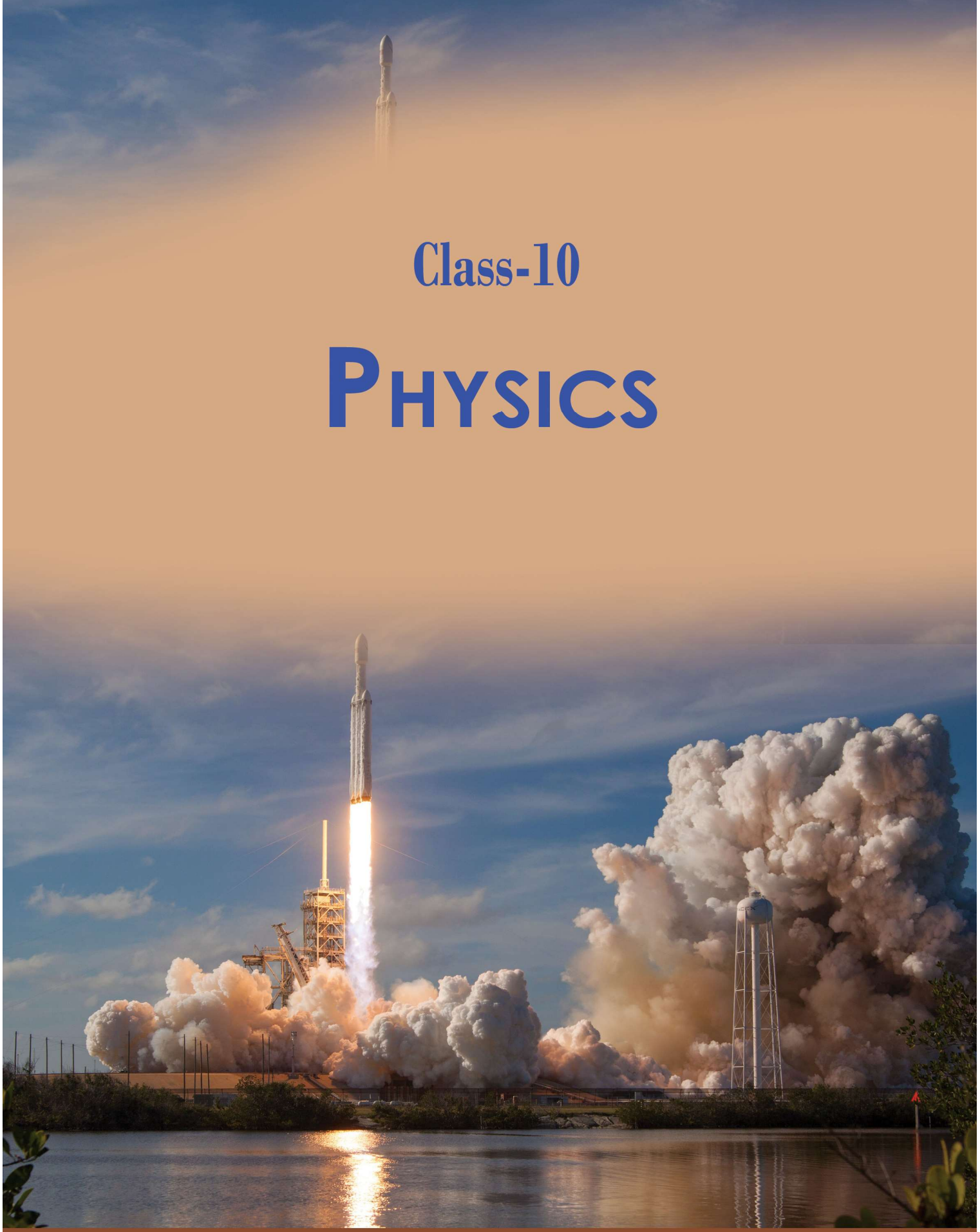
Class-10

PHYSICS



GENERAL EDUCATION DEPARTMENT

SAMAGRA SHIKSHA, KERALA

UNIT I

Effects of Electric Current

Focus Area

Energy conversion in electrical equipments.

Points to Remember

Electric energy can easily be converted to other forms of energy using suitable devices.

Activity 1

Complete the table given below.

Device	Conversion	Effect
Electric stove	.....	Heating effect
Electric bulb	.....	Lighting effect
.....	Electrical Energy to mechanical energy.	.....
Battery (charging)	Electrical Energy to chemical Energy.	.....
Induction Cooker	.....	Heating effect
Electric Oven	.....	Heating effect

- **Focus Point**

Heating effect of electric current.

Joule's law.

Related mathematical problems.

- **Points to Remember**

Joule's Law: The heat generated (H) in a current carrying conductor is directly proportional to the product of the square of the current (I) in the conductor, the resistance of the conductor (R) and the time (t) of flow of current.

$H = I^2Rt$ $H= VIt$ $H= V^2t/R$

➔ When the current in the circuit is doubled heat generated becomes four times.

➔ If the current is halved heat generated becomes 1/4 times.

➔ Instruments that make use of heating effect of electric current are electric heating appliances.

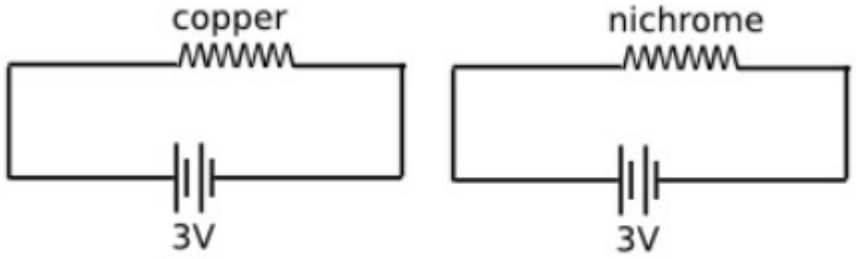
➔ In electric heating appliances heat is produced in the heating coil.

➔ Heating coils are made up of nichrome.

➔ Nichrome has high melting point and high resistivity

Activity 2

A copper wire and nichrome wire of same length and cross section area are connected in two circuits as shown.



circuit.1 circuit.2

a. Identify the circuit having more current.

b. Find out the wire in which more heat is generated.

Activity 3

An electric kettle of 1500 Ω works on 230 V supply.

a) Write the energy change taking place in the electric kettle.

b)Calculate the electrical energy consumed when heater works for one hour

Activity 4

0.1 A current flows through a resistor of resistance 500 Ω for three minute.

a. Calculate the heat generated.

b. What will be the heat if resistance is changed to 1000 Ω keeping current and time remain the same?

c. What will be the heat if current is doubled keeping resistance and time remain the same?

Focus Point

Parallel and series combination of resistance

Related mathematical problems.

Points to Remember

- ➔ Effective resistance is the sum of the resistance of all the resistors when they are connected in parallel. $R = R_1 + R_2$
- ➔ Effective resistance when they are connected in parallel.

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \quad \text{or} \quad R = \frac{R_1 R_2}{R_1 + R_2}$$

➔ If resistors of the same value are connected in parallel then

$$R = \frac{r}{n}$$

➔ If resistors are in series then R = r x n

where 'n' is the number of resistors and 'r' is the resistance of one resistor.

Activity 5

Arrange following statements in the given table.

*When the number of resistors increases current also increases.

* When number of resistors increases effective resistance decreases.

* Same amount of current passes through all the resistors.

* Potential difference is same for all the resistors.

* High resistor gets heated more.

* Applied voltage will be split among the resistors.

* Effective resistance is minimum.

Series connection	Parallel Connection

Activity 6

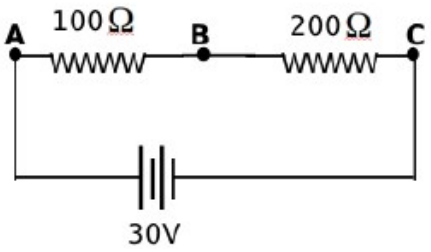
See the circuit,

a. The resistors are connected in .....
(series/parallel)

b. What is the effective resistance in the circuit?

c. High voltage is dropped across .....
(100 Ω/200 Ω)

d. More heat will be generated in .....
(100 Ω/200 Ω)



e. Identify the resistor through which large current passes.

f. If potential difference between 100 Ω is 10V, how much work is done by the battery to move one coulomb charge from A to B?

