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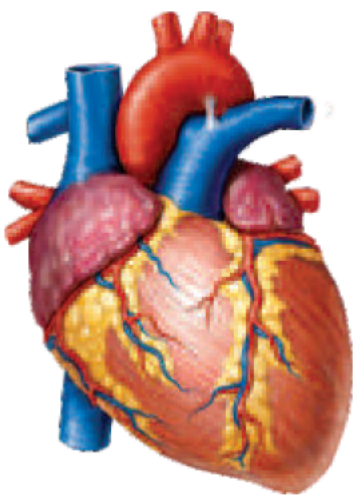
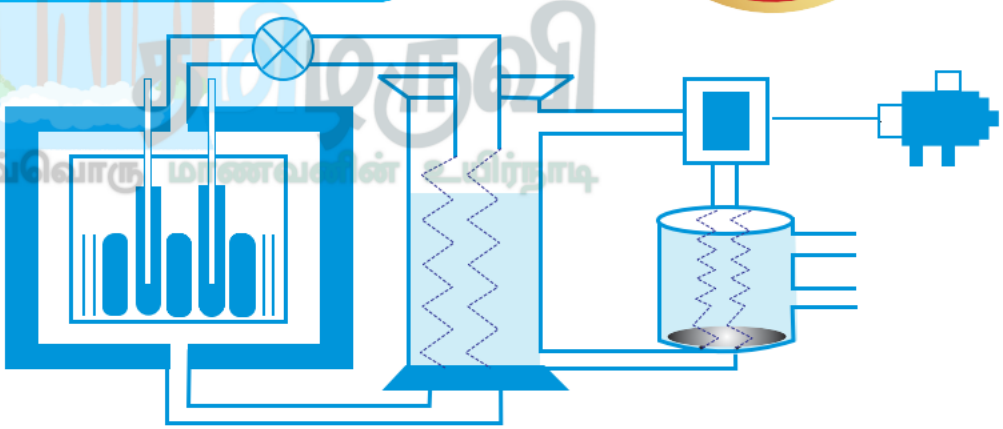


Human Heart



Nuclear Reactor

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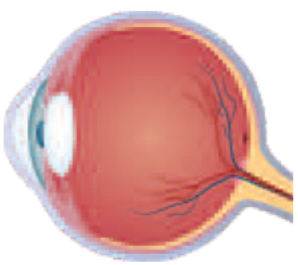

Human Eye

Richard Publication

How to score $\frac{100}{100}$?

"Answers should be in **points** or in
Small paragraphs"
This book has been prepared on the above basis.

Based on the Reduced - New Uniform Syllabus

X - Standard

Science

by

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Content

SELF - EVALUATION QUESTIONS AND ANSWERS,
ANSWERS FOR PRACTICALS

Govt. Model question paper - 2019

Govt. Exam question paper - September 2020

FREE Flash Book

GREEK SYMBOLS

1. LAWS OF MOTION

KEY FORMULAE		
1.	Linear Momentum	$p = mv$
2.	Resultant force Parallel forces acting in the same direction	$F_{net} = F_1 + F_2$
3.	Resultant force Parallel unequal forces acting in the opposite direction	$F_{net} = F_1 - F_2 \text{ (if } F_1 > F_2)$ $F_{net} = F_2 - F_1 \text{ (if } F_2 > F_1)$
4.	Torque	$\tau = F \times d$
5.	Moment of couple	$M = F \times S$
6.	Acceleration	$a = \frac{v-u}{t}$
7.	Force	$F = m \times a$
8.	Impulse	$J = \Delta p$
9.	Conservation of linear momentum	$m_1v_1 + m_2v_2 = m_1u_1 + m_2u_2$
10.	Newton's universal law of gravitation	$F = \frac{Gm_1m_2}{r^2}$
11.	Acceleration due to gravity	$g = \frac{GM}{R^2}$
12.	Mass of the Earth	$M = \frac{gR^2}{G}$
13.	Weight	$W = mg$

I. Choose the correct answer.

1. Inertia of a body depends on

   a. weight of the object
   b. acceleration due to gravity of the planet
   c. mass of the object
   d. Both a & b

   Ans: c. mass of the object

3. Newton's III law is applicable

   a. for a body is at rest
   b. for a body in motion
   c. both a & b
   d. only for bodies with equal masses

   Ans: c. both a & b

4. Plotting a graph for momentum on the Y axis and time on X axis. Slope of momentum - time graph gives

   a. Impulsive force
   b. Acceleration
   c. Force
   d. Rate of force

   Ans: c. Force

6. The unit of 'g' is ms ^{2}.It can be also expressed as

   a. cm s^{-1}
   b. N kg^{-1}
   c. N m^{2} kg ^{1}
   d. cm^{2} s^{-2}

   Ans: b. N kg^{-1}

7. One kilogram force equals to ※

   a. 9.8 dyne
   b. 9.8 × 10^{4}N
   c. 98 × 10^{4} dyne
   d. 980 dyne

Ans: c. 98×10^4 dyne

8. The mass of a body is measured on planet Earth as M kg. When it is taken to a planet of radius half that of the Earth then its value will be kg.

a. 4M b. 2M c. M/4 d. M **Ans: d. M**

10. To project the rockets which of the following principle(s) is/(are) required?

a. Newton's third law of motion **(GMQ - 2019)**
b. Newton's law of gravitation
c. law of conservation of linear momentum
d. both a and c **Ans: d. both a and c**

II. Fill in the blanks.

1. To produce a displacement _____ is required. **Ans: force**

2. Passengers lean forward when sudden brake is applied in a moving vehicle. This can be explained by . ※※ **Ans: inertia of motion**

5. A man of mass 100 kg has a weight of _____ at the surface of the Earth. ※※ **Ans: 980 N**

III. State whether the following statements are true or false. Correct the statement if it is false.

3. Weight of a body is greater at the equator and less at the polar region.

Ans: False

Weight of a body is greater at the **polar region** and less at the **equator**.

IV. Match the following. (PTA I)

Column - I			Column - II			Answers		
1.	Newton's I law	-	a.	propulsion of a rocket	-	**b.**	**Stable equilibrium of a body**
2.	Newton's II law	-	b.	Stable equilibrium of a body	-	**c.**	**Law of force**
3.	Newton's III law		c.	Law of force		**d.**	**Flying nature of bird**
4.	Law of conservation of Linear momentum	-	d.	Flying nature of bird	-	**a.**	**propulsion of a rocket**

VI. Answer briefly.

1. Define inertia. Give its classification. ※※

1. The inherent property of a body to **resist any change** in its **state of rest** or the **state of uniform motion**, unless it is influenced upon by an external **unbalanced force**, is known as inertia.

2. It is classified into three types,

   i. Inertia of rest

   ii. Inertia of motion

   iii. Inertia of direction

2. Classify the types of force based on their application.

Based on the direction and application forces can be classified into,

i. Like parallel forces

ii. Unlike parallel forces

3. If a 5N and a 15N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.

Ans:

$$F_1 = 5\ N$$

$$F_2 = 15\ N$$

Resultant force $F_{net} = F_2 - F_1$ (since $F_2 > F_1$)

$$= 15 - 5$$

$$= 10N$$

1. The resultant force will be in the direction of force with greater magnitude.

2. The direction of action of the resultant force will be in the direction of the greater force (15N).

3. The direction will be along 15N.

4. Differentiate mass and weight. ※※

Mass		Weight	
1.	It is the quantity of **matter**	1.	It is the **gravitational force** exerted

	contained in the body.		on it due to the Earth's gravity.
2.	Its SI unit is **kilogram**.	2.	Its SI unit is **Newton**.
3.	It is a scalar quantity.	3.	It is a vector quantity.

7. State Newton's second law. (GMQ - 2019)

According to Newton's second law, "The force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force".

$$F = m \times a$$

VII. Solve the given problems.

1. Two bodies have a mass ratio of 3 : 4. The force applied on the bigger mass produces an acceleration of 12ms^{-2}. What could be the acceleration of the other body, if the same force acts on it.

Solution:

$M_1 : M_2 = 3 : 4$ (since $M_1 = 4, M_2 = 3$)

$a_1 = 12\ ms^{-2}$

$a_2 = ?$

According Newton's III law of motion

$F_1 = -F_2$

$M_1 \times a_1 = -M_2 \times a_2$

$4 \times 12 = -3 \times a_2$

$a_2 = \frac{48}{3}$

$a_2 = -16$

$\mathbf{a = 16\ ms^{2}}$

2. A ball of mass 1kg moving with a speed of 10ms^{-1} rebounds after a perfect elastic collision with the floor. Calculate the change in linear momentum of the ball.

Solution:

Mass of ball $= 1$ kg

Initial speed $= 10\ ms^{-1}$

Final speed $= -10\ ms^{1}$ (because it rebounds elastically)

Change in momentum (Δp) = mv mu

$$= 1(-10)-1(10)$$
$$= -10-10$$
$$\Delta p = -20 \text{ kg ms}^{-1}$$

$\therefore$ change in linear momentum is 20 kg ms^{-1} in the opposite direction of its motion.

4. The ratio of masses of two planets is 2:3 and the ratio of their radii is 4:7. Find the ratio of their accelerations due to gravity.

Solution:

Acceleration due to gravity $g = \frac{GM}{R^2}$

$g_1 : g_2 = ?$

$R_1 : R_2 = 4:7$

$M_1 : M_2 = 2:3$

$g_1 = \frac{GM_1}{R_1^2}$; $g_2 = \frac{GM_2}{R_2^2}$

$$\frac{g_1}{g_2} = \frac{\frac{GM_1}{R_1^2}}{\frac{GM_2}{R_2^2}} = \frac{\frac{M_1}{R_1^2}}{\frac{M_2}{R_2^2}}$$

$$= \frac{M_1}{M_2} \times \frac{R_2^2}{R_1^2}$$

$$= \frac{2}{3} \times \frac{7^2}{4^2}$$

$$= \frac{2}{3} \times \frac{49}{16_8}$$

$$= \frac{49}{24}$$

$$\mathbf{g_1 : g_2 = 49 : 24}$$

$\therefore$ The ratio of their accelerations due to gravity $\mathbf{g_1 : g_2 = 49 : 24.}$

VIII. Answer in detail. (PTA - III)

1. What are the types of inertia? Give an example for each type.

Definition:

The inherent property of a body to resist any change in its state of rest or the state of uniform motion, unless it is influenced upon by an external unbalanced force, is known as **inertia**.

Inertia is of three types,

i. Inertia of rest

ii. Inertia of motion

iii. Inertia of direction

I. Inertia of rest:

The resistance of a body to **change** its state of **rest** is called inertia of rest.

Example: When we vigorously shake the branches of a tree, some of the leaves and fruits are detached and they fall down.

II. Inertia of motion:

The resistance of a body to change its state of **motion** is called inertia of motion.

Example: An athlete runs some distance before jumping. Because, this will help him jump longer and higher.

III. Inertia of direction:

The resistance of a body to change its **direction of motion** is called inertia of direction.

Example: Making a sharp turn while driving a car, we tend to lean sideways.

2. State Newton's laws of motion? ※※※

First Law of motion:
Everybody continues to be in its state of rest or in the state of uniform motion along a straight line unless it is acted upon by some external force.

Second Law of motion:
The force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force.
Third Law of motion:
For every action, there is an equal and opposite reaction. They always act on two different bodies.

3. Deduce the equation of a force using Newton's second law of motion. ※※

Newton's second law of motion:

1. "The force acting on a body is directly proportional to the rate of change of linear momentum of the body and the change in momentum takes place in the direction of the force".

2. Let, 'm' be the mass of a moving body, moving along a straight line with an initial speed 'u'.

3. After a time interval of 't', the velocity of the body changes to 'v' due to the impact of an unbalanced external force F.

Initial momentum of the body $P_i = mu$

Final momentum of the body $P_f = mv$

Change in momentum $\Delta p = P_f - P_i$

$= mv - mu$

By Newton's second law of motion,

Force, $F \propto$ rate of change of momentum

$$F \propto \frac{\text{change in momentum}}{\text{time}}$$

$$F \propto \frac{mv - mu}{t}$$

$$F = \frac{km\,(v-u)}{t}$$

Here, k is the proportionality constant.

k = 1 in all systems of units. Hence,

$$\mathbf{F = \frac{m(v-u)}{t}}$$

Since, acceleration $= \frac{\text{change in velocity}}{\text{time}}$, $a = \frac{(v-u)}{t}$.

Hence, we have

$$F = m \times a$$

Force = mass × acceleration.

5. Describe rocket propulsion. ※※※ **(SEP - 2020, PTA - IV)**

Rocket Propulsion:

1. Propulsion of rockets is based on the **law of conservation of linear momentum** as well as **Newton's III law** of motion.
2. Rockets are filled with a **fuel** (either liquid or solid) in the propellant tank.
3. When the rocket is fired, the fuel is burnt and a **hot gas is ejected** with a high speed from the nozzle of the rocket, producing a huge momentum.
4. To balance this momentum, an **equal and opposite reaction** force is produced in the **combustion chamber**, which makes the rocket project forward.
5. While in motion, the **mass** of the rocket gradually **decreases**, until the fuel is completely burnt out.
6. Since, there is **no net external force** acting on it, the linear momentum of the system is conserved.
7. The **mass** of the rocket **decreases with altitude**, which results in the gradual **increase in velocity** of the rocket.
8. At one stage, it reaches a velocity, which is sufficient to just escape from the gravitational pull of the Earth. This velocity is called **escape velocity**.

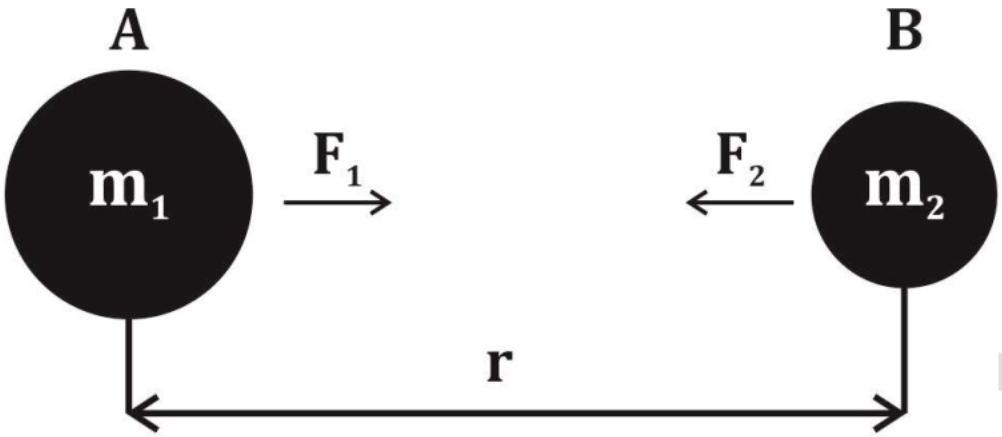
6. State the universal law of gravitation and derive its mathematical expression.

Newton's universal law of gravitation states that,

"Every particle of matter in this universe attracts every other particle with a force. This force is directly proportional to the product of their masses and inversely proportional to the square of the distance between the centers of these masses. The direction of the force acts along the line joining the masses".

Derivation:

1. Force between the masses is always attractive and it does not depend on the medium where they are placed.



Gravitational force between two masses

2. Let, $\mathbf{m_1}$ and $\mathbf{m_2}$ be the masses of two bodies A and B placed *r* metre apart in space

Force $F \propto m_1 \times m_2$

$F \propto 1/r^2$

On combining the above two expressions

$$F \propto \frac{m_1 \times m_2}{r^2}$$

$$\mathbf{F = \frac{G m_1 m_2}{r^2}}$$

where G is the universal gravitational constant.

Its value in SI unit is 6.674×10^{-11} N m^2 kg^{-2}.

IX. HOT questions.

1. Two blocks of masses 8kg and 2kg respectively lie on a smooth horizontal surface in contact with one other. They are pushed by a horizontally applied force of 15N. Calculate the force exerted on the 2kg mass.

