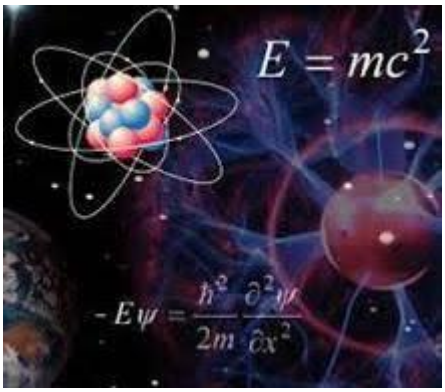
SMART SKILLS

ACADEMIC SESSION

2020 - 2021

CLASS VIII

PHYSICS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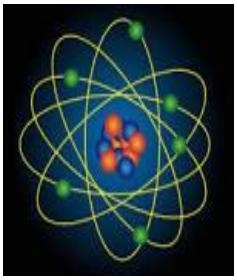

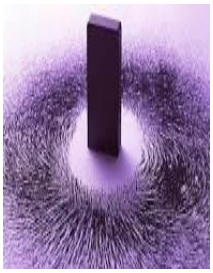

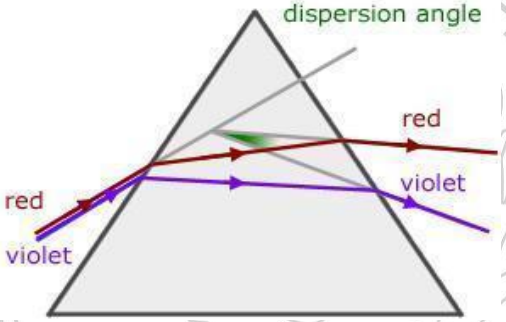
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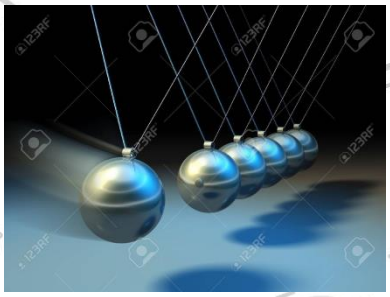
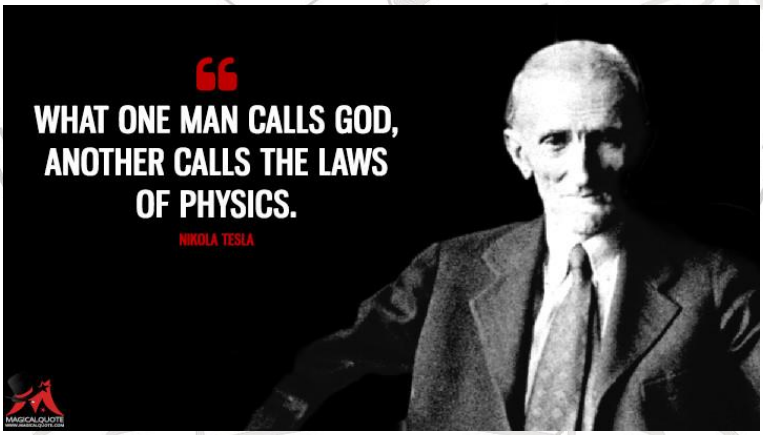
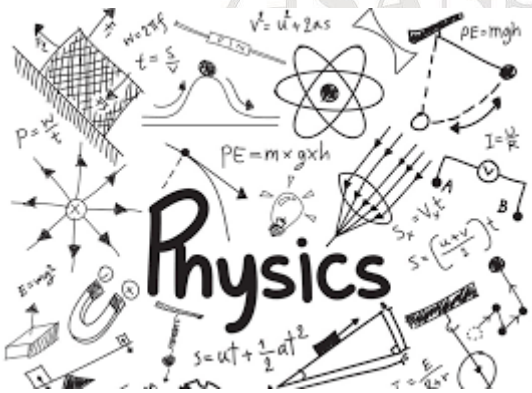
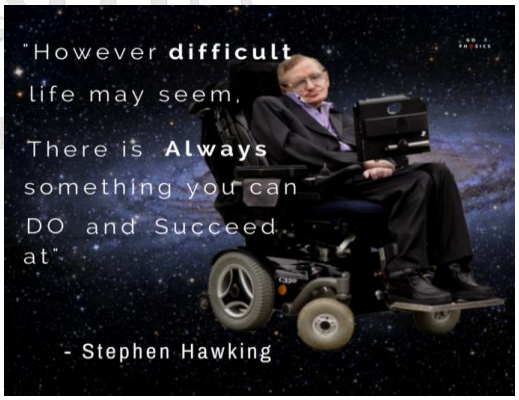



WHAT ONE MAN CALLS GOD, ANOTHER CALLS THE LAWS OF PHYSICS.
NIKOLA TESLA


Physics


"However difficult life may seem, There is Always something you can DO and Succeed at"
- Stephen Hawking

"The important thing is to not stop questioning. Curiosity has its own reason for existence. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvellous structure of reality. It is enough if one tries merely to comprehend a little of this mystery each day.

-Albert Einstein

An experiment is a question which science poses to Nature, and a measurement is the recording of Nature's answer.

- Max Planck

KEY FEATURES

This edition is enriched with activities that will be demonstrated/done by the students and will provide exposure to a variety of questions that include multiple choice questions, application based questions, very short answer type questions, short answer type questions, figure based questions, etc. to check the child's grasp of the concept.

- The H.O.T.S. (High Order Thinking Skills) questions will help in developing child's logical and analytical thinking and will greatly enhance the development of independent thinking skills.

- The assignments will enable the child to express the taught concepts clearly in the desired format.

- The Recapitulation assignments and Question banks will enable students to be better prepared to appear for the examinations by giving them an idea about the format of the paper and to optimise their speed of writing.

- The FACTOPAEDIA contains amazing scientific facts. This will help in creating awareness among the students about the world of science.

- Last but not the least – This Smart Skills has been prepared to help the children develop a scientific aptitude by-

  ✓ Reinforcing concepts
  ✓ Inspiring them to learn by doing.
  ✓ Strengthening expression in the desired scientific language.
  ✓ Developing independent thinking.
  ✓ Understanding the reasoning of day to day phenomena.

INDEX

SYLLABUS PLAN FOR THE YEAR- 2020 - 2021

TERM I

APRIL – MAY

TOPIC: LIGHT

What makes things visible, Reflection of light from a plane mirror, Ray diagrams to show regular and diffused reflection, Ray diagram to show the formation of an image by a Plane mirror, Characteristics of the image formed by a plane mirror, Multiple images formation with plane mirrors ,Laws of light reflection, Structure of the Human eye and the function of its parts, Persistence of vision, Eye care. Braille system for the visually challenged.Refraction.

JULY

TOPIC: SOUND

Production of Sound, Different categories of Musical instruments and their vibrating parts, Sound needs a medium for Propagation, Characteristics of Sound wave, characteristics of Sound, Numericals related to Calculation of Time period, Frequency, Audible and inaudible Sounds, Preliminary idea about the Human ear- Parts and functions, Differences between Noise and Music, Sources and effects of Noise pollution.

AUGUST

TOPIC: SOME NATURAL PHENOMENA

Lightning, Thunderstorm, Earthquakes.

TERM II

SEPTEMBER – OCTOBER

TOPIC: STARS AND THE SOLAR SYSTEM

Celestial objects- Stars, Planets, Meteors, meteorites, comets, asteroids.
Moon- Description of its surface, Phases of the moon
A few constellations and their shapes.
Planets of the Solar system and a brief information about them.
Artificial satellites - their applications.

NOVEMBER –DECEMBER

TOPIC: FORCE AND PRESSURE

Scientific meaning and definition of Force, effects of force, Types of Forces in detail, Definition of Pressure, Formula and units of pressure , Numericals based on Pressure, Pressure exerted by liquids and gases, Atmospheric Pressure and its effects.

JANUARY –FEBRUARY

TOPIC: FRICTION

Scientific meaning and Definition of friction, Cause of friction, Factors affecting Friction, Friction a necessary evil- its advantages and disadvantages, Ways of increasing and reducing friction, Fluid friction.

CHAPTER 11

FORCE AND PRESSURE

FORCE

Force is a physical quantity that changes- the state of rest or uniform motion , shape or size of an, speed and direction of an object. Its SI unit is Newton (N).

- Contact force - It is the force which acts on a body only when the objects are in physical _____ with each other. eg. Muscular force, Frictional force.
- Muscular Force – The force exerted by the _____ of a human or animal body is called muscular force.
- Frictional force – The force acting between two _____ in contact which opposes the motion of one body over the other.
- Non contact force – The force that can act even without any actual _____ between the two objects is called a noncontact force (action –at –a distance force). eg. Gravitational force, Electrostatic force, Magnetic force.
- Gravitational force – The force of attraction between any two objects possessing mass is called Gravitational force. The Gravitational force exists everywhere in the universe. eg. The force of attraction between the earth and the moon.
- Electrostatic force – The force of attraction or repulsion between objects due to electric charges is called electrostatic force. eg. The force of repulsion between like charges, the force by which the rubbed comb _____ bits of paper.
- Magnetic force – The force exerted by a _____ is called magnetic force.eg. the force by which a magnet _____ iron filings.
- Resultant force – it is the single force that produces the same effect on a body as done by all forces acting on it collectively.

- ➢ When two forces act along the same line and same direction on a body then the resultant force is the _____ of the two forces acting on it.
- ➢ When two forces act along the same line and opposite direction on a body then the resultant force is the _____ of the two forces acting on it.

- Balanced forces - When the resultant of all the forces acting on a body is _____, then the forces are said to be balanced forces. Balanced forces do not produce any change in the size, shape , state of rest or uniform motion of a body.
- Unbalanced forces- When the resultant of all the forces acting on a body is not _____, then the forces are said to be unbalanced forces.

  Unbalanced forces produce change in the size, shape and state of motion, that includes direction and speed of a moving body.

Assignment 11.1

Name the forces exerted, as seen in the given pictures. Also state whether they are contact or noncontact forces?

Magnetic force Noncontact Force

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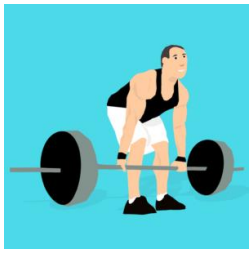

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Fill in the blank spaces after observing the given pictures.

	Agent exerting the force	**Object on which it acts**	**effect of the force**
	Palm and fingers	dough	Force changes the shape
	----------	----------	----------
	----------	----------	----------
	----------	----------	----------
	----------	----------	----------

CHAPTER 11

FORCE

LAB ACTIVITY

ACTIVITY 5

Aim: **To demonstrate the various types of forces.**

Materials Required: Bar magnet, iron filings, straws, newspaper, balloon, sand paper, toy car, spring balance, ball, rubber band, inclined plane, talcum powder.

Theory:

Procedure:

Go to each table, and think of the possible forces that can be demonstrated using the given materials in each tray.

Observation:

Materials	**Materials**	**Materials**
Using the above materials, the forces that could be demonstrated are –	**Using the above materials, the forces that could be demonstrated are –**	**Using the above materials, the forces that could be demonstrated are –**

Conclusion:

_____ and _____ are contact forces.

_____, _____ and _____ are Non contact forces.

Assignment 11.2

Fill up the columns **B** and **C** with appropriate answers:-

S. No.	**Column A** (Situation)	**Column B** (Type of Force)	**Column C** (Contact/Non-Contact)
1	Bat hitting a ball		
2	Between earth and moon		
3	Man rowing a boat		
4	Water fall		
5	Between a magnet and a nail		
6	Between comb(rubbed with hair) and bits of paper		
7	Between tyres of moving vehicle and the road		

1. Identify the type of force acting in each of the following cases:-

a. A meteor crashes into the earth. _____

b. A coin slips and falls from your hand. _____

c. A straw rubbed with paper attracts another straw._____

d. Magnetic compass deflects when kept under the wire of a simple circuit. _____

e. A magnet attracts an iron nail. _____

f. A heavy load is lifted.

g. A cycle stops as one stops pedalling on a flat road. _____

h. A scooter comes to rest as its engine is switched off. _____

i. Animals carry out their physical activities._____

Chapter – 11
FORCE

Assignment 11.3

Multiple choice questions :- Tick the appropriate choice.

1. The pull or push acting on a body is called _____.
   (a) force
   (b) pressure
   (c) thrust
   (d) friction
2. Force applied per unit area of a surface is called _____.
   (a) force of friction
   (b) force of muscles
   (c) pressure
   (d) thrust
3. A force applies on a rolling ball on the ground can cause _____.
   (a) an increase in the speed of the ball
   (b) a decrease in the speed of the ball
   (c) change in direction of the ball
   (d) all of these
4. Which of the following will exert more pressure if pushed with same force?
   (a) geometry box
   (b) sharpener
   (c) end of a new pencil
   (d) pointed end of nail
5. Which of the following is not an example of contact force?
   (a) ball rolling on ground
   (b) horse pulling a cart
   (c) ball falling on earth
   (d) man pushing a load
6. The SI unit of force is _____.
   (a) dyne
   (b) Newton
   (c) gram
   (d) kilogram
7. Which of the following forces is only attractive?
   (a) electrostatic
   (b) magnetic
   (c) gravitational
   (d) all of these
8. Gravitational force acts _____.
   (a) only between sun and the planets
   (b) only between sun and earth
   (c) only between earth and moon
   (d) between all objects in this universe

Give one word for the following:-

a. A force acting on a body from a distance - _____

a. A push or pull acting on a body - _____

b. A force of attraction acting on all bodies because of every other body - _____

Pick the correct choice from col B and write them in the centre, matching them with col A.

Column A		**Column B**
i. Force can make a stationary object move.		a. A man moulding objects with clay.
ii. Force can stop a moving object.		b. A woman pushing a table
iii. Force can change the shape of the object		c. A boy catching a ball.
iv. Force can change the direction of a moving object.		d. A girl pulling the leash of a running dog.
v. Force can make an object move slower.		e. A driver turning the steering wheel of a car.

FORCE AND PRESSURE

Assignment 11.4

1. Fill in the blanks:-

a. The SI unit of force is _____ while that of pressure is ----------

b. _____ is force per unit area.

c. _____ and _____ are together called fluids.

d. Liquids exert _____ in all directions.

e. Static electric charges exert _____ force whereas magnets exert _____ force.

f. An object slows down when force is applied in the _____ direction of its motion.

In a tug of war, two teams A and B exert forces of 65N, 23N, 85 N and 45N, 16N, 78N respectively. What is the net force acting on the rope?

---

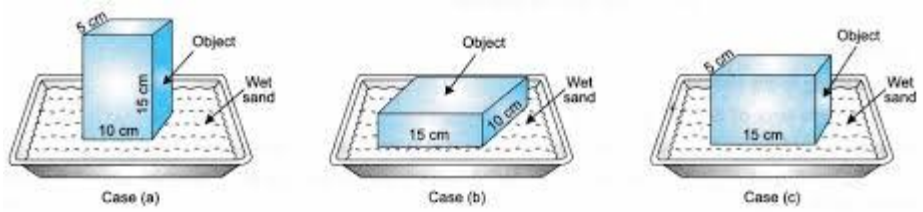
2. Two friends Pragya and Mary are applying forces of 22.8 , 33.5 ,22.5 and 14 N on a box in the same direction. What will be the net force applied by them?

PRESSURE

ACTIVITY 1

Aim – To study the effect of force on a given surface and hence find the relationship between force, pressure and area.

Materials Required – A deep tray, refined flour, glass rod, 4-5 glass slabs



Theory -
Pressure = Force / Area
More the area of contact, less is the pressure exerted.

Diagram –

Procedure –

1. Fill the tray with refined flour and stir it with a glass rod to spread out and loosen the flour.
2. Place a rectangular slab with its three different faces on the flour one by one, and record your observation.
3. Now keep the slab with its maximum dimension in contact with the flour.
4. Arrange the rest of the slabs one on top of the other on the first slab and record your observation.

Observation –

1. When the slab is kept with its maximum dimension in contact ,on the flour, _____

   _____.
2. When the slab is kept with its minimum dimension on the flour, _____

   _____.
3. When the slab is kept with its maximum dimension on the flour and rest of the

   slabs are kept on it, _____.

Conclusion –

1. When the area of contact between the slab and flour is more, the pressure----------

2. When this area of contact decreases, the pressure----------

3. The force acting on the flour due to the slabs together is ----------

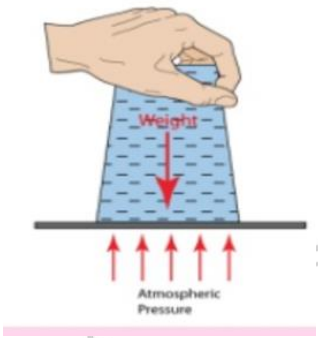
4. Pressure is defined as ----------–

CHAPTER 11

PRESSURE

ACTIVITY 2

Aim: **To prove the presence of atmospheric pressure.**



Materials Required : Plastic Glass with a hole at the bottom, water, cardboard

Theory:
Air has weight and exerts pressure. The presence of atmospheric pressure can be proved indirectly by comparing it with the pressure exerted by a liquid.

Diagram:

Procedure:
1. Take a plastic glass ,pierce a neat hole at the bottom and cover it with cello tape
2. Now fill it with any quantity of water.
3. Place a hard card on the rim ,so that it is covered completely by the card.
4. Holding the card in place with the palm of your hand , invert the glass and gradually take off your palm.
5. Jot down your observation.----1
6. Now carefully peel off the tape from the hole without disturbing the card.
7. Jot down your observation once again.----2

Observation:

1._____

2._____

_____

Conclusion:

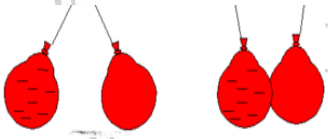
FUN ACTIVITIES
TRY IT OUT!!

1. Fountain Bottle.

Fill a 2-litre soda bottle half full of water. Take a long straw and insert it in the mouth. Wrap a lump of clay around the straw to form a seal. Blow hard into the straw—then stand back. Your blowing increases the air pressure inside the sealed bottle. This higher pressure pushes on the water and forces it up and out the straw.

2. BALLOON ACTIVITY

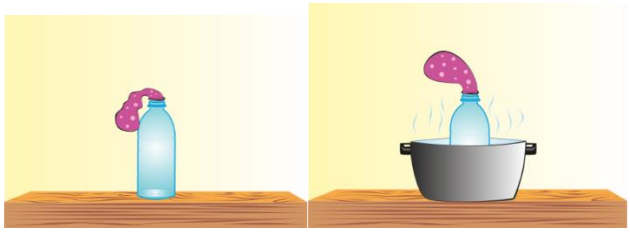
- Materials Required: Two balloons
- Method: Blow the balloons and tie string to it. Hang them 10 – 12 cm apart and blow air in between the balloons.



- Observation: The balloons will move closer.

- Inference: The air pressure between the balloons is reduced . Air moves from higher pressure to lower pressure bringing the balloons closer.A child blows air with a straw near the opening of another straw which has its other end in a soft drink bottle. What do you think will happen and why?

- Take an empty glass bottle (without lid) with a narrow mouth. Fix a balloon in the mouth of this bottle now place this bottle first in a tub or a large mug containing water at room temperature, and then in warm water (not too hot).

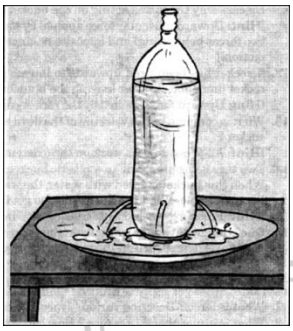


CHAPTER 11

PRESSURE

ACTIVITY 3

Aim: To show that liquids exert equal pressure in all directions at the same level.



Materials Required: Mineral water bottle, water, compass/needle

Theory:

Diagram:

Procedure:

1. Take a bottle and pierce 3-4 holes at the same horizontal level.
2. Paste a cello tape over the holes.
3. Fill it up with water
4. Now peel off the cello tape.
5. Observe what happens

Observation:

_____

_____

_____

_____

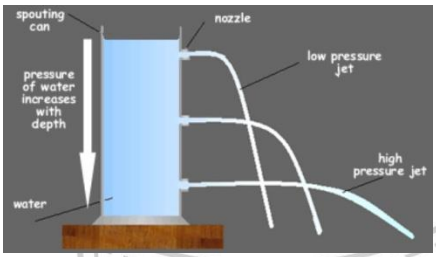
Conclusion:

CHAPTER 11

PRESSURE

ACTIVITY 4

Aim: To show that pressure exerted by liquids increases with depth.



Materials Required: Mineral water bottle, compass/needle, water

Theory: The pressure exerted by liquids increases with the increase in depth due to the increase in the force per unit area exerted by the liquid above.

Diagram:

Procedure:

1. Take a bottle and pierce 3 holes at different heights but along the same vertical line.
2. Fill it up with water and keep on a plane surface.
3. Measure the distance between the bottle and the different points where the water is falling on the surface from the holes.

Observation:

_____

_____

_____

Conclusion:

_____

Chapter – 11

PRESSURE

Complete the following paragraph to find out how a vacuum cleaner works:-

A vacuum cleaner works by removing some of the air inside its collecting bag. This reduces the _____ inside the bag. So the air pressure outside is _____ than the air pressure inside it. The increased air pressure _____ the vacuum cleaner pushes air into it, taking dust and bits of dirt along with it.

2. **The properties of a liquid in an open vessel are :-**

a. Pressure of the liquid _____ with increase in its density.

b. The liquid exerts pressure on the _____ as well as _____ of the container.

c. The pressure of the liquid _____ _____ _____ is same in all directions.

d. The pressure of the liquid _____ with an _____ in its depth.

3. **Two objects of masses M and 20M are lying on an equal area. Determine the ratio of pressure exerted by them on the ground.**

---

4. **Calculate the thrust on an area of 6 sq cm if a pressure of 45 Pa is exerted?**

---

5. **Calculate the area on which a force of 4000 N exerts a pressure of 25 Pa.**

---

6. **Calculate the pressure exerted on an area 2.5 m² by a force of 150 N.**----------

---

Chapter – 11

PRESSURE

Assignment

Give reasons for the following:

Astronauts have to wear special pressurized suits.

Deep sea divers have to wear specially designed suits.

War tanks move on caterpillar tracks which cover wheels.

---

4. A sealed packet of chips gets inflated , when carried to high altitudes.

Chapter – 11

FORCE AND PRESSURE

[LET US DO]
Find out 12 words from the grid given on 'Force and Pressure'

I	U	Y	T	W	Q	M	U	S	C	U	L	A	R
O	O	P	L	K	J	H	G	F	I	D	S	A	A
E	C	I	T	A	T	S	O	R	T	C	E	L	E
J	L	K	G	P	M	O	U	T	E	R	I	H	B
B	V	C	R	X	Z	A	S	F	N	F	F	G	T
N	H	G	A	F	D	S	N	E	G	U	O	E	H
S	D	A	V	H	I	E	U	O	A	T	E	H	R
R	N	O	I	T	C	I	R	F	M	M	N	L	U
E	C	X	T	D	S	M	P	U	H	E	O	B	S
T	B	J	A	Z	N	B	O	J	S	G	T	U	T
E	Y	U	T	X	C	V	L	K	F	S	W	E	K
M	T	R	I	Y	T	R	A	F	D	S	E	B	R
O	F	E	O	U	F	R	Q	O	A	P	N	R	W
R	O	D	N	I	N	T	A	R	O	I	U	Q	P
A	K	J	H	O	U	S	D	C	Y	T	R	E	W

Chapter – 11

FORCE AND PRESSURE

Recapitulation Assignment

1. In a game of tug of war, the two teams pull equally hard. So, the rope does not move in either direction. Predict the kind of forces acting on the rope?

---

2. Define pressure and write the mathematical expression for it.

---

3. Define the S.I unit of Pressure?

---

6. Where is the liquid pressure greater – 10m below the surface of sea or 20m below?

---

7. Why is electrostatic force called non contact force?

Chapter – 15

SOME NATURAL PHENOMENA

Read the lesson and answer the following questions-

1. Lightning is caused by the accumulation of _____ in the clouds.
2. The process of transferring of charge from a charged object to the earth is called _____.
3. It is not safe to be in contact with telephone cords, electrical wires and metal pipes during lightning. Why?
4. _____ _____ is a device used to protect building from the effect of lightning.
5. An _____ is a sudden shaking of trembling of the earth which lasts for a very short time.
6. Earthquakes can cause floods, _____ and _____.
7. The tremors are caused by the disturbance deep down inside the uppermost layer of the earth called _____.
8. The power of an earthquake is expressed in terms of a magnitude on a scale called the _____ _____.
9. The seismic waves are recorded by an instrument called the _____.
10. _____ charges repel and _____ charges attract each other.
11. An _____ is a device to detect whether a body is charged or not.
12. The boundaries of earth's plates where earthquake tends to occur are called _____ zones.

Chapter- 15

Some Natural Phenomenon

Fun Activity … Making an electroscope

Aim--To make an electroscope using aluminium foil.

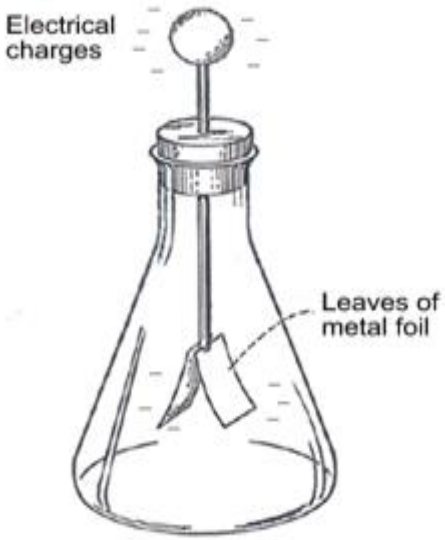
Material Required--A glass bottle or jar, piece of cardboard, pair of scissors, paper clip, tape, metal wire, ebonite rod, silk cloth.

Theory--

An electroscope is a device used to detect the presence of charge and the nature of charge on a body.

Like charges repel each other while unlike charges attract each other.

Diagram:



Procedure:

- Take a glass bottle with a wide mouth.
- Cover it with a piece of cardboard. Pierce a hole in the cardboard and pass a metal wire through it. (You may use the bottle cap in place of the cardboard)
- Turn one end of the wire to make a U.
- Cut two strips of aluminium foil about 3 cm by 1cm each.
- Hang them at the bent end of the metal wire.
- Fix the metal wire to the cardboard with a tape.

- Now take some aluminum foil and crumple it to form a small ball.
- Put the end of the wire with foil leaves inside the box and fix the cardboard on the mouth of the bottle.
- Now fix the crumpled foil ball on the end of the metal wire outside which works as a collector.
- Rub an ebonite rod with with a silk cloth and touch to the foil ball and observe the aluminium leaves carefully.

Observation:

Conclusion:

Try making an electroscope in different ways by seeing some videos:

https://youtu.be/2PmWlPjV6n0

https://youtu.be/3qyeQO1guKk

Search for 10 natural disasters [You can go up, down, sideways, backwards, diagonally]

I	O	P	L	K	J	H	G	F	D	S	B	O	N	A	C	L	O	V	A
V	B	N	M	H	N	B	V	C	X	Z	A	Q	W	E	R	T	Y	U	F
O	T	S	R	U	B	D	U	O	L	C	I	U	Y	T	R	E	W	Q	L
L	I	L	K	R	J	H	G	F	D	Y	S	X	X	C	B	V	N	M	O
C	S	W	Q	R	E	Z	A	T	S	C	R	U	B	D	U	O	L	C	O
A	B	H	Y	I	T	R	E	W	Q	L	P	O	L	K	J	G	D	A	D
N	S	S	A	C	O	G	G	E	P	O	A	N	O	O	M	V	B	N	M
L	N	J	I	A	G	D	I	R	B	N	K	A	U	Q	H	T	R	A	E
A	K	J	H	N	U	Y	T	R	E	E	A	R	T	H	Q	U	A	K	E
N	O	I	L	E	D	E	F	N	O	O	P	S	M	N	B	V	C	X	Z
D	P	U	O	S	R	S	A	L	L	E	R	B	M	U	O	O	D	A	J
S	E	T	I	K	N	I	D	O	G	M	A	R	D	R	E	T	S	M	A
L	K	K	J	H	G	F	F	D	S	A	O	E	S	M	Y	K	C	U	L
I	J	J	H	G	F	D	S	T	E	T	R	I	O	U	Y	D	C	B	A
D	M	Y	T	R	E	E	W	Q	S	M	L	K	J	H	G	F	D	S	B
E	J	A	N	B	V	C	E	W	Q	E	T	L	U	P	I	U	T	A	C
A	O	O	N	R	C	B	A	U	O	I	R	E	A	U	O	I	E	A	D
Z	S	A	K	U	N	A	H	A	J	R	O	O	N	O	O	H	P	Y	T
Y	N	I	B	T	S	A	D	I	S	R	E	V	F	O	P	O	T	S	E
X	W	V	U	T	S	T	R	Q	P	O	N	M	L	K	J	I	H	G	F

Write down the names of the Natural disasters that could be figured out-

Chapter – 12
FRICTION

Friction is defined as a contact force that opposes the _____ of one surface over the _____. It always acts _____ the direction of the motion of the body.

Friction arises because of --

- ➢ <u>The interlocking of the surfaces-</u> Friction is due to the _____ of the surfaces. The grooves and ridges of the two surfaces get interlocked with each other and oppose motion.
- ➢ <u>Due to adhesion between the two surfaces –</u> The atoms or molecules present at the point of contact of the two surfaces _____ each other due to electrostatic attraction and oppose the motion.

Friction depends on

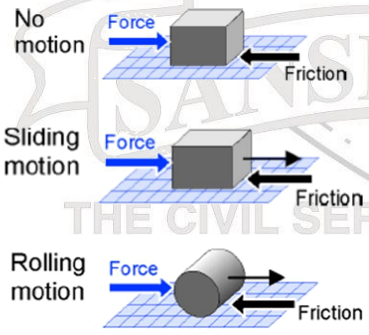
- ➢ Nature of the surfaces in contact: Rough surfaces have _____ friction than the smooth ones.
- ➢ On a horizontal surface, the force of friction is _____ proportional to the weight of the body which moves.

There are different types of friction-

Static friction

Sliding friction

Rolling friction



- **Static friction-** is the friction that exists between a stationary body and the surface on which it rests. The static friction is experienced, when we try to just move the body at rest and it is called the limiting value of the static friction or limiting friction. eg._____

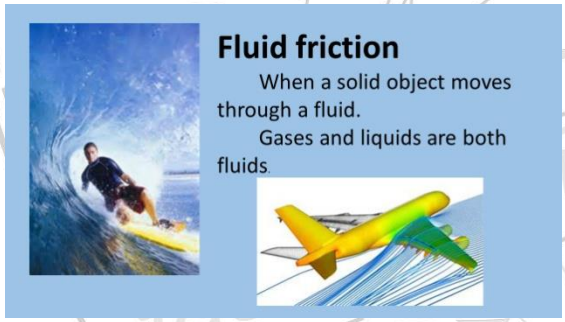
- **Rolling friction** is defined as the force of friction between two surfaces in contact when one of them is _____ over the other. eg. _____

- Sliding Friction is defined as the force of friction between the two surfaces in contact when one of them is _____ on the other .eg. _____

- **Fluid friction or drag** is the fiction exerted by fluids ie. _____ and _____.

  The fluid friction depends on

  - ➢ Nature of the fluid
  - ➢ Shape of the solid body moving in the fluid
  - ➢ Speed of the solid body with respect to the fluid.
  - ➢



- Friction can be decreased in the following ways –

➢ By _____ the surfaces

➢ By applying Grease or _____ on the surfaces

➢ By using wheels , _____ or roller bearings

➢ By streamlining the body of the object.

➢

There are a number of ways to reduce friction:

1. Make the surfaces smoother. Rough surfaces produce more **friction** and smooth surfaces **reduce friction**. ...
2. Lubrication is another way to make a surface smoother. ...
3. Make the object more streamlined. ...
4. **Reduce** the forces acting on the surfaces. ...
5. **Reduce** the contact between the surfaces.

- **Friction can be increased by -**

➢ Making the surfaces _____.

➢ increasing the mass of the moving object.

- **"Friction is considered to be a necessary evil"**

➢ **Friction is <u>necessary</u> for the following reasons-**

➢ **Friction is an <u>evil</u> since ---**

It generates _____leading to energy wastage and minimisation of efficiency in machines.

Friction causes wear and _____ of machinery parts ,tyres, shoe soles etc.

- Sliding friction is smaller than static friction because during sliding the time for interlocking is _____.
- **Streamlining** is a change in the shape of an object moving through a ----------

  to enable it to move easily with ---------- friction.
- Birds and fishes have evolved to have special shapes since----------

  ---

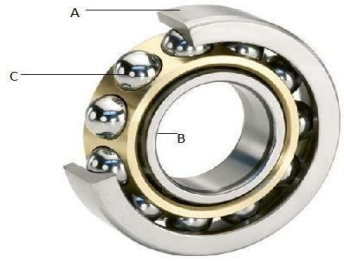
- **BALL BEARINGS**

Ball bearings contain a set of balls between two metallic rings where the ----------ring rotates easily while the ----------ring is static. It can be used to support a rotating shaft that is fixed to the inner ring of a ball bearing.

The shaft and **inner ring rotate** together while the **outer ring** remains stationary**.**

Bicycles, DVD players, water pumps, washing machines and fans are just a few of many day to day products that we use that use **ball bearings**.

In the given diagram of ball bearings label the parts A, B and C.



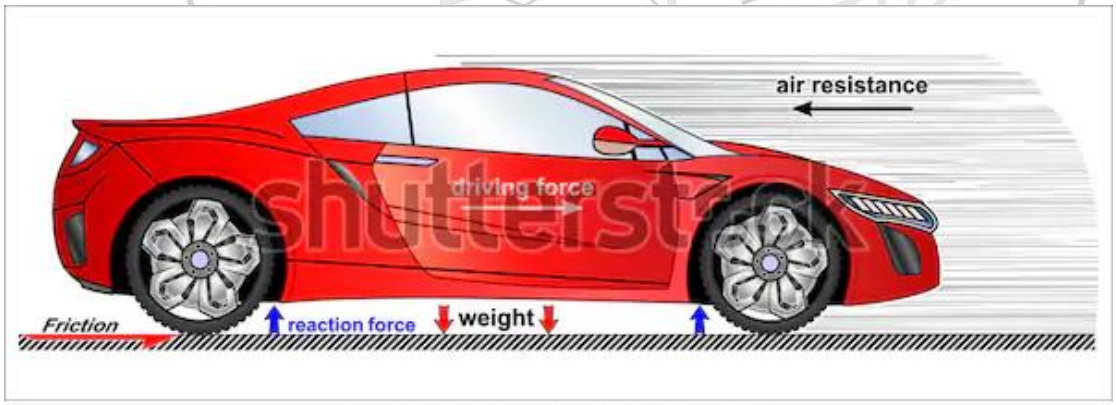
FUN ACTIVITY

1. Make a straight track on ground for a battery operated toy car. Coat the track one by one with different materials like sand, paper, cardboard, stones, mud, etc. and move the car from one end of the track to another. In each case, measure the distance travelled by the toy car and the time taken to cover that distance.

Observation table

Track material	Distance travelled	Time taken	Distance travelled/ time
Sand			
Paper			
Cardboard			
Stones/ mud			

Conclusion :



Chapter – 12

FRICTION

ACTIVITY 1

Aim – To determine the factors affecting friction.

Materials required – a block of wood with a hook, a spring balance, a sheet of glass/ cellophane sheet, a large sheet of coarse sandpaper, weights, two round pencils, and a large table.

Theory –

Method

1. Pull the block of wood gently across the tabletop with the spring balance.

2. Note down the reading on the spring balance ----------. This tells you the force needed to pull the block.

3. Place the sheet of glass or cellophane on the table and pull the block of wood over it. Note down the reading. ----------

4. Now place the sandpaper on the table, with the rough side up and pull the wooden block over it. Note down the reading on the spring balance. ----------

5. Finally, place the wooden block over the two round pencils and pull it with the spring balance. Again note the reading. ----------

6. Repeat the whole activity, with some weights over the wooden block on each type of surface. And note down the readings. ----------

Observation table

Type of surface	**Force in Newtons required to move the wooden block.**
Tabletop	
Glass/ cellophane sheet	
Sandpaper	
Using pencils as rollers	
Adding weights on the block	

Conclusion - (i) Friction depends on:

a. _____

b._____

Chapter – 12
FRICTION
ASSIGNMENT 12.1

1. Which of the following is not used to reduce friction?
   (a) ball bearing
   (b) lubricant
   (c) air cushion
   (d) saw dust
2. When two surfaces are rubbed against each other, _____.
   (a) heat is produced
   (b) wear and tear takes place
   (c) surfaces become smooth
   (d) nothing happens
3. On decreasing the weight of an object, friction _____.
   (a) decreases
   (b) increases
   (c) remains unaltered
   (d) vanishes
4. Streamlining reduces _____.
   (a) static friction
   (b) sliding friction
   (c) rolling friction
   (d) fluid friction

5. Which of the following is not true about friction?
   (a) It wears down an eraser
   (b) It helps us to walk
   (c) It helps a ship to sail through water
   (d) It heats up our palms when rubbed.

6. The hinges of a creaking door are oiled to _____.
   (a) to keep them clean
   (b) to keep them rust free
   (c) to maintain their shine
   (d) to reduce noise and wear and tear

7. The easiest way to shift a heavy carton from one place to another is_____.
   (a) tie it with rope and pull
   (b) ask more labourers to push it
   (c) Put it on trolley
   (d) Split it up into parts

8. A car skids on a wet road because _____.
   (a) water increases the friction between road and tyres
   (b) water decreases the friction between road and tyres
   (c) it is not possible to apply brakes on wet road
   (d) brakes are ineffective on wet road

9. It is not possible to open a bottle's lid with oily hands because due to friction _____.
   (a) surface becomes sticky
   (b) surface becomes rough
   (c) surface becomes smooth and slippery
   (d) none of these.

10. Circle the odd one out and justify scientifically:-
   1. oil, grease, sand, graphite, powder

   2. sole of shoe, tyre of car, surface of road, oily hands

   3. ball bearing, trolley, bags with rollers, wooden box, toy car

Name the forms of friction exerted, as seen in the given figures.

Sliding friction

Chapter – 12
FRICTION
ASSIGNMENT 12.2

1. Give reason for each of the following:

a. Gymnasts rub mud on their palms. ----------

---

b. Ships are made streamlined. .----------

---

c. Studs are provided in football shoes. ----------

---

d. Tyres are provided with treads. ----------

---

e. It is convenient to pull luggage fitted with rollers. ----------

---

f. A large sized brake on a bicycle is as effective as a small brake provided material of brakes remain same. ----------

---

g. Aircrafts and ships have pointed fronts. ----------

State whether presence of friction is helpful or troublesome, as seen in the following pictures. Justify your answers.

Chapter – 12
FRICTION
ASSIGNMENT 12.3

1. Name the two surfaces between which friction plays a ton ole in the following cases:-

   a. A boy slips on stepping on a banana peel.

   b. A student writes, using a chalk, on a board

   c. A man turns the lid to open a bottle.

   d. The screw remains gripped to the wall.

2. Fill in the blanks with an appropriate lubricant used in each of the following cases :-

   a. Asha removes her bangles easily by applying _____ on her hands.

   b. Rashi puts some _____ on the carrom board.

   c. Piyush applied _____ on the chains of his bicycle to prevent wear and tear.

   d. _____ in our mouth helps us to swallow food.

   e. The shafts of rotating machines are mounted on _____ to reduce friction.

3. Wear and tear due to friction depends on two factors. What are they?
   _____
   _____
   _____

4. Why is it is easier to stir a glass of lemonade as compared to a glass of honey?
   _____
   _____

5. Imagining that friction is non-existent, write down or draw two or three situations that will make our life difficult?

Chapter – 12
FRICTION
Assignment 12.4

1. In which direction is frictional force applied with respect to the motion of an object?

2. Which is easier – to move a box from rest or to move it when it is already in motion? Justify your answer.

3. What are the effects of friction?

4. Mention two ways each of (a) increasing friction (b) decreasing friction.

5. Fill in the blanks with words 'increase' or 'decrease':-

   a. The treaded tyres of trucks _____ the friction between the tyres and the ground.

   b. Gymnasts apply a coarse substance in the hands to _____ the friction for better grip.

   c. Kabaddi players rub their hands with soil to _____ friction for better grip.

   d. Fine powder is sprinkled on carom board to _____ the friction.

   e. A motor mechanic uses grease between moving parts of machines to _____ the friction.

   f. The use of lubricants _____ friction.

6. What are the factors on which fluid friction depend?

7. Mention three situations where friction is undesirable.

8. On what principle do ball bearings work?

H.O.T.S

Maglev trains move without touching the ground and hence face no friction due to the ground. What does Maglev stand for? Name the form of friction experienced by them?

Chapter – 12
FRICTION
Assignment 12.5

ACROSS

1. Another name for fluid friction (4)
2. A necessary evil (8)
3. _____ friction is the least (7)
4. _____ friction is the most (6)
5. Force required to move the object with same speed ____ friction (7)

DOWN

6. Used to reduce friction between two surfaces (9)
7. Gymnasts apply coarse substance on hands to _____ friction for better grip. (8)
8. Sprinkling powder on carrom board _____ friction (7)
9. Design used to reduce fluid friction (12)
10. _____ converts sliding friction into rolling friction (4,7)

9.												1.
								3,8				
												10.
							6.	5.				
										7.		
											2.	
								4.				

Chapter – 17
STARS AND THE SOLAR SYSTEM
Assignment 17.1

1. Rewrite the following statements correctly:-

   a. Halley's comet is seen after every 76 centuries.

   ---

   b. Helium gas constitutes most of the sun and other stars.

   ---

   c. The unburnt part of meteor, which reaches the earth, is called meteoroid.

   ---

   d. Asteroids are present between orbits of Saturn and Jupiter.

Match the following:- Pick up the correctly matched word from column B and write them in the second column.

Column A		**Column B**
Hunter		Stars
Long tail		Constellation
Spins sideways		Orion
Pole star		Comets
Galaxy		Uranus
Jupiter		Milky way
Ursa major		Polaris
Twinkle		Giant planet

2. Answer in one word:-

   a. Name the comet which is expected to be seen in 2062 from earth.

   b. Name the nearest planet from the sun.

   c. Name the star which does not appear to move from earth.

   d. Name the constellation which resembles a distorted W or M.

   e. Name the planet having the special feature- the great red spot.

   f. Which planet is also called the red planet?

   g. Name the planet with only one moon.

   h. Name the two planets that rotate from east to west.

   i. Name the planet that is hidden most of the time in the glare of the sun.

   j. Name the constellation that helps in locating the brightest star, Sirius.

   k. Name the heavenly body which revolves around a planet.

   l. What are meteors commonly known as?

   m. Can we hear on the moon? Justify your answer?

3. What are the characteristic features of inner planets?

4. What are the characteristic features of outer planets?

5. How will you identify a comet in the night sky?

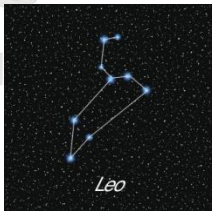
6. Name one constellation each seen in summers and winters.

7. Draw neat figures to show the following constellations-

Orion

Great Bear

Cassiopeia



Leo

Chapter – 17

STARS AND THE SOLAR SYSTEM

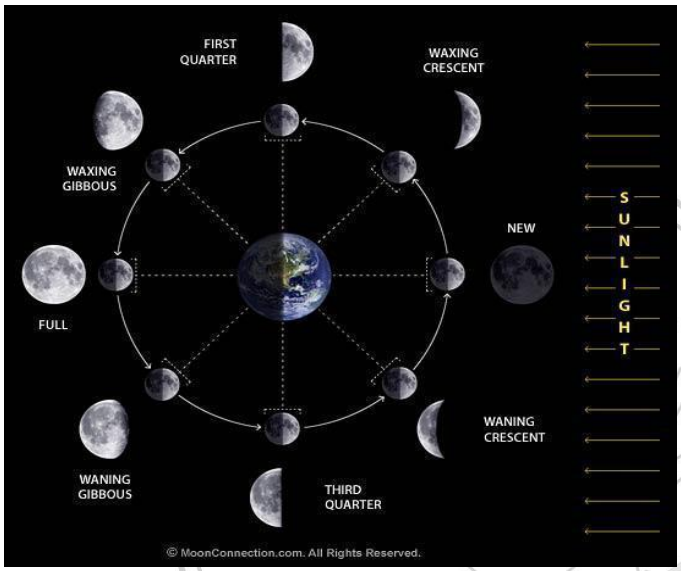
Assignment 17.2

1. What are celestial bodies? Name any three celestial bodies.
2. Name a star which appears stationary from the earth.
3. Why is Venus the brightest planet?
4. Distinguish between star and shooting star.
5. Why do comets have a long bright tail?
6. Why does the sun appear to move from east to west?
7. How can we locate pole star in the night sky?
8. Circle the odd one out and justify your answer:-
    a. Ursa Major, Cassiopeia, Pole star, Orion, Scorpio
    b. Stars, moon, planets, comets, clouds
9. Name the planets which can be seen with naked eye.
10. Draw the constellation 'Orion' and write a short note on it.
11. 'The brightest star Sirius is 8.7 light years from the earth'. What does this statement mean?
12. What are the characteristic features of earth which makes life possible on earth?
13. What are the practical applications of artificial satellites?

CHAPTER 17
STARS AND SOLAR SYSTEM
Assignment 17.4

Draw the phases of moon as shown below, on the right hand side of the fig and fill in the blanks with appropriate words:-

Diagram of the Phases of the moon



The various shapes of the bright part of the moon as seen during a month is called the _____ of moon. The time period between one full moon and the next full moon is slightly longer than 29 days.
The moon is not self luminous. It is visible to us since it _____ the light of the sun. Only that part of the moon from which sunlight is reflected towards us is visible to us. Since the moon revolves around the _____ and the earth revolves around the ___ the relative positions of the sun, moon and earth keep changing. The moon completes one _____ around the earth (29.5 days).

As the moon revolves around the earth, we are able to see only the part of the moon which is _____ by the sun and is towards us.
When the rays of the sun fall directly on the moon and the moon is seen as a full disc of light, it is called _____.

As the moon revolves around the earth, the illuminated part of the moon that faces the earth keep reducing gradually from _____ to half moon to _____ moon until the part of the moon facing the earth becomes completely dark and is called _____. This phase where there is a gradual _____ in size of the visible part of the moon is called the _____ phase or Krishna Paksha.

Once again, after new moon, the size of the illuminated part of the moon visible from the earth increases from _____ to Half Moon to _____ moon and finally the Full Moon. This phase where there is a gradual _____in the size of the visible part of the moon as seen from the earth is called the _____ Phase or Shukla Paksha.

Chapter – 17
STARS AND THE SOLAR SYSTEM
Recapitulation Assignment

Answer very briefly-

1. Name the brightest object in the night sky.
2. Give one word for the celestial object revolving around the sun,
3. In which direction does the earth rotate?
4. What is the total number of planets in the solar system?
5. Which is the nearest star from us?
6. What is the main source of heat and light for all planets? What happens to the period of revolution of the planets as the distance of the planet increases from the sun?
7. Name the only natural satellite of the earth.
8. Name the planet nearest to the sun.
9. Which planet appears yellowish in colour?
10. Which is the planet whose density is less than that of water?
11. Which planets are also called outer planets?
12. Name the four planets which are called inner planets.
13. Which planet appears to roll on its sides.
14. Name the only planet where life is known to exist.
15. What is the common feature between Uranus and Venus?
16. Name the planet which can be seen only with large telescopes?
17. Which planet is often called the morning or evening star?
18. Which planet is also called the Red Planet?
19. Which is the brightest planet in the night sky?
20. The earth appears to be of _____ colour from space.
21. Which is the smallest planet of the solar system?
22. Which is the largest planet of the solar system?
23. Which planet can float on water?
24. Which planet has two moons?
25. Which planet is mostly hidden in the glare of the sun?
26. Which planet shows phases just like that of moon?
27. Which planet is often seen near the horizon just before sunrise or after sunset?

Question Bank for Recapitulation

1. Name the forces exerted, as seen in the given pictures. Also state whether they are contact or noncontact forces?

2. Observe the pictures and answer in columns -Agent exerting the force, Object on which it acts, effect of the force.

3. Write in activity format, an activity to show that Pressure in a liquid increases with depth?
4. List down three possible effects of force exerted on an object?
5. Calculate the force by a pile of books that exert a pressure of 225 Pa on a surface of area 25sqm?
6. Explain giving scientific reasons.- (Write down these answers)

a. We are not crushed under the weight of the air above us.

b. A balloon bursts as it goes high in the air.

c. Shoulder bags are provided with wide straps.

d. The pillars of bridges and flyovers have a broad base.

e. A fruit can be cut into thin slices using a sharp knife.

f. Porters place a round piece of cloth on their heads.

g. The foundation of a high rise building is wide.

h. Tools meant for cutting and piercing have sharp edges.

i. People living in plains suffer from nose bleeding as they go to high altitudes.

j. It is easy to convenient to pull luggage fitted with rollers.

k. Ball bearings are used between hubs and axles of ceiling fans.

l. The shape of an aeroplane resembles that of a bird.

m. It is difficult to tie a knot in a silk thread.

n. The moving parts of machines are oiled from time to time.

o. Wheels of automobiles are made circular.

p. Grooves are made in the tyres of vehicles.

7. Fill up the blanks after rewriting the sentences.

a. Three forces that can act from a distance are _____, _____ and _____.
b. Force per unit area is called _____.
c. If the same force is made to act on a larger area, the pressure _____.
d. Pressure in a liquid _____ as the depth increases.

8. How can the brightest star, Sirius be located in the night sky?

9. Give three differences between planets and stars.

10. Why does Uranus appear to roll on its sides?

11. Mention three applications of artificial satellites?

12. Draw neat diagrams to show -

Summer constellation

Winter constellation

Phases of the moon

CHAPTER 16
LIGHT
Assignment 16.1

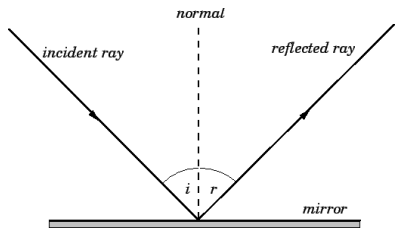
Light is a form of energy. It enables us to see the beautiful world around us. Light has dual nature; it is an electromagnetic wave and it also exists in the form of tiny packets of energy called photons.

- The white light of the sun visible to us is a mixture of _____ colours . (VIBGYOR).
- The spectrum of the sun consists of the Ultraviolet radiation, the visible white light and the _____ radiation.
- The bouncing back of light when it falls on a smooth surface is called _____.
- The laws of reflection are
    - The incident ray, the reflected ray and the normal at the point of incidence, all lie in the same _____.
    - Angle of incidence = Angle of _____
- When an object is placed between two mirrors at 90^{o} to each other, the number of images seen through the mirror is _____.
- Periscope is based on the principle of _____of light.
- Diffused reflection occurs when light is reflected from a _____ surface.
- We get an infinite number of images if two plane mirrors are placed _____.
- In a _____ , beautiful patterns by coloured glass pieces can be seen.
- _____ reflection takes place from a cinema screen.
- If the angle between the incident ray and the reflected ray is 60 degree, then the angle of incidence = _____.
- The image formed by a plane mirror is :
    - ➢ erect
    - ➢ of the _____ size as the object
    - ➢ _____ (cannot be taken on a screen)
    - ➢ laterally inverted ie. the left hand side of the object appears to be _____ hand side of the image and vice versa.
    - ➢ as far behind the mirror as the object is in front.

CHAPTER 16
LIGHT

ACTIVITY 1- LAB ACTIVITY

Aim: To verify the laws of reflection



Materials Required: Plane mirror, wooden board, sheet of white paper, laser torch, pencil, protractor

Theory: The two laws of reflection are:-

1. The angle of incidence is always equal to the angle of reflection
2. The incident ray, the normal at the point of incidence and the reflected ray, all lie in the same plane.

Diagram:

Procedure (Write in steps, after observing the demonstration)

Angle of reflection	**Observation Table**: of incidence

Conclusion:

1.---

---

2. The incident ray, the normal and the reflected ray lie in the same _____

CHAPTER 16
LIGHT

ACTIVITY 2. **LAB ACTIVITY**

Aim : To view multiple images by multiple reflection by using plane mirrors.

Materials Required: 2 plane mirrors, 1 pencil or sketch pen, a white sheet of paper, wooden board

Theory:

Procedure:

1. Place the paper on the wooden board.
2. Draw a horizontal line on it and mark its centre as O
3. From O, draw a perpendicular to the horizontal line.
4. Place a pencil on the vertical line.
5. Place 2 plane mirrors on both sides of the pencil with the edges of mirrors touching O at different angles.
6. Each time the mirrors are placed at an angle, count the number of images formed.
7. Repeat this for 3-4 times.
8. Now place the mirrors parallel to each other and count the number of images formed.

Diagram .Read the steps in the Procedure and draw the figure.

Observation:

S No	Angle between the mirrors.	Number of images
1		
2		
3		
4		

Conclusion:

CHAPTER 16

LIGHT

Assignment 16.2

1. A ray of light AB strikes a plane mirror MM′ at B and is reflected along BC. Draw the ray diagram and complete the following sentences:-

a. The ray AB which strikes MM at B, point B is called_____.

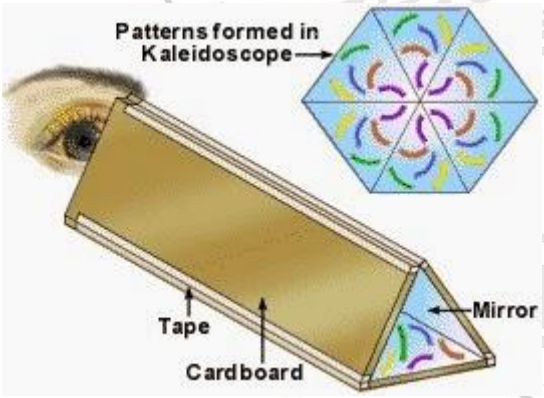
b. The bounced ray BC from B is called _____.

c. The line BD which is perpendicular to MM′ is called the _____.

d. The angle between AB, _____ and BD, _____ is called the _____.

e. The angle between BD, _____ and BC, _____ is called the _____ .

3. What is a Kaleidoscope? Write its principle.



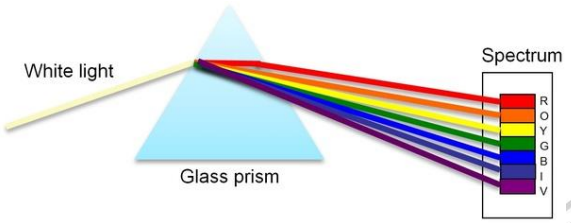
_____

_____

Chapter 16
LIGHT

LAB ACTIVITY

Aim: To show dispersion of light.



Materials Required: Prism, white light/ sunlight, screen

Theory: The phenomenon of splitting of white light into its constituent colours is known as dispersion.

Diagram:

Procedure:

1. One of the non-parallel face of the prism is focused towards sunlight at an angle and is held at the position.
2. Observe the screen placed on the opposite side.

Observation:

Conclusion: Sunlight splits into _____.

Name a natural optical phenomena that is seen due to dispersion of light----------

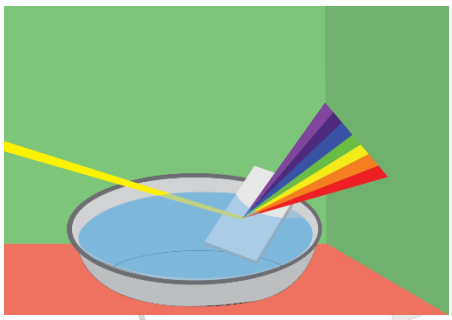
Define Spectrum.

Try it out!

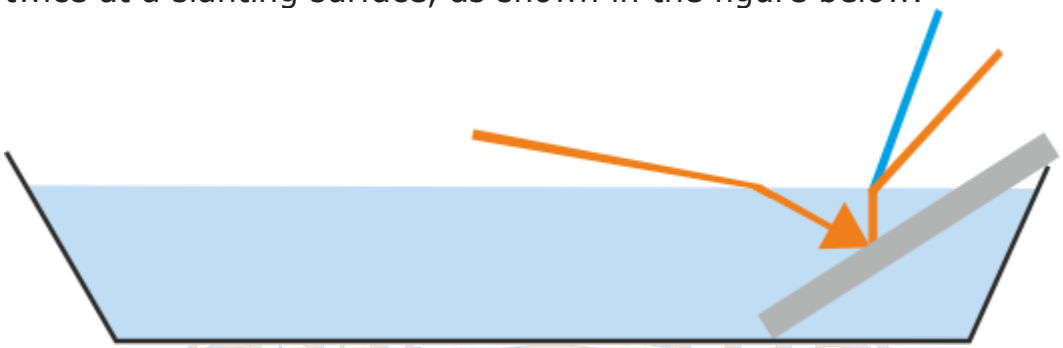
Make a rainbow without a prism

You can obtain a spectrum without a prism. For that you need a deep pan with a flat base. Place this pan where there is direct sunlight. Place a plain mirror in the pan as shown in the diagram so that you see sunlight reflected on your ceiling or on a white wall. Next, slowly pour water in to the pan.

At one point you will get a beautiful rainbow coloured spectrum on the wall.

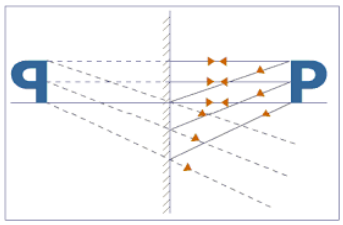


Can you guess how a rainbow is made in this case?
Here, water and mirror combined act as a prism, forcing light to bend twice at a slanting surface, as shown in the figure below.



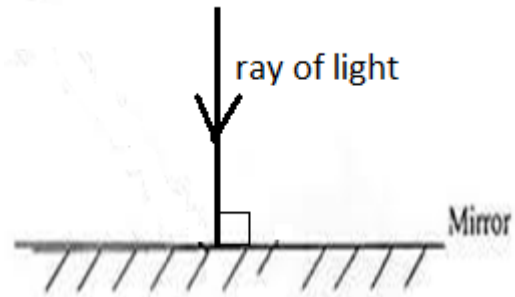
CHAPTER 16
LIGHT
Assignment 16.2

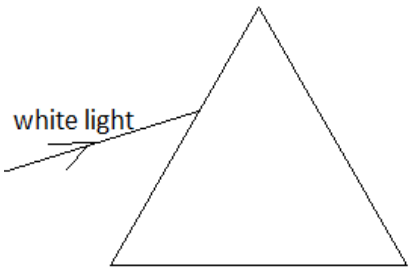
1. Which characteristic of image formed by plane mirror is shown in each of the following figures:-



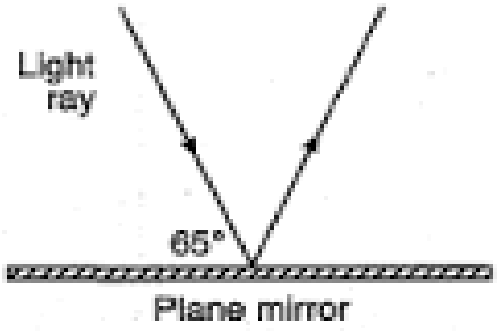
_____

2. Complete the following figures, label it and write the key on its right:-

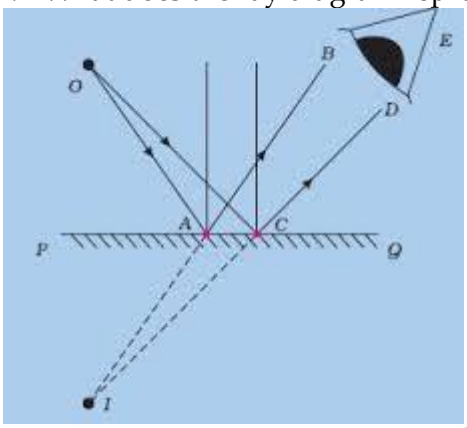




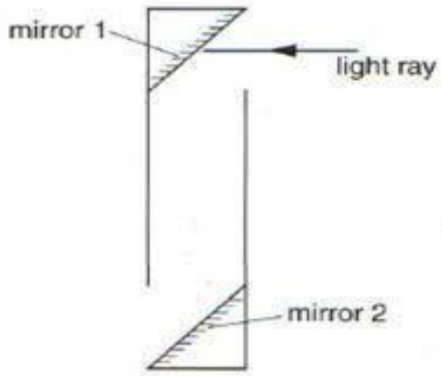
3. In the given figure, calculate the angle of reflection.



4. What does the ray diagram represent? Write its key.



5. Draw the reflected ray from the mirror 2 and complete the diagram.
This alignment of plane mirrors is used in which device? Mention one application of this device?

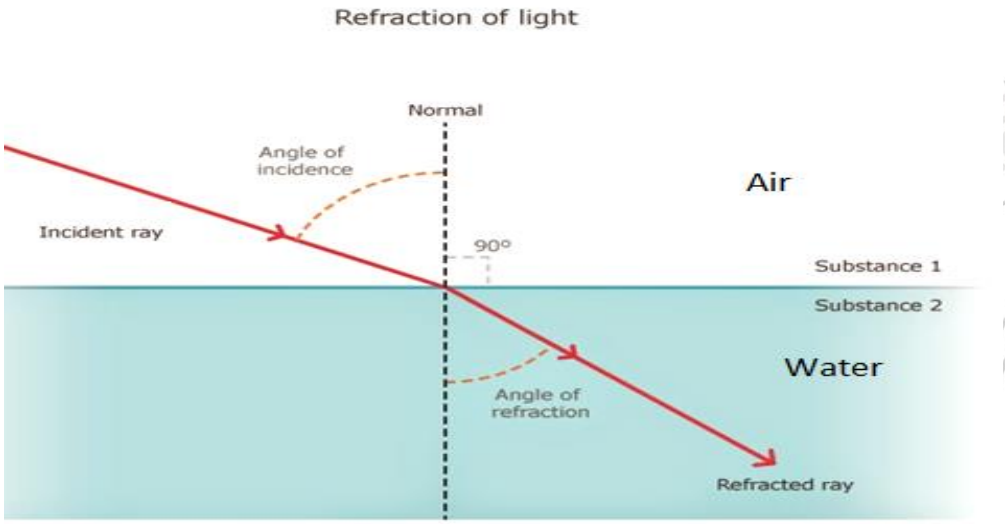


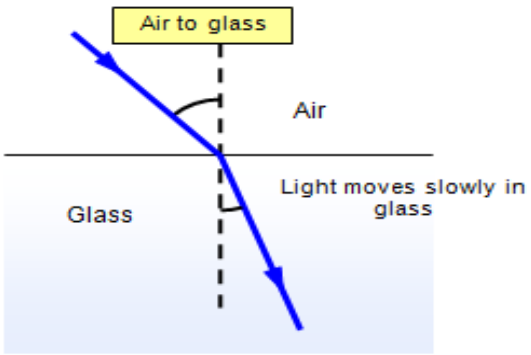
CHAPTER 16
LIGHT

INTRODUCTION TO THE CONCEPT OF REFRACTION

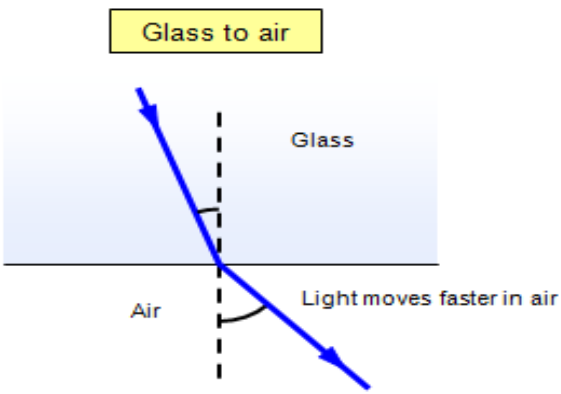
Assignment 16.3

- When light passes from one medium to another it changes its path, this phenomenon is called _____.
- Refraction occurs because speed of light changes in different media.
- The speed of light is _____ in a denser medium than in a rarer medium.
- When a ray of light passes from a rarer to a denser medium, it _____ towards the normal.
- When a ray of light passes from a denser to a rarer medium it moves _____ from the normal.



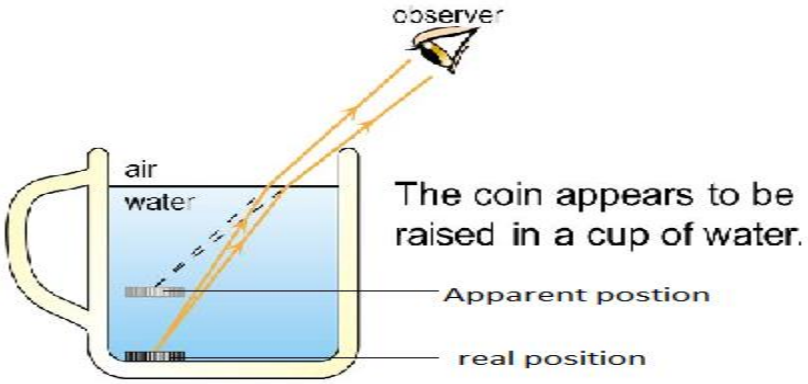


Refraction from rarer to denser medium

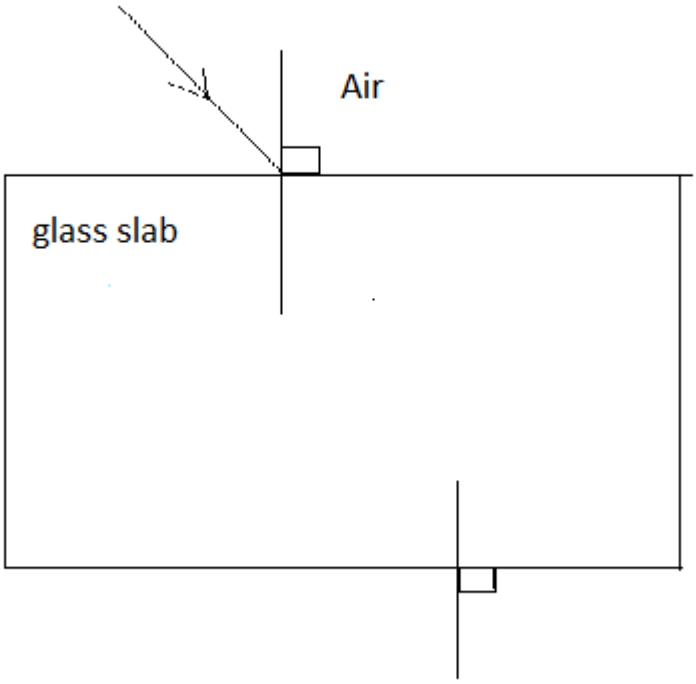


Refraction from denser to rarer medium

- Why does a coin in water appear higher than its actual position?



Complete the following ray diagram and label it.



CHAPTER 16
LIGHT
REFRACTION

ACTIVITY

Aim : To study refraction through a glass slab.

Materials Required: **Theory:** A rectangular glass slab, a laser light , pencil, ruler.

Procedure:

1. Place the glass slab in the centre of a sheet paper.
2. Using a pencil, draw the outline of the glass slab.
3. On one side, draw a line showing the incident ray.
4. Using a laser light, pass the light through the glass slab and make atleast three points in light ray seen on the other side of the slab.
5. Join these points to draw the emergent ray.
6. Produce the incident ray (dotted) and mark the lateral displacement in the path of light.
7. **Read the steps in the Procedure and draw the figure with the ray directions.**

Figure

Observation:
The incident ray is parallel to the emergent ray.
The lateral displacement in this case is _____.

Conclusion:
When a ray of light passes from a _____ to a _____ medium it, it bends towards the Normal.
When a ray of light passes from a _____ to a _____ medium , it moves away from the Normal.

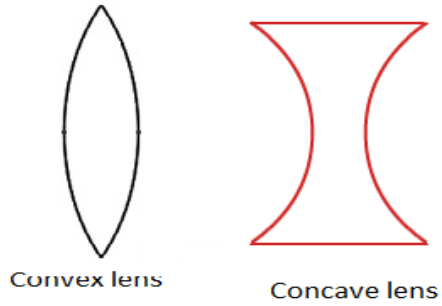
Chapter – 16
LIGHT

INTRODUCTION TO THE CONCEPT OF LENSES

Spherical lenses

A spherical lens is a transparent refracting object whose either one or both refracting surfaces are spherical.

There are two Types (major) of spherical lenses-



The convex lens is used as a magnifying glass. It is also used in binoculars, microscopes, telescopes, overhead projectors, etc.

The convex lens is a converging lens as it collects or converges the parallel beam of light passing through it at a single point. This point is called the principal focus of the convex lens.

Converging lens

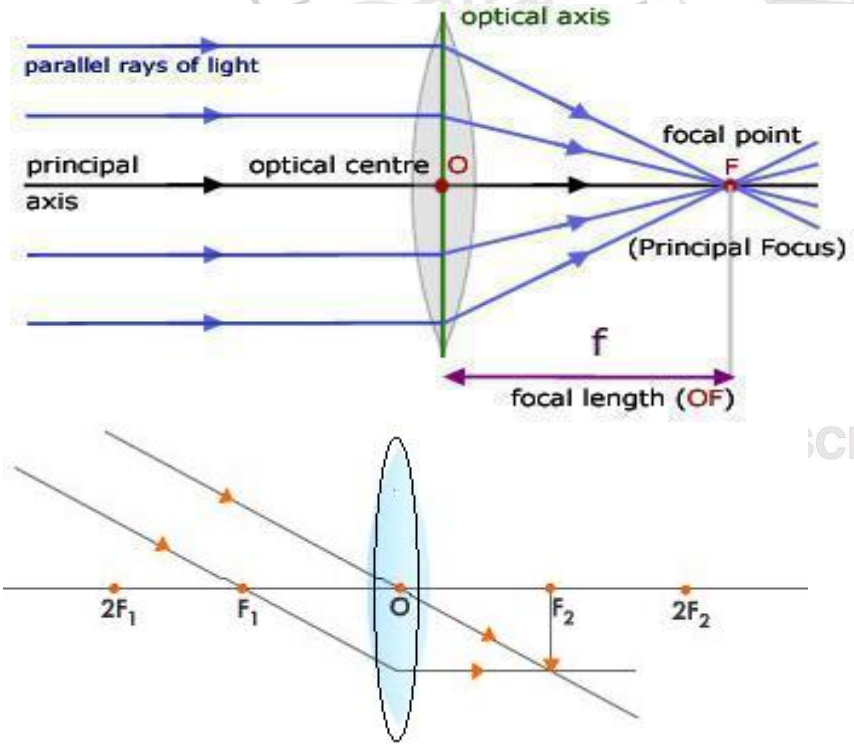


Image formed is real, smaller and inverted.

Chapter – 16
LIGHT
Assignment 16.4

1. Fill in the blanks :-

   a. The _____ nerve carries the impression on the retina to the brain.

   b. The image formed by a plane mirror is _____ inverted.

   c. Cataract is the condition that affects the _____ of the eye.

   d. We get _____ images with two plane mirrors placed parallel to each other.

   e. The Normal makes an angle of _____ with the plane mirror.

   f. The light sensitive cells on the retina are called _____.

   g. The colour of the eye is due to _____.

   h. The impression of an image persists for _____ of a second.

   i. Cataract effects the _____ of human eye.

2. Give one word for the following:-

   a. A kind of reflection in which reflected rays travel parallel to one another.

   b. A reflection taking place from the walls of a room.

   c. Phenomenon of splitting of white light by a plane mirror immersed in water at an angle of 45^{o} .

   d. A special script designed for reading for visually challenged people.

   e. This part of eye acts as window to the world.

   f. Light sensitive screen at the back of eye where image is formed.

   g. Its function is to carry optical messages to the brain.

   h. Its function is to alter the focal length of the crystalline lens.

Chapter – 16
LIGHT
Assignment 16.5

1. What is cataract? How is it treated?

---

2. Mention 3 important measures to ensure proper eye care.

---

3. Why is the blind spot so called?

---

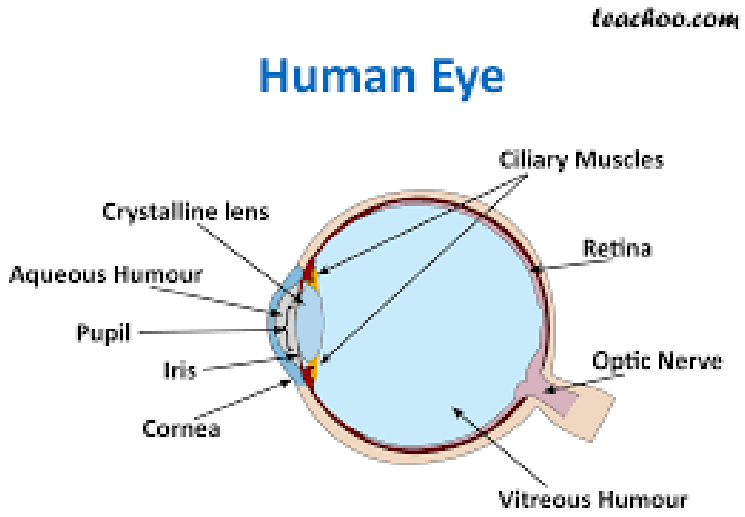
4. If a ray strikes at an angle of **42** degrees with a reflecting surface, what will be the angle of reflection. Draw a figure to show the same.

---

5. If the angle between the incident and reflected ray is **75** degrees, determine the angle of reflection. Draw a figure to show the same.

---

6. Define Dispersion.



7. Complete the following table-

Description and Functions	**Part of the human eye.**
It is the front transparent membrane of the eye. It permits light into the eye and causes maximum refraction of the light rays.	Cornea
	Iris
	Pupil
	Eye lens
	Ciliary muscles

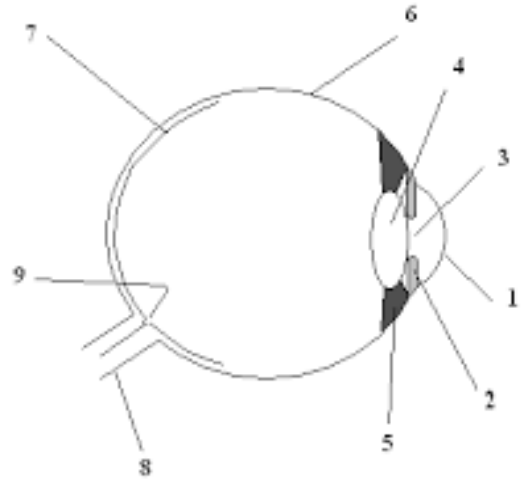
	Retina
	Optic nerves
	Blind spot

Define-
Persistence of vision-

Myopia

Hypermetropia

CHAPTER 16
LIGHT
Assignment 16.6



Label the diagram of human eye

1. Answer the following questions:-

(a) What is the distance between man and chair?

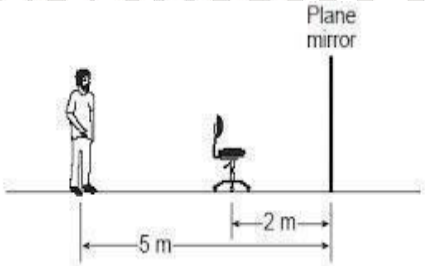
(b) What is the distance between the chair and its image?

(c) What is the distance between the man and his image?

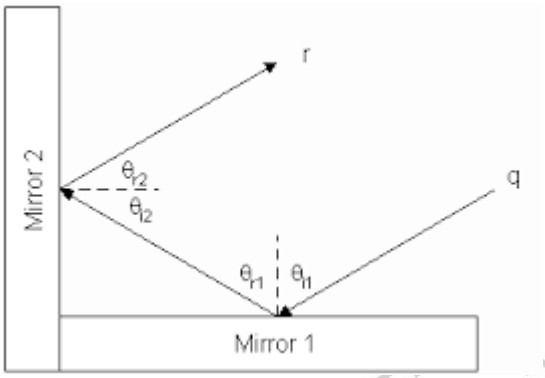
(d) What is the distance between the image of chair and the mirror?

(e) What is the distance between the image of man and the mirror?

(f) What is the distance between the image of man and image of chair?



1. If the angle of incidence in mirror 1 is 70^0, find the angle of reflection in mirror 2.



3. Name the parts of human eye and complete the following:-

_____ → _____ → _____

light enters → muscles control pupil → opening through which light enters eye

↓

_____

light gets finely focussed

↓

_____ ← _____ ← _____

Decodes message ← carries sensation to brain ← inverted image is formed on it

4. Myopia (or short-sightedness) is the defect due to which a person is not able to see the _____ objects clearly, though he can see the nearby things clearly.

- Hypermetropia (or long-sightedness) is the defect due to which a person is not able to see the _____ objects clearly, though he can see the distant objects clearly.
- Myopia (or short-sightedness) can be corrected by using spectacle made from _____ lenses of suitable focal length.
- Hypermetropia (or long-sightedness) can be corrected by using spectacle made from ____lenses of suitable focal length.

H.O.T.S.

Oil spilled from a vehicle on a wet road after rainfall appears coloured. Why?

Most of the light reflected from objects around us is due to diffused reflection. What would happen if all objects around us are plane, smooth and highly polished?

We know that angle of incidence is equal to angle of reflection for a plane mirror. Is this true for curved polished surfaces?

Louis Braille - As a small child, he was blinded in an accident; as a boy he developed a mastery over that blindness; and as a young man – still a student at school – he created a revolutionary form of communication that transcended blindness and transformed the lives of millions.

After two centuries, the braille system remains an invaluable tool of learning and communication for the blind, and it has been adapted for languages worldwide.

The 200th anniversary of Braille's birth in 2009 was widely celebrated throughout the world by exhibitions and symposiums about his life and achievements. Belgium and Italy struck 2-euro coins, India struck a 2 rupee coin, and the USA struck a one dollar coin to mark the event.

Enlighten yourself about the following facts.

The Differences Between the Human Eye & a Camera Lens

The human eye and a camera lens have a few things in common, most notably that they both use a converging lens to receive and project images. But human eyes and camera lenses have many things that set them apart from each other.

Retina Provides Color

- The image an eye perceives is projected from the cornea to the retina, which absorbs the image and projects it to the brain. A camera projects an image on to film where it is captured and saved as a black and white image. The retina contains millions of cones that provide the image with color.

Stereoscopic View

- The biggest difference between eyes and a camera lens is that two eyes give us stereoscopic vision. This allows our eyes to project a more detailed image to the brain than a single camera lens and provide depth of field, something a single camera lens can't do.

Light Sensitivity

- A camera lens projects an image onto film that has chemicals with a uniform sensitivity to light. The eye project images on to the retina that has rods with varying capacities to absorb light.

Light Adjustment

- The human eye controls how much light it receives by reducing and enlarging the size of the pupil. A camera lens has to be adjusted to receive the proper amount of light.

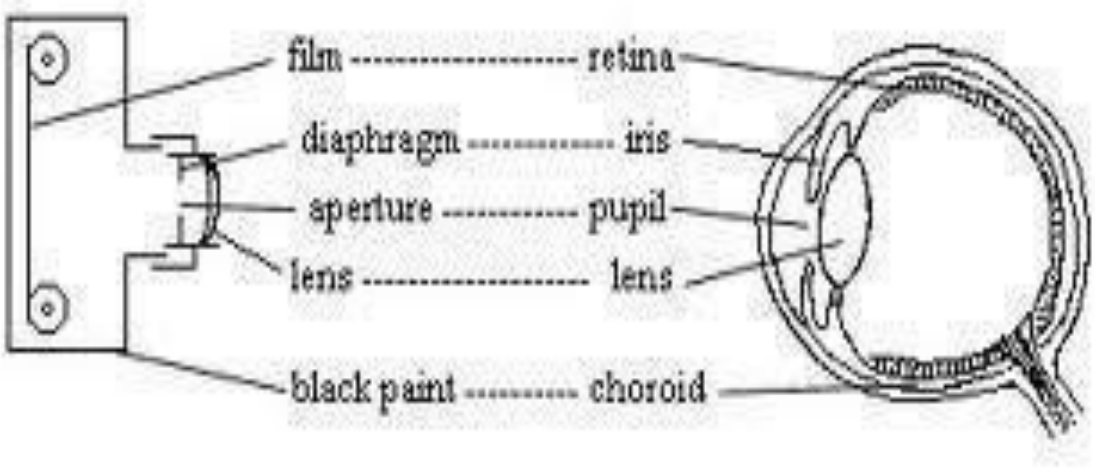
Cameras Have no Blind Spot

- The human eye has a "blind spot" located where the optic nerve leaves your eye and connects to the brain. At that connection point, the eye can't see anything. A camera lens doesn't have a connecting point like this and has no blind spot.

Similarities Between the Eye and the Camera

First of all, both of them have an opening at the centre for light to enter; aperture for the camera and a pupil for the eye. The camera has a diaphragm to control the size of the aperture(to control the amount of light entering camera/eye) while the eye has iris muscles to control the size of the pupil. Cornea is the main part of the eye(included are lens, aqueous and vitreous humor) that functions to refract light as a glass biconvex does in the camera. Photosensitive chemicals on film(camera) and photoreceptors in the cornea(eye) are the objects of light action to form image. The last similarity is that they both absorb excessive light to prevent multiple images formation using a dark internal surface in the camera and a pigmented, dark choroid in the eye.

Structural comparison between human eye and a camera



Chapter - 13

SOUND

ACTIVITY 1

Aim : Sound is produced by a vibrating body.

Materials required :

Theory:

Diagram :

Procedure:

1. Strike the tuning fork on the rubber pad and bring it close to your ear.
2. Strike it again on the rubber pad and touch the surface of water kept in the beaker with one of its prongs.

Observation :

1. When the tuning fork is brought close to the ear, _____
2. When the prongs of the tuning fork is allowed to touch the surface of water, _____.

Conclusion : _____.

- Rapid to and fro or back and forth motion of an object is called **vibration**.

Identify the musical instruments shown in the pictures and state the vibrating part of the instrument.

Name of instrument **Vibrating part**

1.

---------- ----------

2.

---------- ----------

3.

- ---------- ----------

4.

---------- ----------

5. ---------- ----------

6.  ---------- ----------

7.  ---------- ----------

8.  ---------- ----------

9. 

10. ---------- ----------

---------- ----------

11.

. ---------- ----------

Chapter - 13

SOUND

ACTIVITY 3

Aim : Sound needs a material medium to propagate

Materials Required : Metal glass with narrow mouth, mobile / bell

Theory:

Diagram:

Procedure :

1. A ringing mobile is kept inside the glass and is heard.
2. Air inside the glass is sucked out with the ringing mobile still inside and heard.

Observation :

1. The sound of the ringing mobile is _____ when it is kept inside the glass.
2. When air is sucked out slowly from the glass, _____

   _____.

Conclusion : _____.

Note : If the air is sucked out completely, vacuum will be created inside the glass and the sound of the ringing mobile will not be heard at all as sound does not travel through vacuum.

Chapter – 13

SOUND

Assignment 13.1

1. How is sound produced by humans?

In humans, sound is produced by the organ called _____ or larynx. It is located at the upper end of the _____. Inside the voice box, _____ vocal cords are stretched across such that it leaves a narrow slit between them for the passage of air. When the lungs force air through the slit, the vocal cords _____ producing sound.

_____ of sound produced depends on whether the ----------are tight or loose. Muscles attached to the vocal cords can make them tight or loose. The sound is further modulated by the air chamber of mouth and nose.

Some points to remember:-

- Sound travels _____ in gases, faster in liquids and _____ in solids.
- Sound _____ travel through vacuum.
- Speed of sound in ---------- is 340 m/s approximately. It changes with atmospheric conditions like temperature, atmospheric pressure, humidity, etc.
- Speed of light in air/vacuum = 3×10^8 m/s
- The speed of sound in air depends on temperature. More the temperature , _____ is the speed of sound in air.

Characteristics of sound

1. **Loudness –** It depends on the _____ of vibrations. Large amplitudes produce loud sounds whereas small amplitudes produce soft sound.

2. **Pitch –** Pitch of a note depends upon the _____ of the sound. A high pitch sound has high frequency and vice versa.

   High pitch » high frequency » sharp, shrill voice. Eg. Women 's voice
   Low pitch » low frequency » heavy, hoarse, blunt voice. Eg. Men's voice

3. **Quality –** It is the characteristic of sound that depends on the nature of the vibrating material or particles.A violin and guitar may produce the sound of same loudness and pitch but still their sounds differ in their quality.

Musical Instruments

They are classified into three types depending on the kind of vibrations produced.

1. **Stringed instruments –** Vibrations in the _____ produce sound. The frequency of vibration is changed by changing the thickness, tightness and length of the wires. Eg – Guitar, *sitar*, violin, *sarod*, *veena*, etc.

2. **Wind instruments** – Vibrations in _____ produce sound. The frequency of vibration is changed by changing the length of vibrating air columns. Eg – Flute, mouth organ, clarinet, *shehnai*, etc.

3. **Percussion instruments –** Vibrations of the _____ produces sound. The frequency of vibration can be increased by stretching the membrane more. The loudness can be increased by striking the membrane harder. Eg – Tabla, drum, mridangam, etc.

Music – 1. Regular vibrations produce musical sound

2. Soothing, pleasant, refreshing

Noise – 1. Irregular vibrations produce noise

2. Irritating, unpleasant, tiring

H.O.T.S.

When can music become noise?

Chapter – 13

SOUND

Assignment 13.2

Multiple choice questions:-

1. Sound travels fastest in _____.
   (a) air
   (b) water
   (c) vacuum
   (d) solids
2. Decibel is the unit to measure _____.
   (a) pitch
   (b) frequency
   (c) loudness
   (d) quality

3. The SI unit of frequency is _____.
   (a) second $^{-1}$
   (b) hertz
   (c) mega hertz
   (d) decibel

4. Which of the following frequency of sound is inaudible?
   (a) 50 Hz
   (b) 500 Hz
   (c) 5000 Hz
   (d) 50000 Hz

5. Sound having frequency less than 20 Hz are called _____.
   (a) ultrasonic
   (b) supersonics
   (c) infrasonic
   (d) SONAR

6. In sitar, sound is produced by _____.
   (a) beating
   (b) blowing
   (c) rubbing
   (d) plucking

7. A stretched rubber band vibrates 500 times in 5 seconds. Its frequency is _____.
   (a) 10 Hz
   (b) 100 Hz
   (c) 1000 Hz
   (d) 500 Hz

8. The rapid to and fro motion of an object is called _____.
   (a) periodic motion
   (b) oscillation
   (c) vibration
   (d) both (a) and (c)

9. Curtains, cushions, rugs, etc are _____ of sound
   (a) poor absorbers and good reflectors
   (b) good absorbers and poor reflectors
   (c) only good reflectors
   (d) only good absorbers

10. Complete the following table:-

S No	Source	Shriller	Louder
1.	Drum or guitar		
2.	Roar of lion or tweeting of bird		
3.	Voice of female or male		
4.	Crying baby or shouting man		

Chapter – 13

SOUND
Assignment 13.3

1. Fill in the blanks:-

   a. The loudness is determined by the _____ of the vibrating body.

   b. Sound cannot travel through _____.

   c. Vibrations of frequency less than 20 Hz are called _____.

   d. The number of vibrations completed in 1 second is called _____..

   e. The shrillness of sound depends upon _____.

2. Classify the sound produced by the following into high pitched and low pitched:-

   a. man b. child c. bird

   d. frog e. woman f. whistle

   g.thunder h. mosquito i. drum

   j. flute k. jet plane

3. State whether the following statements are true or false. If false, write down the correct statement.

   a. The audible range of frequency is 20-20,000 Hz.

   b. The louder the sound, the lesser is the amplitude of a vibrating body.

   c. A medium is not necessary for the propagation of sound.

   d. Time in which the vibrating particle completes one vibration is called the time period.

   e. Loudness and duration of a sound determines the amount of noise pollution.

4. Unscramble these letters to make a word (Clue given for each).

   a. AHPR (An ancient stringed instrument) -

   b. ABTS (These animals use sound waves to navigate) -

   c. EIONS (A very harsh sound) -

   d. ACIOLNRSUT (Sound of a very high frequency) -

   e. CEOH (A reflected sound wave) -

f. IDLEUBA (A sound that we can hear) -

g. TUFLE (A wind instrument) -

h. NAILSCOTIOL (To and fro motion of a body) -

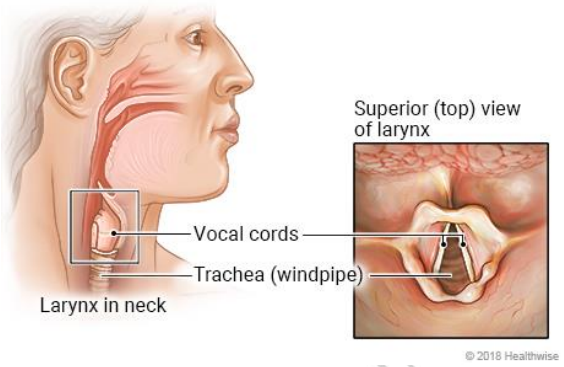
i. CMSUI (Sounds that have a soothing effect) -

j. RAYXLN (Another term for voice box) -

5. Classify the following into stringed, percussion and wind instrument:

a. Flute	b. *Tabla*	c. Whistle
d. Clarinet	e. *Shehnai*	f. *Dafli*
g. Congo	h. *veena*	i. Guitar
j. Violin	k. *sitar*	l. *Sarod*

Explain how is sound produced by human beings?



Chapter – 13

SOUND

Assignment 13.4

1. Name the state of matter in which sound travels?

   a. the fastest b. the slowest

2. Name the instrument used in the laboratory to produce sound of fixed frequency.

3. What is the role of ear drum in hearing?

4. What is the unit in which loudness of sound is measured?

5. In space, astronauts use radios to talk to each other. Why?

6. On the basis of production of sound, what is the difference between birds which chirp and bees that buzz?

7. Circle the odd one out and justify your answer:-

   a. amplitude, frequency, time period, Hertz

   b. Violin, bursting cracker, electric drill, honking vehicle

   c. bats, dogs, human beings, deers, monkeys

8. How is the voice of a 5 year old child different from the voice of a 25 year old man?

Characteristics of vibration / oscillation

Amplitude : The maximum displacement from the mean position is called the amplitude. Its SI unit is metre (m).

Time – period (T) : Time taken to complete one oscillation / vibration is called the time period. Its SI unit is **second (s).**

Frequency (*f*) : Number of oscillations in 1 second is known as frequency. Its SI unit is **Hertz (Hz).**

Relationship between *f* and T

$$f = 1 / T$$

Chapter – 13

SOUND

Assignment 13.5

1. An object completes 1800 vibrations in 20 s. Calculate its frequency.

2. Calculate the time period of a vibrating particle whose frequency is 20 Hz.

3. Calculate the frequency of a pendulum whose time period is 3s

ACTIVITY

[LET US DO]
Collect pictures showing the major sources of noise pollution and create a neat collage of the same. Write a brief catchy slogan in Hindi or English on "Creating awareness about harmful effects of noise pollution".

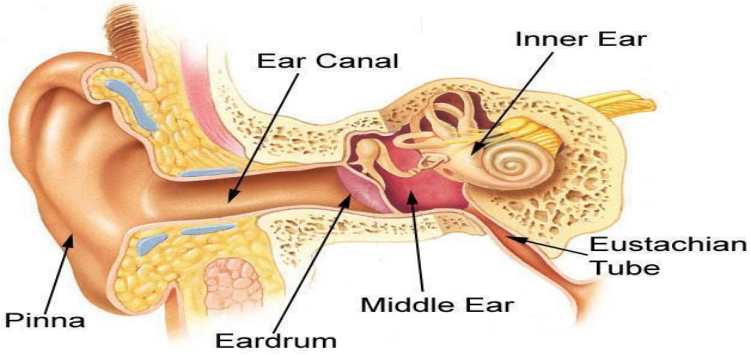
H.O.T.S

Extreme loud sounds can make one deaf. Explain why?

The wires of a guitar are of different thickness. Why?

Chapter – 13
SOUND
Assignment 13.6

Observe and study the parts of the Human ear.



Draw a table and enlist the name and the corresponding functions of the human ear.

2. How do we hear sound through our ears?

The _____ part of the ear channels vibrations down to a thin membrane called _____ which is stretched very tightly. The eardrum then begins to _____ and the vibrations are passed on to _____ tiny bones (the hammer, the anvil and the stirrup) in the _____ ear. From here, the vibrations are passed on to the _____ ear. The inner ear consists of a 34 cm long coiled tube called the _____. It is filled with fluid and contains cells with hairs. These hair cells are very _____ to vibrations. The vibrations are transmitted by the _____ nerve to the brain to register _____.

QUESTION BANK

1. Fill in the blanks :-

e. Sound requires a _____ to travel.

f. A force can _____ a moving body or change the _____ of motion.

g. Pitch of a sound depends on _____ of vibration.

h. Electric charges exert _____ force and magnets exert _____ force.

i. Sounds above 20,000 Hz are called _____.

j. _____ is the time taken to complete one vibration.

2. What is noise pollution? How can it be reduced?
3. Which are the states of matter in which sound travels the fastest and the slowest?
4. Give an example to prove that 'light travels faster than sound'?
5. Describe an activity to show that a body producing sound is in a state of vibration.
6. <u>Rewrite the following statements correctly:-</u>

a. Kaleidoscopes are used by barbers to show the back of the head.

b. Poor vision is caused due to the deficiency of vitamin C.

c. A ray of light which bounces off from the reflecting surface is the incident.

7. State the laws of reflection..
8. Give two differences between real and virtual image.
9. What is the function of ciliary muscles?
10. What is meant by regular and diffused reflection? Give one advantage of each .

RECAPITULATION

Rewrite the given sentences and fill in the blanks, underlining the answer word.

a. An optical device used by sailors, that works on the principle of light reflection from two plane mirrors placed parallel to one another is a----------while that which works using three parallel mirrors inclined at 60 degrees to one another is a ----------.
b. Shrillness of a sound is determined by the ---------- of a sound wave while loudness is determined by the ----------of a sound wave.
c. If the angle between the incident ray and the surface of a plane mirror is 35 degrees, the angle of incidence is ---------- and the angle between incident ray and the reflected ray is ----------
d. Musical notes produced by a guitar is caused by vibrating ---------- while that produced by a tabla is caused by a vibrating ----------.

Q2. Answer in brief-

a. On throwing a pebble into a pond, ripples are observed with water molecules vibrating at the rate of 18000 times per minute.
   i. Determine the frequency and time period of the wave?

   ii. Will this sound be audible to man?
b. How is sound produced by human beings?
c. Rahul stays in a noisy locality and suffers from the ill effects of noise pollution. His friend Reena took the initiative to implement a few measures to control noise pollution in the area.
   i. Suggest three common sources of noise pollution in a residential locality?
   ii. What value is reflected in Reena's action?

FACTOPAEDIA IN PHYSICS

- Although tyres of all vehicles are grooved, the tyres of racing cars are smooth to reduce friction so that they can run faster. These tyres are called slicks.
- Sustained exposure for 8 hours or more at 90-95 dB can result in hearing loss.
- The word 'noise' is derived from a latin word 'noxia' which means 'I do harm'.
- Audible range of some animals

Animal	**Audible Range**
Dogs	as high as 40,000 hz
Cats	100 – 60,000 Hz
Elephants	1 – 20,000 Hz
Grasshopper	upto 50,000 Hz
Mice	1000 – 1,00,000 Hz
Dolphin	upto 1,00,000 Hz
Moth	1000 – 2,40,000 Hz

- Loudness of sound produced by different objects / activities

Object/activity	**loudness in dB**
Silence	0
Breathing	10
Ticking clock/murmuring	30
City traffic	60-90
Subway train	95
Car horn	110
DJ/Rock n roll music	120
Jet engine / Gunblast	140

➢ **Strength of earthquake and its effect**

Richter scale reading	**Nature of earthquake**
0-3.5	May not be felt, can be recorded
3.5-5.4	Often felt, but rarely causes damage
5.5 – 6.0	Slight damage to well constructed buildings
6.1-6.9	Can be destructive in areas upto 10km across
7-7.9	Major earthquake, causes serious damage over larger areas
8 and above	Severe, serious damage across several 100 km

SCIENTIFIC FACTS

➢ Whales in the ocean "sing" to each other. The sound of their song can travel a distance of 800 km.

➢ The earliest seismograph was invented in China, in AD 136, by a man named Choko.

➢ We cannot dive more than 120 m (approx) in water. Water pressure below this level is enough to crush the human body.

➢ Dogs can hear sound at a higher frequency than humans, allowing them to hear noises that we cannot.

➢ A flash of lightning could power a light bulb for a month.

➢ The blue whale can produce sounds up to 188 decibels. This is the loudest sound produced by a living animal and has been detected as far away as 530 miles.

➢ The first coast to coast telephone line was established in 1914.

➢ The largest meteorite crater in the world is in Winslow, Arizona. It is 4150 feet across and 150 feet deep.

➢ The human eye blinks an average of 4,200,000 times a year.

➢ The highest temperature produced in a laboratory was 920,000,000 F (511,000,000) at the Tokamak Fusion Test Reactor in Princeton, NJ, USA.

➢ The hottest planet in the solar system is Venus, with an estimated surface temperature of 864 F (462 C).

- The cosmos contains approximately 50,000,000,000 galaxies.
- There are between 10^{11} and 10^{12} stars in a normal galaxy.
- The microwave was invented after a researcher walked by a radar tube and a chocolate bar melted in his pocket.
- A car travelling at a speed of 80 km/h uses half its fuel to overcome wind resistance.
- There is enough fuel in a full tank of Jumbo Jet to drive an average car four times around the world.
- It takes 70% less energy to produce a ton of paper from recycled paper than from trees.
- Cats have over one hundred vocal sounds, while dogs have only about ten.

Add a few more to this list and write them down here-

SAMPLE PAPER

General Instructions

Q1 carries 3 marks

Q 2, 3 carries 1 mark each

Q 4,5,6 carries 2 marks each

Q 7,8 caries 3 marks each.

Q 9,10 carries 5 mks each.

Read the questions carefully.

Marks will be deducted for not following instructions given in the questions.

Write question numbers as given in the paper and answer in the correct sequence .

PHYSICS **MM-27**

Q1. Write the correct option with the option number in the following:

(A) The sneaker is pulled by the spring balance to the left. In what direction does the frictional force act?

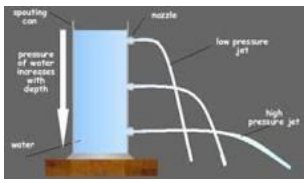
(a) To the left (b) To the right (c) Upward (d) Downward

(B) One of the following is classified as a percussion instrument -
a. guitar b. flute c. drums d. violin

(C) Application of force brings the change in-

(a) Shape and size of object (b) Speed and direction of object (c) Position of object
(d) all the above.

Q2. Which characteristic property of pressure exerted by liquids is shown in the figure where water is coming out from the holes in the container?



Q3. You want to lift a heavy box. The force of gravity pulls it downwards with 700N.

(a) What should be the minimum force that should be applied to lift the box?

(b) If your friend supports the box from below with a force of 370N, how much force will you apply to lift the box?

Q4. Copy down the two given statements and explain them scientifically:-

(a) Spaceships are provided with heat shields.

(b) The steps of the foot over-bridges at railway stations are worn out.

Q5. Calculate the force acting on an area of 25 sq cm which exerts a pressure of 2 Pa.

Q6. Define the following with examples --Regular reflection, Static friction.

Q7. Write an activity in the correct format to prove that Friction between solids is determined by the nature of the surfaces ?

Q8. Identify the specific type of force responsible, in the following examples and define them:

(a) Waterfall (b) A rubbed balloon stuck on a wall

Q9. Answer in brief:

(a) What is meant by static friction?

(b) How can sliding friction in machines be replaced by rolling friction?

(c) Why is the Blind spot of the eye so called?

(d) Why does a sealed packet of chips get inflated when taken to high altitudes?

(e) Why are objects invisible in a dark room?

Q10 .Answer the following-

a. Mention two disadvantages of friction between two surfaces.

b. Mention two ways each of increasing and decreasing fluid friction.

c. What are the two factors on which friction between two solid surfaces depend upon?

ALL THE BEST !!

ENRICH YOUR SCIENTIFIC VOCABULARY

List out the new scientific terms here, as you keep learning through the year.