Activity 7

10 resistors each of 2Ω are connected in parallel.

a) Calculate the effective resistance.

b) What will be the effective resistance if they were connected in series?

Activity 8

The resistance of 2 Ω, 3 Ω and 6 Ω are given to you,

a) What is the highest resistance that you can get using all of them?

b) What is the least resistance that you can get using all of them?

c) Can you make resistance 4.5 Ω using these three? Draw the circuit diagram.

Activity 9

Instruments that make use of heating effect of electric current are electric heating appliances.

a) Write any two examples for electric heating appliances.

b) Which alloy is used to make heating coils in heating appliances ?

c) Why do we use this alloy as heating coil.?

Focus Point

Safety Fuse

Points to Remember

- ➔ Safety fuse is a device that works on the heating effect of electric current.
- ➔ Fuse wire has low melting point.
- ➔ During overloading and short circuit the fuse wire melts and circuit breaks.

Activity 10

Safety fuse is a device that protect circuit and appliances from danger due to excess flow of current through the circuit.

a. Which effect of current is used in safety fuse?

b. How is the fuse connected in a circuit? (in parallel/series)

c. What must be the major feature of the substance used to make fuse wire?

d. Briefly explain how does a safety fuse make sure the safety of circuit and appliance.

e. What is your opinion about using thick wire as fuse wire?

f. Write the precautions to be taken while using fuse.

Activity 11

Amperage indicates current bearing capacity of a conductor/electric device.

a) What do you meant by amperage?

b) What is the relation between amperage and thickness of a wire

Focus Area

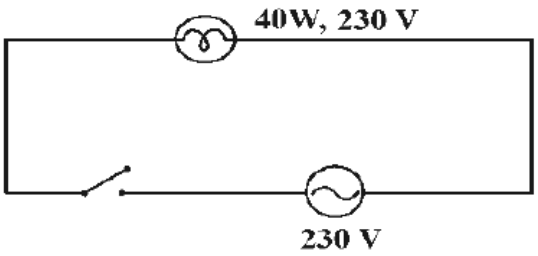
Electric Power - Related mathematical problems

Points to remember.

- ➔ The amount of energy consumed by an electrical appliance in unit time is power.
- ➔ Unit of power is watt (W)
- ➔ Electric power $P= I^2R$ $P=VI$ $P=V^2/R$

Activity 12

Observe the circuit given below:



a) What is the power of the bulb in the circuit?

b) What is the resistance of the bulb?

c) When a 60 W bulb also is connected series in this circuit which bulb glows more brightly? Justify your answer.

Activity 13

An electric appliance designed to work at 230 V has 1000 Ω resistance. Find its power.

Activity 14

The marking on an electrical appliance is 800 W, 200 V.

a. If it works on 100 V, what will be the consumed power?

b. What is the power when it works on 50 V ?

Activity 15

A heating appliance has a resistance of 200 Ω. If 1 A current flows through it, What is the power of the appliance?

Focus Point

Lighting effect of electric current, Filament lamps

Points to remember

- ➔ The filament of incandescent lamp is made up of tungsten metal.
- ➔ Tungsten metal has high resistivity and high melting point.
- ➔ In order to avoid oxidation of tungsten the bulb is evacuated.
- ➔ To avoid vaporisation the bulb is filled with some inert gas at low pressure or filled with nitrogen.

Activity 16

Filaments lamps are also called incandescent lamps.

a. What is the meaning of the word 'incandescent'

b. Name the substance used for making filament?

c. What are the features of this substance?

d. What are the advantages of filling the bulbs with nitrogen after removing air from them?

e. What is the major limitation of filament lamp?

Activity 17

Bulb will glow if the broken filament will be connected together

a)What happens to the length of the filament, increase/decrease

b) What happens to the resistance of the filament, increase /decrease

c) What happens to the brightness of bulb, Justify your answer

Activity 18

Match the following

A	B	C
Fuse wire	Watt	$R=R_1+R_2+R_3$
Incandescent lamp	Decrease in effective resistance	I^2R
Heating device	tungsten	$1/R=1/R_1+1/R_2+1/R_3$
Resistors in series	Low melting point	Electric energy into heat energy
Power	Increase in effective resistance	Tin and Lead
Resistors in parallel	nichrome	Nitrogen

UNIT I

Effects of Electric Current

ANSWER KEY

1.

Devices	Conversion	Effect
Electrc stove	Electrical energy to heat energy	Heating effect
Electric bulb	Electrical energy to light energy	Lihting effect
Electric fan & motor	Electrical energy to mechanical energy	Mechanical/Magnetic effect
Battery (charging)	Electrical energy to chemical energy	Chemical effect
Induction cooker	Electrical energy to heat energy	Heating effect
Electric Oven	Electrical energy to heat energy	Heating effect

2. a. As resistance of copper wire is less than that of nichrome wire, more current will flow through circuit - 1

b. For the same voltage heat is inversely proportional to resistance. So more heat will be produced in copper as its resistance is small.

3. a. Electrical energy → Heat Energy

b. $H = V^2t / R$

$V = 230\ V$

$R = 1500\ \Omega$

$t = 1 \times 60 \times 60 = 3600$

$$H = \frac{(230)^2 \times 3600}{1500}$$

$= 126960\ J$

4. a. $H = I^2Rt = 0.1 \times 0.1 \times 500 \times 3 \times 60 = 900\ J$

b. $H = 0.1 \times 0.1 \times 1000 \times 3 \times 60 = 1800\ J$

c. $H = 0.2 \times 0.2 \times 500 \times 3 \times 60 = 3600\ J$.

When current is doubled, the heat is increased by four times.

5.

Series connection of resistors	**Parallel connection of resistors**
Same amount of current passes through all the resistors	When the number of resistors increases current also increases.
Applied voltage will be split among the resistors	When the number of resistors increases effective resistance decreases
High resistor gets heated more	Potential difference is same for all the resistors
	Effective resistance is minimum.

6. a. Series.

b. 300 Ω ($R = R_1 + R_2$)

c. 200 Ω (When resistors are connected in series more voltage is dropped across high resistor)

d. 200 Ω (When resistors are connected in series more heat is generated in resistor having high resistance)

e. Same current passes through both resistors. (When resistors are connected in series same current passes through all the resistors)

f. 10J (If potential difference between two point is V volt, V joule of work is to be done to move one coulomb charge from one point to other).

7. a) R= r/n

= 2/10 = 0.2 ohm

b) R = r x n

= 2 x 10 = 20 ohm

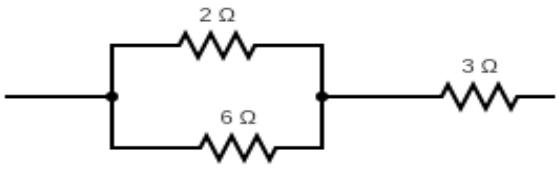
8. a. Highest resistance, $R=R_1+R_2+R_3$

$R = 2+3+6 = 11\ \Omega$

b. Least resistance ,$1/R=1/R_1+1/R_2+1/R_3$

$1/R = 1/2 + 1/3 + 1/6= 6/6 = 1\ \Omega$

c.



9. a) Iron box, Electric Heater.

b) Nichrome.

c) High resistivity, High melting point, It can remain red hot for long time without getting oxidised.

10. a. Heating effect.

b. In series

c. Low melting point.

d. Melting point of fuse wire is low. When excess current flows through the circuit due to short circuit or over loading, the fuse gets heated. As its melting point is low, it melts and the circuit is broken.

e. If we use thick wire, it may not melt and break while excess current flows through the circuit. So it is not good to use thick wire as fuse wire.

f. *The ends of the fuse wire must be connected firmly at appropriate points

*Fuse wire should not project out of the carrier base.

* Use fuse wire having required amperage/ thickness according to the load of the circuit.

* Use fuse wires made of suitable material having low melting point.

11. a) Amperage is the ratio of the power of the equipment to the to the voltage applied.

b) Amperage increases with thickness.

12. a) 40 W

b) $R = V^2/P = 230 \times 230/40 = 1322.5\ \Omega$

c) 40 W bulb, Resistance is more.

13. Power $P = V^2/R$

$= 230x230/1000 = 52.9$ W

14. a. Resistance of the appliance,

$R = V^2/P$

$= 200x200/800 = 50\ \Omega$

Power when it is worked on 100V,

$P = V^2/R$

$= 100x100/50 = 200$W.

b. Power when it is worked on 50V,

$P = V^2/R = 50x50/50 = 50$W

15. $P = I^2R = 1 \times 1 \times 200 = 200$ W

16. a. Glowing with heat.

b. Tungsten

c. Ability to emit white light on being heated, high melting point, high resistivity, high ductility.

d. Prevent oxidation and vaporisation of filament.

e. Major portion of electrical energy consumed is lost in the form of heat.

17. a. Decreases

b. Decreases

c. The intensity of light increases

18.

A	B	C
Fuse wire	Low melting point	Tin and Lead
Incandescent lamp	tungsten	Nitrogen
Heating device	nichrome	Electric energy into heat energy
Resistors in series	Increase in effective resistance	$R=R_1+R_2+R_3$
Power	Watt	I^2R
Resistors in parallel	Decrease in effective resistance	$1/R=1/R_1+1/R_2+1/R_3$

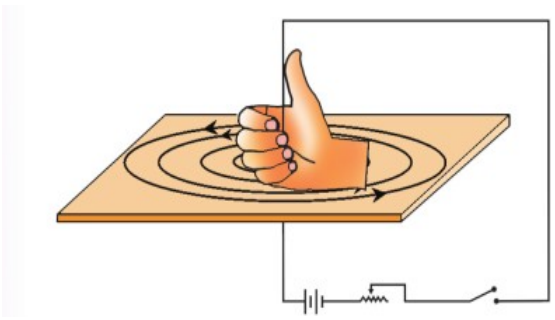
UNIT 2
MAGNETIC EFFECT OF ELECTRIC CURRENT

Focus Area:
Magnetic field arround a current carrying cunductor

Points to remember:

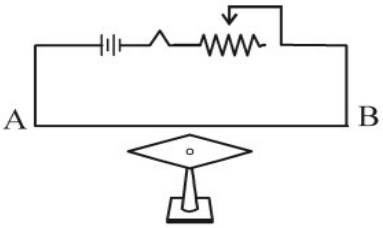
Right Hand Thumb Rule

Imagine you are holding a current carrying conductor with the right hand in such a way, that the thumb points in the direction of the current. The direction in which the other fingers encircle the conductor gives the direction of the magnetic field.



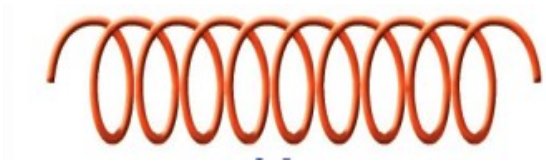
Activity 1

1. Astraight conductor AB is arranged parallel to a magnetic needle as shown in figure. When the switch is on, the magnetic needle deflects.



a) The direction in which the North pole of the magnet deflects is: (Clockwise / Anticlockwise)
Name the law used to find the direction of deflection of the needle?
b) What is the reason for the deflection of the needle?
c) Suggest a method to reverse the direction of deflection of the magnetic needle?

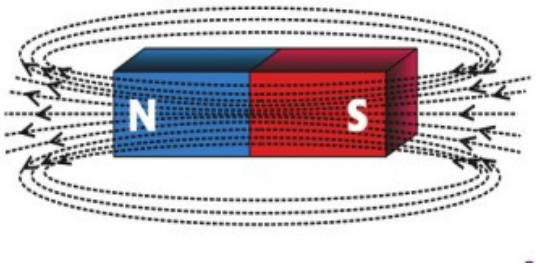
Focus Area : Solenoid
Points to remember:
A solenoid is an insulated wire wound in the form of helix.

