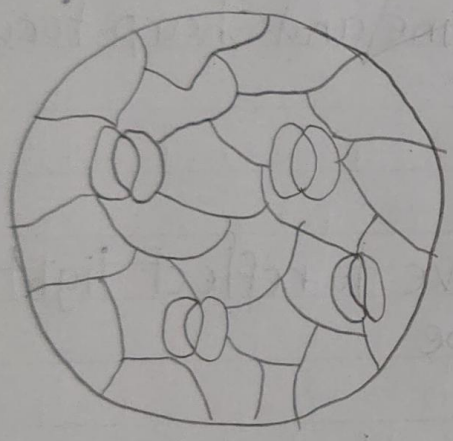


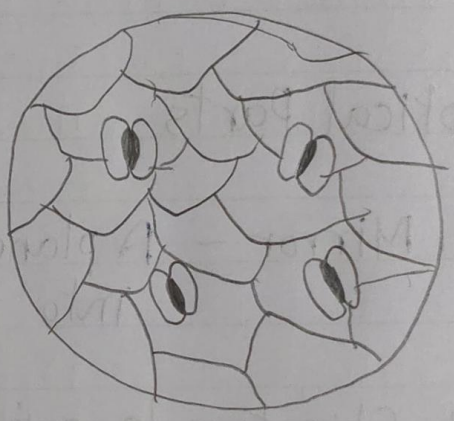
(II)





(III)





EXPT. NO. | NAME | M T W T F S S | Page No.: | Date: | YOUVA

TEMPORARY MOUNT PREPARATION

Aim:

To prepare temporary mount of leaf peel to show its stomata

Requirements:

Leaf of plants like Lily, Bryophylum or Tradescantia.
Forceps, watch glass, slide, covership, brush, needles, blade, safranin, glycerine and compound microscope

Procedure:

1. Take a fresh leaf and break it from the center
2. Remove the broken peel and put in watchglass containing wate
3. Add 2-3 drops of safranin stain
4. Put the stained peel on a clean slide using brush
5. Cut it in a rectangular or square shape.
6. Put a drop of glycerine on the slide
7. Put cover slip to avoid entry of air bubbles
8. Slightly tilt the slide to remove extra glycerine
9. Focus the slide under microscope
10. Observe carefully and draw diagram.

Result

- The minute operators seen in the mount are stomata.
- Each stomata is ~~surrounded~~ surrounded by two bean-shaped cells called guard cells.

Teacher's Signature: