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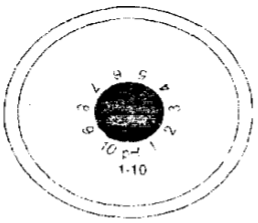
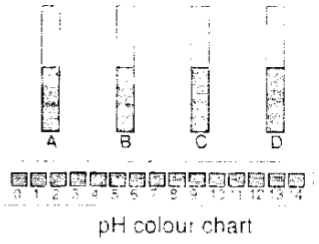
pH_of_given_sample

Aim : To find the pH of 1) Dilute Hydrochloric Acid 2) Dilute NaOH Solution 3) Dilute Acetic Acid Solution 4) Lemon juice 5) Water 6) Dilute sodium bicarbonate solution by using pH paper.

Apparatus : Test tubes, Test tube stand, dropper, white glazed tile, pH paper, distilled water and solutions of given samples.

Fig -





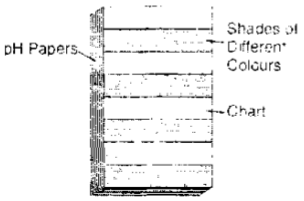


Fig. 2 : Wide range pH-papers booklet

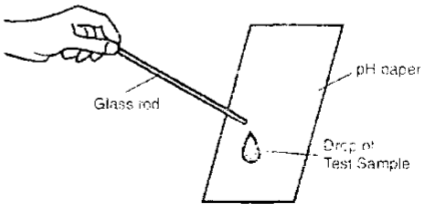


Fig.3 . Correct use of pH paper to find the pH

Procedure :

1. Place six clean and dry test tubes in a test tube stand. Take 10 ml of each given sample in it.
2. With the help of dropper transfer 1-2 drops of first sample on a piece of pH paper.
3. Observe the colour developed on pH paper and compare it with the colours in the chart on the cover of pH paper booklet.
4. Note the pH given against the colour which tallies with developed colour on pH paper.
5. Repeat the same procedure for other samples and note their pH in the observation table.

Inference :

1. Acid Samples (with pH less than 7) = _____.
2. Basic Samples (with pH more than 7) = _____
3. Neutral samples (pH = 7) = _____.

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Properties_of_Acids_and_Bases

Aim : To study the properties of acids and bases (HCl and NaOH) by their reaction with 1) Litmus solution (blue and red) 2) Zinc metal 3) Sodium carbonate.

Apparatus : Test tubes, test tube stand, upward delivery tube, blue and red litmus solution, zinc metal, sodium carbonate, NaOH, lime water.

Procedure :

1. Take 5 ml of HCl in a test tube. Dilute it with about 10 ml of water.
2. Take two test tubes and take 1 ml of dilute HCl in each test tube. Add about 2-3 drops of blue litmus solution in one test tube and red litmus solution in another.
3. Take a small piece of zinc metal in a upward delivery tube. Add about 2 ml of acid in it. Note the colour and odour of the gas evolved. Ignite the gas coming out of the tube and note the colour of the flame produced.
4. Take a pinch of sodium carbonate in a test tube . Add 2 ml of dilute acid in it. A vigorous reaction starts. Note the colour of the gas evolved. Pass the gas through fresh lime water and observe.
5. Repeat the same process (point 1 to 4) for NaOH solution.

Inference :

1.Dilute HCl turns the colour of litmus solution from blue to red and solution of NaOH turns the colour of litmus solution from red to blue.
2. When zinc metal reacts with acids and bases , both liberate hydrogen gas.
3. Dilute HCl reacts with sodium carbonate to give carbon dioxide gas but NaOH does not react with sodium carbonate.