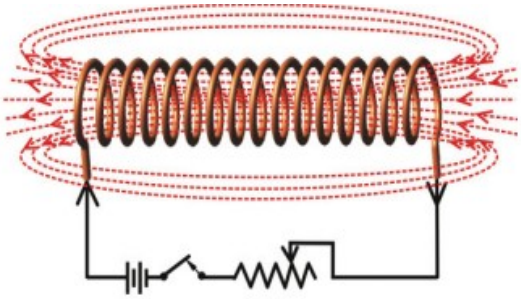


Focus Area :
Magnetic field arround a current carrying solenoid

Points to remember:

A current carrying solenoid producess same magnetic field as that arround a bar magnet





Activity 2
Complete the table

Bar magnet	Solenoid
The magnetism is permanent	The magnetism is temporary ....

Focus Area :
Factors affecting the strength of the magnetic field of a solenoid carrying current

Activity 3

List the factors affecting the strength of the magnetic field of a solenoid carrying current

1. Intensity of electric current

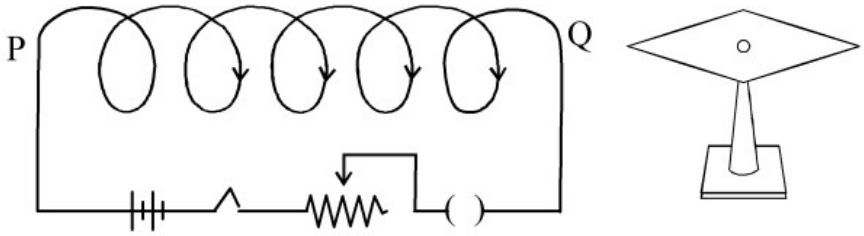
2.----------

3.----------

4.----------

Activity 4

A magnetic needle is arranged at the end Q of a solenoid PQ.



a) When the switch is ON, which pole of the magnetic needle is attracted towards the end Q?

b) State the fact that helped you to reach the above conclusion?

c) Suggest two methods to increase the magnetic field strength of a current carrying solenoid.

Focus Area :

Motor principle

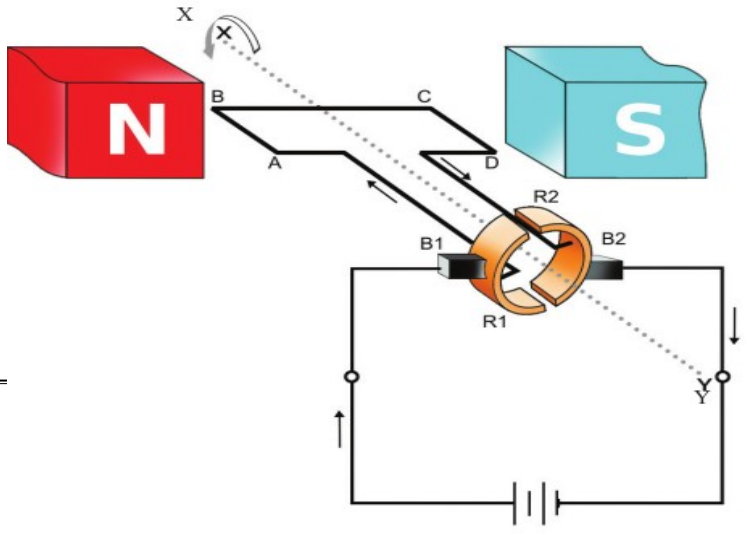
A conductor , which can move freely and which is kept in a magnetic field,experiences a force when current passes through it and it moves.

Activity 5

Electric motors work according to motor principle.

a) Write down the energy conversion taking place in an electric motor.

b) Name another device that works according to motor principle



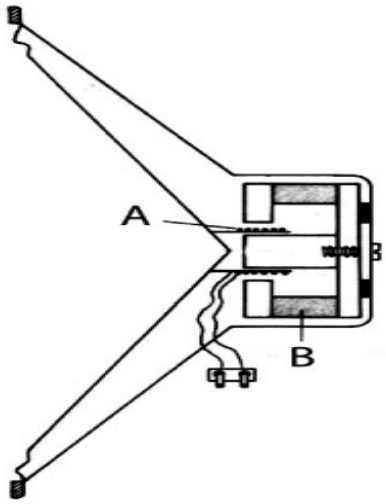
Focus Area : DC motor

Activity 6

List the parts of DC motor

Activity 7

Figure shows a Moving coil loudspeaker.



a) Name the parts marked A and B?
b) What is the energy conversion in this device?
c) What is the working principle of a moving coil loudspeaker?
d) Explain the working of this device.