Given data:

Mass (m_1) = 8 kg

Mass (m_2) = 2 kg

applied force (F) = 15 N

$$= \frac{m_2}{m_1 + m_2} \times \text{applied force}$$

$$= \frac{2}{8+2} \times 15 = \frac{\cancel{2}}{\cancel{10}_{\cancel{5}}} \times \overset{3}{\cancel{15}}$$

$$= \mathbf{3\ N}$$

Force exerted on the 2 kg mass **= 3 N**

2. A heavy truck and bike are moving with the same kinetic energy. If the mass of the truck is four time that of the bike, then calculate the ratio of their momenta. (Ratio of momenta = 1:2)

Given data:

$$\frac{1}{2}m_1v_1^2 = \frac{1}{2}m_2v_2^2 = K$$

$$\therefore V_1^2 = \frac{2K}{m_1}; V_2^2 = \frac{2K}{m_2}$$

$$V_1 = \sqrt{\frac{2K}{m_1}};\ V_2 = \sqrt{\frac{2K}{m_2}}$$

∴ momentum of the two bodies is given by

$$P_1 = \sqrt{2\ m_1 k}\ ;\quad P_2 = \sqrt{2\ m_2 k}$$

m_1 = 4 times that of the bike

$m_2 = 1$

$$\therefore P_1 = \sqrt{2 \times 4 \times k}\ ;\quad P_2 = \sqrt{2 \times 1 \times k}$$

$$= \sqrt{8k}\ ;\quad \sqrt{2k}$$

$$= 2\sqrt{2k}\ ;\quad 1\sqrt{2k}$$

$$= \mathbf{2:1}$$

∴ Ratio of momenta **= 1:2**

3. "Wearing helmet and fastening the seat belt is highly recommended for safe journey". Justify your answer using Newton's laws of motion.

1. Wearing helmet and seat belt helps in preventing accidents.
2. When the car is moving with a high speed, our body tends to be in movement due to inertia of motion in the forward direction.
3. So, when there is a sudden collision, serious injuries can happen.

However, seat belt exerts a force on our body to slow down the forward motion.

PRACTICALS - SOLUTIONS

DETERMINATION OF FOCAL LENGTH OF A CONVEX LENS

Exercise No: 2 **Date:**

Aim:

To determine the focal length of a convex lens by using

1. Distant object method
2. uv method

Apparatus required:

A convex lens, stand, wire gauze object, screen and measuring scale.

Formula:

$$f = \frac{uv}{(u+v)}$$

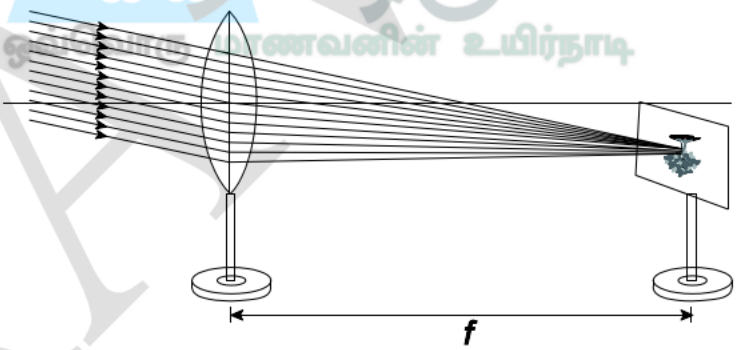
Here,u is the distance betweenthe object (light source) and the convex lens.

v is the distance of the image (screen) from the convex lens.

f is the focal length of the convex lens.

1. Distant Object Method:

1. Fix the given convex lens vertically on the stand and place it on the table near an open window of the laboratory.
2. Locate a distant object (tree or building) through the open window.

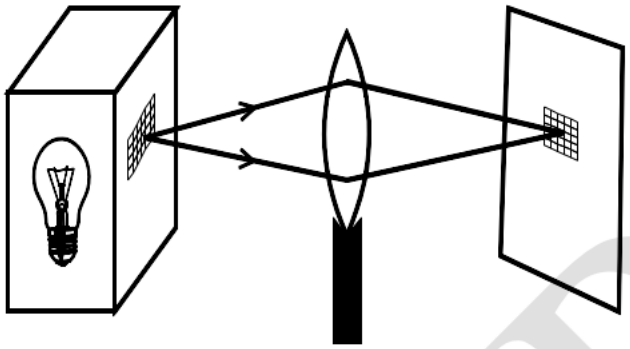


3. Place the screen behind the convex lens.
4. Adjust the position of the convex lens and thescreen so as to get a sharp, inverted and diminished image.
5. Measure the distance between the screen and the convex lens with the help of the measuring scale.
6. This distance is equal to the approximate focal length of the convex lens(f).