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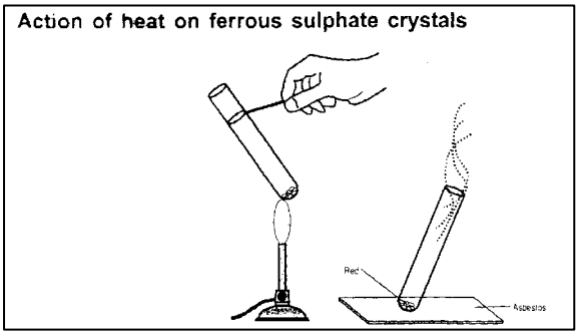
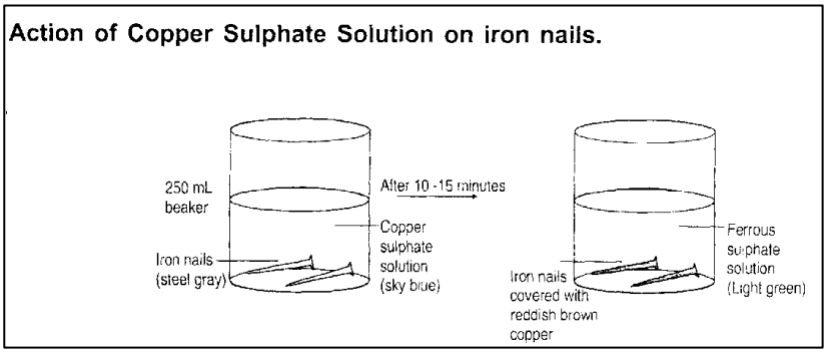
Types_of_Reactions

Aim : To perform and observe the following reactions and classify them into :
i)Combination Reaction ii) Decomposition Reaction iii) Displacement Reaction iv) Double Displacement Reaction.

Apparatus : Beaker, China dish, dropper, test tube, test tube holder, test tube stand, sand paper, filter paper , quick lime, ferrous sulphate, iron nails, copper sulphate solution.





Procedure :

1. Take quick lime in a china dis h and sprinkle some drops of water and observe.
2. Take ferrous sulphate in a test tube and heat it over burner. Note the smell and colour of the gas. Continue heating till colour of the residue in the test tube changes. Note the colour of the residue after cooling.
3. Take some copper sulphate solution in a beaker, note its colour. Place one iron nail in the solution for 10 minutes and observe. Note the colour of the solution and nail.
4. Take some sodium sulphate solution in a beaker and barium chloride solution in another beaker. Note the colour of both the solutions. Add barium chloride solution to sodium sulphate solution with constant stirring and observe.

Inference :

1. Calcium oxide and water reacts to give calcium hydroxide. This is an example of combination reaction and exothermic reaction.
2. Light green colour crystals of ferrous sulphate on heating decomposes to give mixture of gases (SO_2 and SO_3) and red coloured residue. It is an example of dcomposition reaction.
3. When grey coloured iron nails are placed in blue coloured copper sulphate solution, iron displaces copper from copper sulphate solution and nails become reddish brown in colour. This is an example of displacement reaction.
4. Formation of curdy white precipitate is due to formation of insoluble barium sulphate. This is an example of double displacement reaction.

Reactions :

1. $CaO\ (s) + H_2O\ (l) \quad ? \quad Ca(OH)_2\ (aq)$
2. $2(FeSO_4.7H_2O) ? \quad Fe_2O_3 + SO_2\ (g) + SO_3\ (g) + 14H_2O\ (g)$
3. $Fe\ (s) + CuSO_4\ (aq) ? \quad FeSO_4\ (aq) + Cu\ (s)$
4. $BaCl_2\ (aq) + Na_2SO_4\ (aq) ? \quad BaSO_4\ (s) + 2NaCl\ (aq)$

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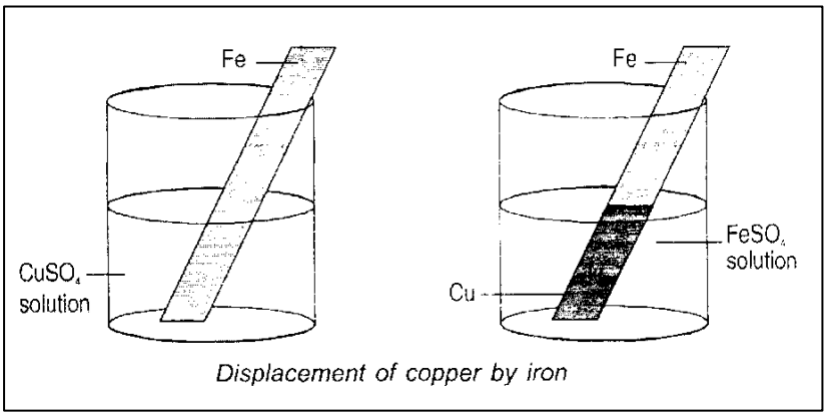
Displacement_Reactions

Aim: To observe the action of Zn, Fe, Cu and Al metals on aqueous solutions of salts $ZnSO_4$, $FeSO_4$, $CuSO_4$, Al2(SO_4)3 and based on these results arrange these metals in decreasing order of reactivity.

Apparatus: Test tube, test tube stand, sand paper, Fe, Cu, Al, Zn metals, $FeSO_4$, $CuSO_4$, $Al_2(SO_4)_3$, $ZnSO_4$.



Displacement of copper by iron

Procedure:

1. Take 2ml each of $FeSO_4$, $CuSO_4$, $Al_2(SO_4)_3$, $ZnSO_4$ solutions in test tubes. Add one or two pieces of Al metals to each test tube. Record your observation.
2. Repeat the same procedure for remaining 3 metals.

Inference: The order of reactivity of these metals is – Al > Zn > Fe > Cu

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Properties_of_Acetic_Acid

Aim: To study the properties of Acetic Acid (ethanoic acid)

Apparatus: Test tubes, test tube stand, acetic acid, red and blue litmus solution, sodium bicarbonate solution.

Procedure:

1) Take two to three drops of acetic acid in a test tube. Observe its colour and smell.
2) Add 3 to 5 drops of water and shake the test tube well.
3) Add 2 to 3 drops of blue litmus solution to acetic acid solution taken in a separate test tube. Repeat the same procedure for red litmus solution.
4) Add a pinch of sodium bicarbonate to acetic acid solution.

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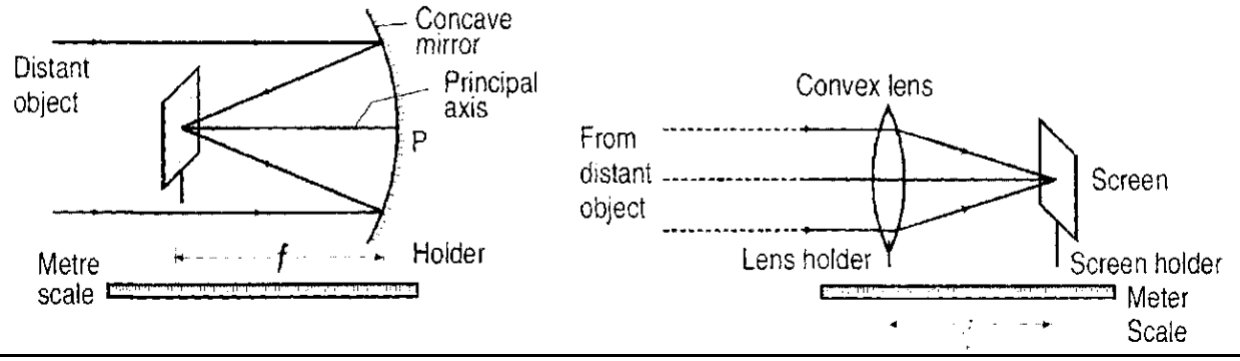
Focal length of Concave mirror and Convex lens

Aim- To determine the focal length of a)concave mirror b)convex lens by obtaining image of a distinct object.

Apparatus- Concave mirror, convex lens, a meter scale, a screen, a mirror holder, a lens holder and a screen holder.

Fig -



Procedure-

1. Mount a concave mirror in the holder.
2. Select a distant object like electric pole. Turn the reflecting surface of the mirror towards the selected distant object.
3. Mount a screen on the screen holder and hold it in front of the mirror.
4. Move the screen towards or away from the mirror to obtain a sharp image of the elecric pole.
5. Measure the distance between the pole of the mirror and the screen.
6. Repeat the procedure by selecting distant objects like a tree and a telephone pole.
7. Repeat the same procedure from 1 to 6 by using convex lens.

Inference-

1. Focal length of mirror = Mean distance= ------- cm
2. Focal length of convex lens = Mean distance = ------- cm

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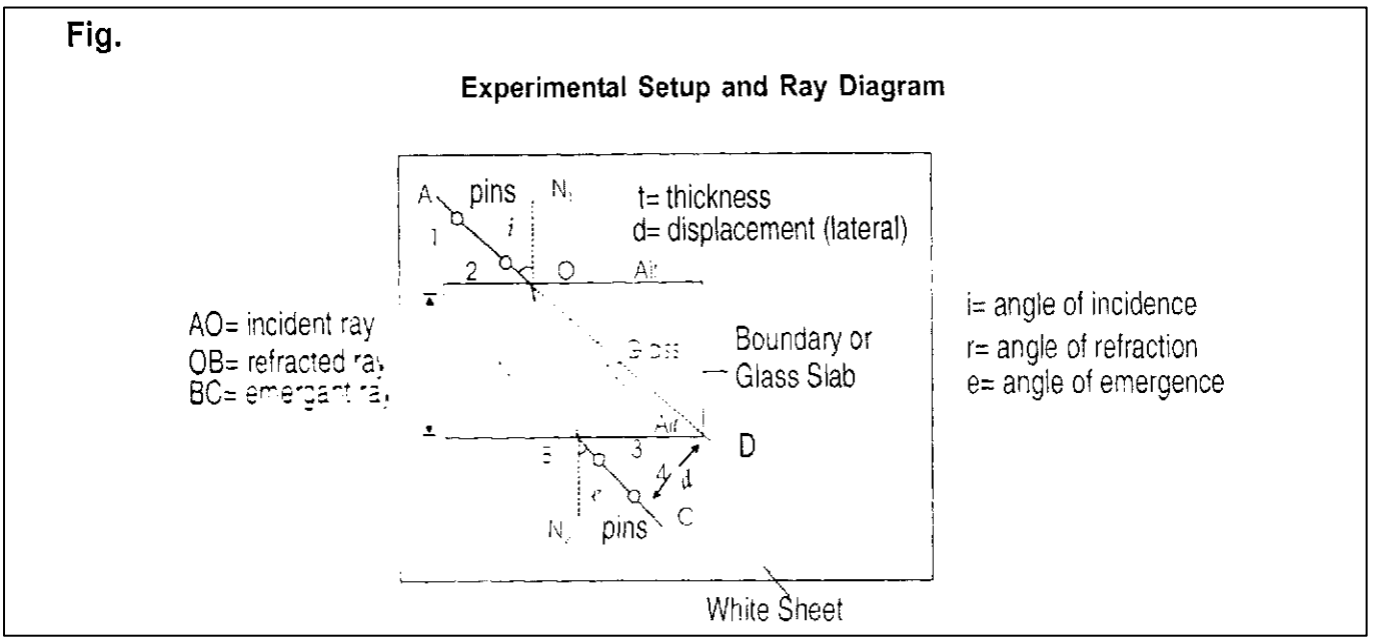
Angle_of_Incidence_,Refraction_and_Emergence

Aim- To trace the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Measure the angle of incidence, angle of refraction, angle of emergence and interpret the results.

Apparatus- A rectangle glass slab, drawing board, plain sheet of paper, drawing pins, alpins, etc.

Fig.



Procedure-

1. Fix a plain sheet of paper on a drawing board with the help of drawing pins.
2. Place a given rectangular glass slab on the paper sheet and mark its boundary with a sharp pencil.
3. Remove the glass slab and draw a normal M_1N_1 as well as ray AO at point O which forms an angle of incidence of 30^0 (i) with normal $M_1 N_1$.
4. Erect two alpines on Ray AO.
5. Replace the glass slab in its original position. See pins 1 and 2 from opposite side of slab and fix two more pins 3 and 4 on the line BC drawn on images of pins 1 and 2. Ray BC represents the emergent ray.
6. Remove the slab and join OB and draw normal M_2N_2 at point B.
7. Measure the angles (i) (r) and (e).
8. Repeat the above procedure for two more angles of incidence of 45^0 and 60^0.

Result-

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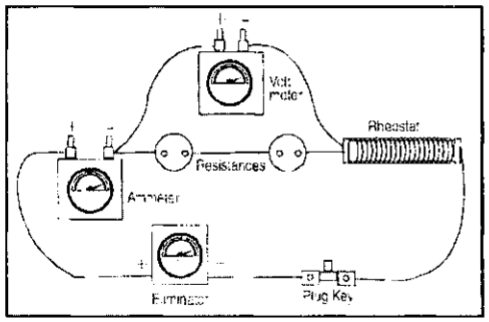
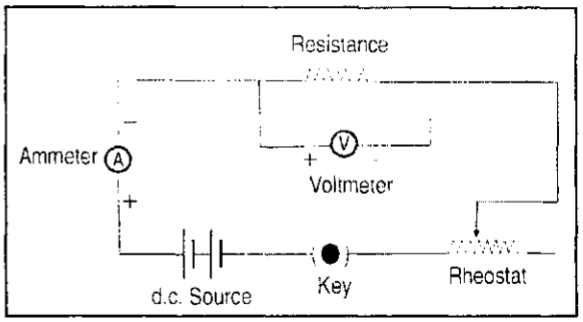
Ohm's_Law

Aim- To study the dependence of current (l) on the potential difference (v) across a resistor and determine its resistance. Also plot a graph between (v) and (l).

Apparatus- A nichrome or manganin resistance, rheostat, battery, plug key, d.c. voltmeter, d.c. ammeter, connecting wires and sand paper.

Fig.





Procedure-

1. Select a Voltmeter and a ammeter of proper range, note down their zero error and least count.
2. Connect the circuit by with precautions as shown in the circuit diagram.
3. Close the circuit by plugging the key. Adjust the rheostat by sliding the variable terminal till desirable reading will be obtained in the ammeter.
4. Note down corresponding reading of the voltmeter and open the circuit by taking out the plug.
5. Repeat steps 3 and 4 to get 3 to 5 different readings as shown in the given table.
6. Plot a graph between (v) and (l) for various readings.

Result-

1. Current (l) in circuit increases with increase in voltage (v).
2. Value of unknown resistance is = _____ ohms.
3. Graph between (v) and (l) is a straight line passing through origin.

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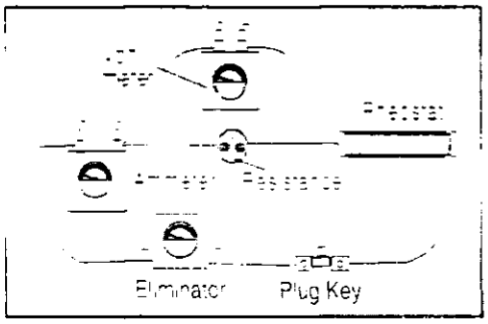
Resistance_in_Series

Aim – To determine the equivalent resistance of two resistors when connected in series.

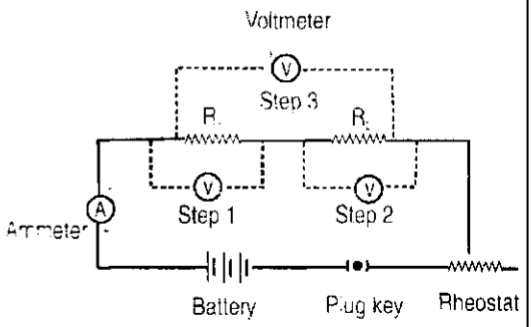
Apparatus – Two unknown resistors, rheostat, d. c. voltmeter, d. c. ammeter, plug key, battery, connecting wires, sand paper, etc.

Fig.

*Experimental Set up



*Circuit Diagram



Procedure :

1. Select a voltmeter and an ammeter of suitable range. Note the least count and zero error of voltmeter and ammeter.
2. Connect the electrical circuit as shown in the circuit diagram.
3. In the first step connect the voltmeter across resistor R1. Put the plug in the key and adjust rheostat to obtain desired current in the ammeter. Note down the readings of voltmeter and ammeter. Obtain four sets of such readings for different currents.
4. Then connect the voltmeter across resistor R2 and again obtain four sets of readings as above.
5. Finally connect the voltmeter across both resistors. Here also, obtain four sets of readings as above.
6. Remove the plug from key and disconnect the circuit.

Result :

1. Equivalent resistance of two resistors in series = ---------- ohms.
2. The relation Rs = R1 + R2 is experimentally verified.