2. uv - Method:

1. Fix the given convex lens vertically on the stand and place it on the table.
2. Place the wire gauze object on the left side of the convex lens (say at a distance greater than 2f). Measure the distance between the object and the lens (u).

3. Place the screen on the right side of the convex lens and adjust its position to get a sharp, inverted and diminished image.



4. Measure the distance between the screen and the lens (v).
5. Repeat the same procedure, by changing the distance of the object (u) and tabulate your observations.

Observation:

Focal length of the convex lens (By distance object method) is (f) =**12 cm**.

2f=**24cm**.

	Size of the Image	**Position of the object**	**Distance between the object and the lens (u) cm**	**Distance between the screen and the lens (v) cm**	**Focal length of convex lens** $\mathbf{f = \frac{uv}{(u+v)}}$ **cm**
1.	Diminished	u>2f	25	26.5	12.8
2.			26	24.9	12.7
3.	Same size	u= 2f	24	28.5	13.0
4.	Magnified	u < 2f	22	31.0	12.8
5.			23	30.5	13.1
				Mean	**12.8**

Result: The focal length of the given convex lens

1. By distance object method f = **12** cm.
2. By 'uv' method f = **24** cm.

DETERMINATION OF RESISTIVITY

Exercise No: 3 **Date:**

Aim:

To determine the resistivity of the material of the given coil of wire.

Apparatus required:

A coil of wire, screw gauge, a metre scale, battery, key, ammeter, voltmeter, rheostat and connecting wires.

Formula:

The resistivity of the material of the coil of wire is

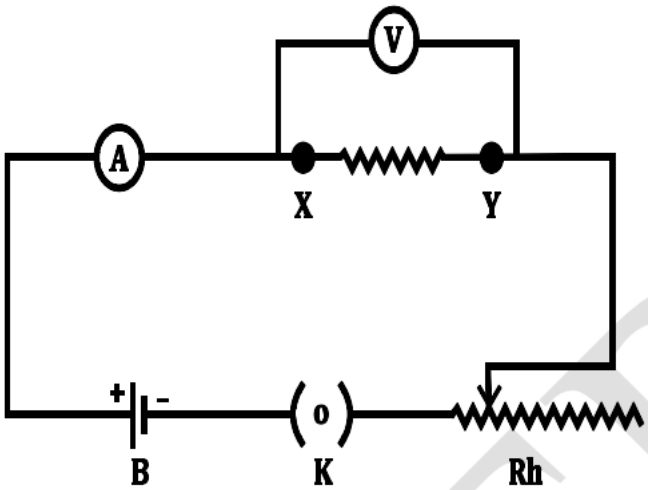
$$\rho = \left(\frac{A}{L}\right) R \,(\text{in ohm metre})$$

Where A is the area of cross section of the wire (m^2)

L is the length of the coil of wire (m)

R is the resistance of the coil of wire (ohm)

Circuit Diagram:



Procedure:

1. Connect the battery, ammeter, given wire, rheostat and key in series, as shown in the circuit diagram.
2. Connect the voltmeter in parallel to the unknown resistor.
3. Close the key and hence the circuit is closed.
4. Adjust the rheostat such that the ammeter reads a current of 0.5 ampere.
5. Note down the potential difference across the resistor as shown by the voltmeter.
6. Adjust the rheostat and change the current in steps of 0.5A (that is 0.5A, 1.0A, 1.5A, etc).
7. For each current, note down the corresponding potential difference as shown by the voltmeter.
8. Tabulate the observations.
9. Measure the diameter of the wire using a screw gauge.
10. Measure the length of the coil using metre scale.

Observations:

i. To find the resistance:

	Ammeter reading - I (Ampere)	**Voltmeter reading- V (Volt)**	**Resistance = $\frac{V}{I}$(Ohm)**
1.	0.8	4	5
2.	1.2	5.5	4.583
3.	1.6	7.5	4.687
Mean:			**4.756**

ii. To find the diameter of the wire using screw gauge:Least count (LC) = 0.01mm
Zero coincidence (Zc) = 0.42mm

	Pitch Scale reading- PSR (mm)	**Head scale coincidence - HSC**	**Head scale reading - HSR= HSC × LC (mm)**	**Total reading = PSR + HSR (mm)**
1.	0	94	0.94	0.52
2.	0	89		0.47
3.	0	90		0.48
			Mean Diameter:	**0.49mm**