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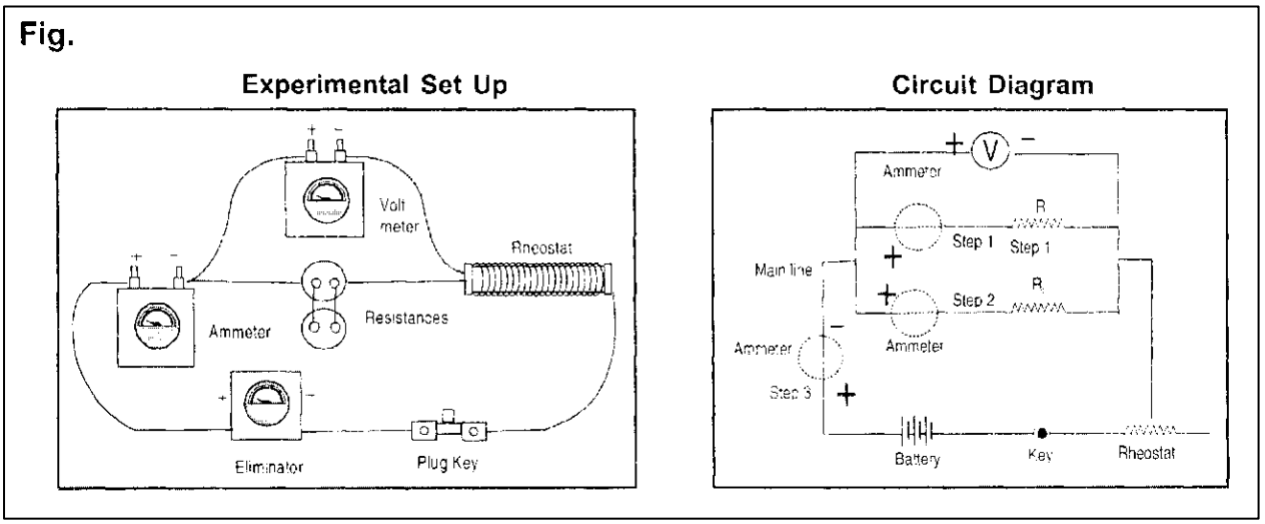
Resistance_in_parallel

Aim – To determine the equivalent resistance of two resistors when connected in parallel.

Apparatus – Two unknown resistors, rheostat, d. c. voltmeter, d. c. ammeter, plug key, battery, connecting wires, sand paper, etc.

Fig.



Procedure :

1. Select a voltmeter and an ammeter of suitable range. Note the least count and zero error of voltmeter and ammeter.
2. Connect the electrical circuit as shown in the circuit diagram.
3. In the first step connect an ammeter in series with resistor R1. Put the plug in the key and adjust rheostat to obtain desired current in the ammeter. Note down the readings of voltmeter and ammeter. Obtain four sets of such readings for different currents.
4. Then connect an ammeter in series with resistor R2 and again obtain four sets of readings as above.
5. Finally connect the ammeter in the main lines across both resistors. Here also, obtain four sets of readings as above.
6. Remove the plug from key and disconnect the circuit.

Result :

1. Equivalent resistance of two resistors in parallel = ---------- ohms.
2. Low of parallel grouping of resistance i. e. 1/Rp = 1/R1 + 1/R2 is verified.

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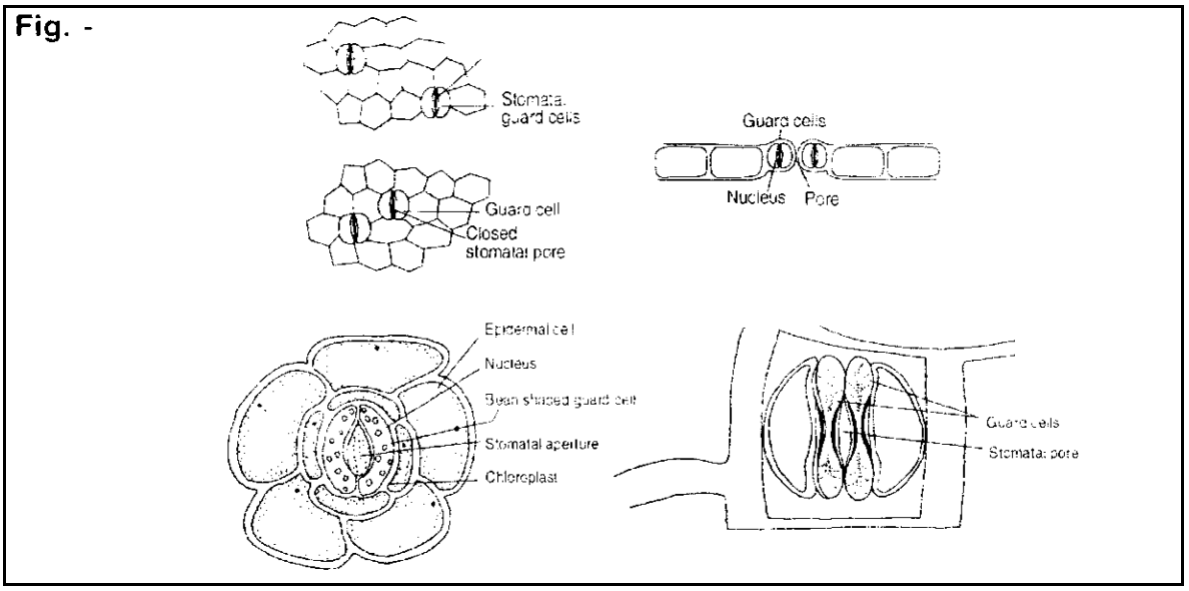
Slide_Preparation

Aim– To prepare a temporary mount of leaf peel to show its stomata.

Apparatus – Any dicot leaf, glass slides, microscope, distilled water, dropper, glycerol, coverslips, forceps, etc.

Fig. -



Procedure :

1. Take a leaf and observe its parts. In case of a small leaf, place it on the glass slide and put a drop of glycerine, cover it with cover slip and observe a temporary mount of leaf under microscope.
2. For observing stomata, select a plant and keep it exposed to sunlight for a few hours.
3. Take a leaf of such plant, tear it tangentially from its lower surface to obtain a thin peel.
4. Mount its small piece in water and expose it to sunlight.
5. Observe the leave peel under microscope. Not down the observations.
6. Keep the slide in darkness for 5 to 10 minutes and again observe it under microscope. Note down the observations.

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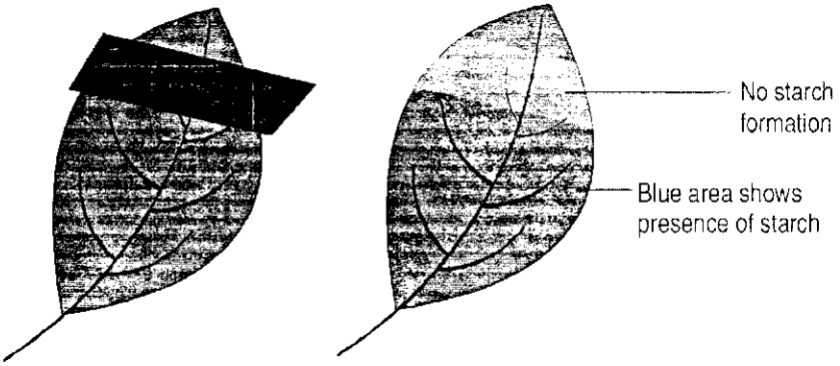
Photosynthesis

Aim-To show experimentally that light is necessary for photosynthesis.

Apparatus-A potted plant, Iodine solution, Black paper, paper clips.

Fig.



Procedure :

1) Select a potted plant and keep it in complete darkness for about 48 hours.(The plant will be discharged as photosynthesis is not taking place due to absences of sunlight)
2) With the help of clips, fix a strip of black paper on both sides of a single leaf of it.
3) Keep the potted plant in sunlight for about 8 hours so that process of photosynthesis takes place but part remains destarched.
4) Removes the black strip and boil the leaf in alcohol in a water bath so that chlorophyll is removed.
5) Wash the leaf with water and a few drops of Iodine on it.

Inferences-

This experiment shows that _____ is necessary for photosynthesis.

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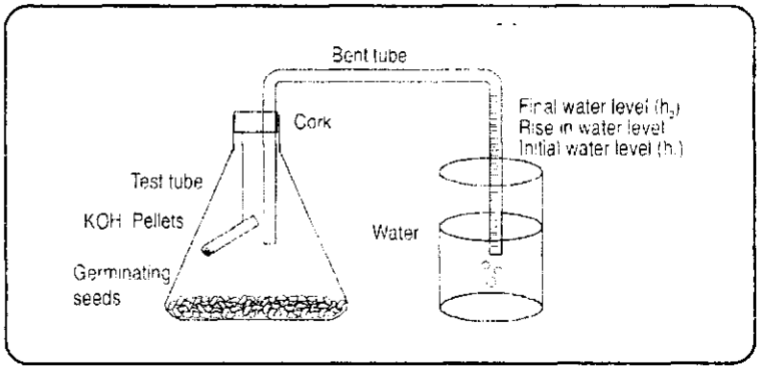
Respiration

Aim-To show experimentally that carbon dioxide is given out during respiration.

Appar atus-A conical flask, beaker, test tubes, KOH pellets, bent tubes cork, thread, soaked gram seeds , coloured water.

Fig.