Calculations:

$$\text{Radius of the wire, } r = \frac{\text{diameter}}{2} = \frac{0.49}{2} = \underline{\mathbf{0.245\ mm}}$$

Area of cross section of the wire, $A = \pi r^2 = 0.196 m^2$

Length of the wire L $= \underline{\mathbf{1}}$ m

$$\text{Resistivity of the material of the wire} = \rho = \left(\frac{A}{L}\right) R = 0.196 \times 4.7$$

$$= 0.9212\ \Omega m$$

Result:

The resistivity of the material of the wire $= \mathbf{0.9212\ \Omega m.}$

CHEMISTRY

IDENTIFY THE DISSOLUTION OF THE GIVEN SALT WHETHER IT IS EXOTHERMIC OR ENDOTHERMIC

Exercise No: 4 **Date:**

Aim: To test the dissolution of given salt is exothermic or endothermic.

Principle:

1. If the reaction or process liberates the heat, then it is called exothermic.
2. If the reaction or process absorbs the heat, then it is called endothermic.

Apparatus required:

Two beakers, thermometer, stirrer, weighed amount oftwo samples.

Procedure:

1. Take 50 ml of water in two beakers and label them as A and B.
2. Note the temperature of the water from beaker A and B.
3. Then, add 5g of sample A into the beaker A and stir well until it dissolve completely.
4. Record final temperature of the solution.
5. Now, repeat the same for the sample B.
6. Record the observation.

Observation:

	Sample	Temperature before addition of sample (°C)	Temperature after addition of sample (°C)	Inference (temperature increases or decreases)
1.	A	**20°C**	**48°C**	**increases**
2.	B	**20°C**	**8°C**	**decreases**

Result:

From the inferences made,

The dissolution of sample A is **Sodium hydroxide** is Exothermic reaction.

The dissolution of sample B is **ammonium Nitrate** is endothermic reaction.

Note: Sodium hydroxide, ammonium nitrate, glucose, calcium oxide etc. May be given as the sample.

TESTING THE SOLUBILITY OF THE SALT

Exercise No: 5 **Date:**

Aim:

To test the solubility of the given salt based on the saturation and unsaturation of the solution at a given temperature.

Principle:

1. A solution in which no more solute can be dissolved in the solvent at a given temperature is called saturated solution.
2. If the solvent can dissolve more solute than what is present, the solution is called unsaturated solution.

Materials Required:

A 250 ml beaker, a stirrer, sufficient quantity of distilled water, 100 ml measuring jar, table salt in three packets weighing as 25g, 11g and 1g.

Procedure:

1. In a 250 ml beaker, pour 100 ml water using measuring jar.
2. To this water add table salt (25g) from first packet.
3. Stir the content very well.
4. Add the next packet containing 11g salt followed by constant stirring.
5. Now add the third packet containing 1g salt.
6. Record your observations.

Observation:

	Amount of salt added	**Observation (Salt dissolved / undissolved)**	**Inference (unsaturated / saturated / super saturated)**
1.	25 g	dissolved	Unsaturated
2.	11 g	dissolved	saturated
3.	1 g	undissolved	Super saturated

Result:

From the above observation, it is inferred that the amount of salt required for saturation is **36** g.

BIO - BOTANY
PHOTOSYNTHESIS - TEST TUBE AND FUNNEL EXPERIMENT (DEMONSTRATION)

Exercise No: 8 **Date:**

Aim:

To prove that oxygen is evolved during photosynthesis.

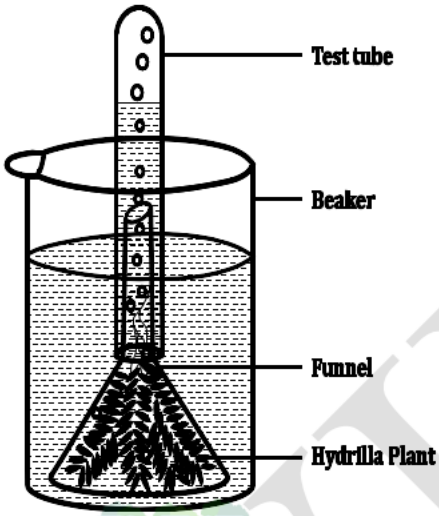
Materials required:

Test tube, funnel, beaker, pond water and Hydrilla plant.