Procedure :

1) Soak gram seeds overnight in water and germinate them by placing in moist cotton wool for 3 to 4 days.
2) Place moist germinated seeds in conical flask so that respiration continues for longer time.
3) Then suspend a fusion tube with KOH pellets in a conical flask.
4) Fit a cork with glass tube (which is bent twice at a right angle) to the conical flask. Keep the connections air tight.
5) Dip the free end of tube in a beaker containing water. Mark the initial level of water.
6) Keep this set undisturbed for about 15 minutes and mark the final level of water.
7) Note down the observation.

Inferences :

Carbon dioxide is given out during respiration in plants.

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Permanent_Slides

Aim- To a) binary fission in amoeba 2) budding in hydra with the help of prepared slides.

Apparatus - Compound microscope, prepared slides of binary fission in Amoeba and budding in hydra.

Fig.

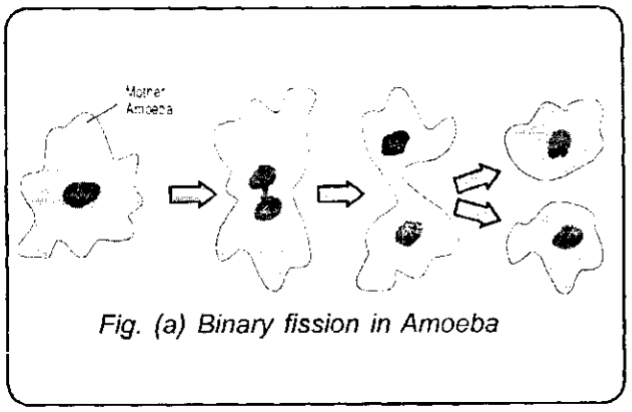
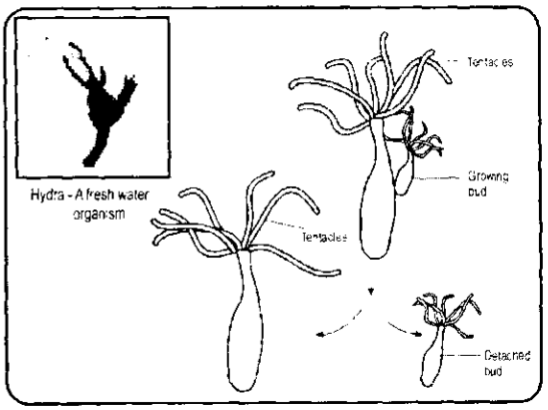


Fig. (a) Binary fission in Amoeba



Procedure :

1) Select prepared slides of binary fission in Amoeba and budding in hydra.
2) Set up the compound microscope. Look through the eye piece and adjust the mirror and diaphragm.
3) Observe the slides first under the lower and then under the higher power of the objective.
4) Note down the observation.

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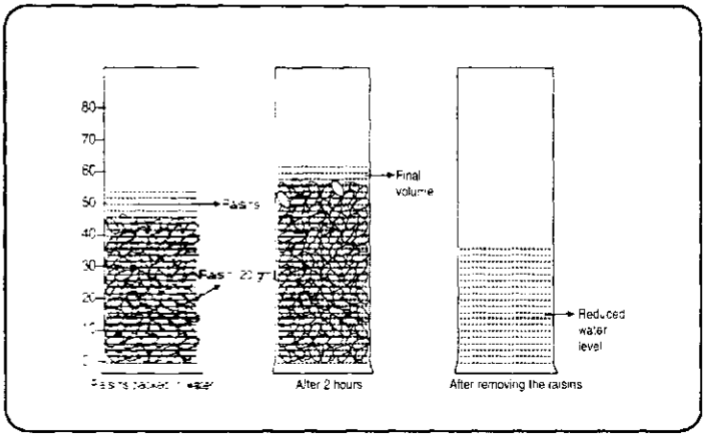
Osmosis

Aim-To determine percentage of water absorbed by resins.

Apparatus-measuring cylinder, raisins, water, beaker, Petri dish, thermometer.

Fig.



Procedure :

1) Take a measuring cylinder and level it as A. Take about 20 gms of raisins in it.
2) Take 50 ml of water in measuring cylinder.
3) Pour water in cylinder (A) so that the raisins are fully dipped .Measure the temperature in the set up in centigrade and convert it in to Kelvin.
4) Let the set up remain undisturbed for about two hours.
5) After the raisins have imbided water, take them out and spread them on filter paper so that the excess water is absorbed .Also make a note of the final reduced volume of water.
6) Again weigh the raisins and note down their final weight.
7) Repeat the experiment to calculate percentage of water absorbed.