Procedure:

1. Take a few twigs of Hydrilla plant in a beaker containing pond water.
2. Place an inverted funnel over the plant.
3. Invert a test tube filled with water over the stem of the funnel.
4. Keep the apparatus in the sunlight for few hours.

Observation:



After one hour, it is noted that water gets displaced down from the test tube.

Inference:

1. During photosynthesis, oxygen is evolved as a by - product.
2. Gas bubbles liberated from the Hydrilla plant reach the top of the test tube and it displaces the water downwards.
3. Take the test tube and keep the burning stick near the mouth of the test tube.
4. Increased flame will appear.
5. Hence, it is proved that oxygen is evolved during photosynthesis.

TO STUDY THE LAW OF DOMINANCE

Exercise No: 10 **Date:**

Aim:

To study the monohybrid cross by using model / picture / photograph. To find out the phenotypic ratio and genotypic ratio in pea plant using checker board.

Note:

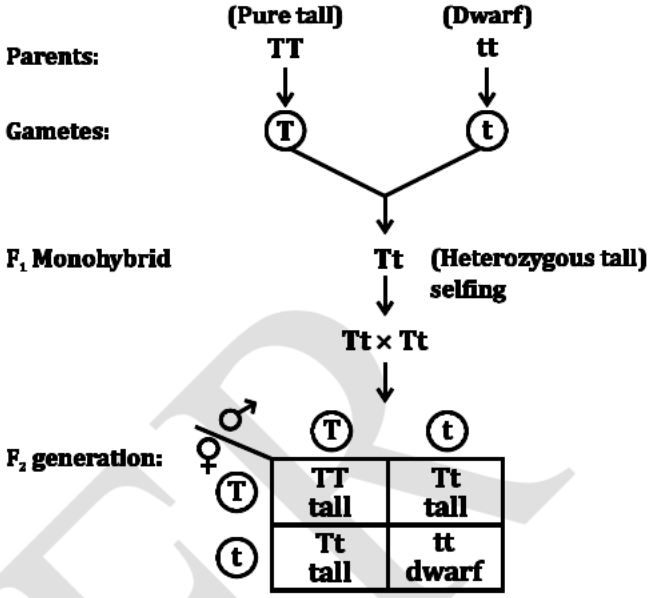
Depict parental generation and the gametes using colour chalk pieces.

Definition:

Cross involving one pair of contrasting characters is called monohybrid cross.

Procedure:

1. Pure breeding tall plant is crossed with pure breedingdwarf plant.
2. All the F1 hybrid plants were tall (Tt)
3. Selfing the F1 hybrid plants resulted in tall and dwarf plants in F2 generation.



Result:

1. Phenotypic ratio= Tall - 3: Dwarf - 1
2. Genotypic ratio = Pure Tall - 1: Hybrid Tall - 2: Pure Dwarf - 1

IDENTIFICATION OF BLOOD CELLS

Exercise No: 13 **Date:**

Aim:

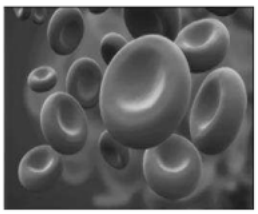
Identification of blood cells (Red blood cells and white blood cells). To draw a neat labelled diagram and write a note on the blood cells identified.

Materials required:

Permanent prepared slides of blood cells.

Identification:

a. The given slide is identified as **Red blood cells:**
   1. They are biconcave and disc shaped.
   2. They are also known as erythrocytes.
   3. Mature mammalian RBC's do not have nucleus.
   4. Haemoglobin is a respiratory pigment which gives red colour.
   5. It transports oxygen from lungs to tissues and carbon - dioxide from tissues to lungs.



Red Blood Cells

b. The given slide is identified as **White blood cells:**
   1. WBC's are colourless and they have nucleus.
   2. They are also known as Leucocytes.

Monocyte Lymphocyte Neutrophil Eosinophil Basophil

   3. They show amoeboid movements.
   4. They fight against germs and other foreign bodies and thus protect the body from microbial infections and diseases.
   5. There are five different types of WBC namely Neutrophils, Eosinophils, Basophils, Lymphocytes and Monocytes.