Answer

Activity 1

(a) Anticlockwise direction.
Maxwell's Right hand thumb rule

(b) When a current is passed through the conductor, a magnetic field is produced
around it.

(c) Reverse the direction of current.

Activity 2

Solenoid	Bar magnet
Magnetic field is temporary	Magnetic field is permanent
Polarity can be reversed	Polarity cannot be reversed
Magnetic field strength can be increased or decreased as desired	Magnetic field strength cannot be increased or decreased as desired

Activity 3

Intensity of electric current
Number of turns
Area of cros section
Soft iron core

Activity 4

(a) South Pole
(b) In the end Q, the current is in anti clockwise direction and hence it is the North pole. Hence this end attracts the South pole of the magnetic needle

Activity 5

(a) electric energy is converted in to mechanical energy
(b) Moving coil loud speaker

Activity 6

Armature

Field magnet
Brushes
Bplitring commutator

Activity 7

(a) A-voice coil,B- FieldMagnet

(b) Electric energy in to Sound energy

(c) Motor principle

(d) The electrical pulses from a microphone are strengthened using an amplifier and sent through the voice coil of a loudspeaker.The voice coil, which is placed in the magnetic field, moves to and fro rapidly, in accordance with the electrical pulses. These movements make the diaphragm vibrate, thereby reproducing sound.

UNIT 3
ELECTROMAGNETIC INDUCTION

Focus Point

Electromagnetic Induction, Factors affecting the induced emf

Points to Remember

- Whenever there is a change in the magnetic flux linked with a coil, an emf is induced in the coil. This phenomenon is called electro-magnetic induction.
- The factors affecting the induced emf are
  1. Number of turns of the coiled conductor
  2. Strength of the magnet
  3. Movement of magnet or solenoid

Activity -1

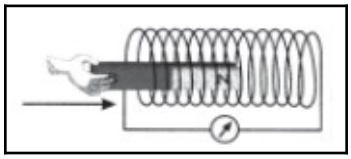
You are given a Bar magnet ,a Solenoid and a Galvanometer

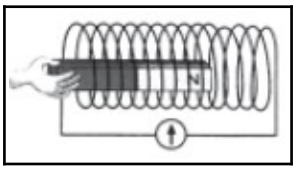
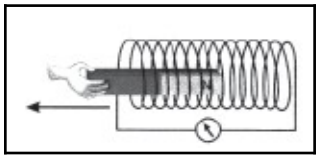
(i) Draw the complete circuit of the experiment done in class room, to produce electric current using the components shown.

(ii) Which phenomenon causes the production of electricity through the circuit.

(iii) Define this phenomenon.

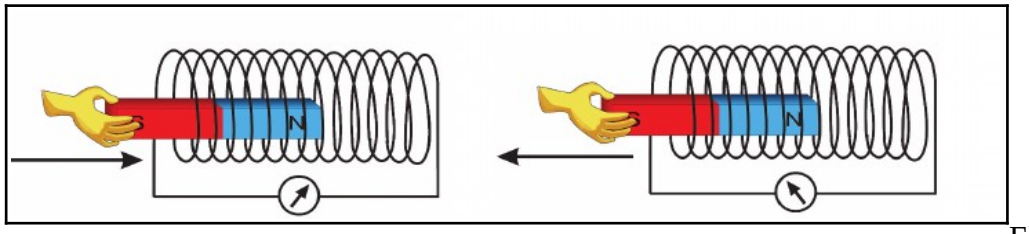
(iv) Fill the observation column suitably

Diagram	Activity	Observation
	Magnet is moved in to the solenoid	.....

	Magnet is stationary inside the solenoid	.....
	Magnet is moved out of the solenoid	.....

Activity 2

Observe the figure:



Electric current is produced in the circuit when an experiment is setup as shown in figure.

i) Name the phenomenon behind the flow of current.

ii) Write the name of the current produced in the coil

iii) Write the definition for this phenomenon.

iv) What are the factors influencing the intensity current ?

Focus Point

AC generator – Structure and Working

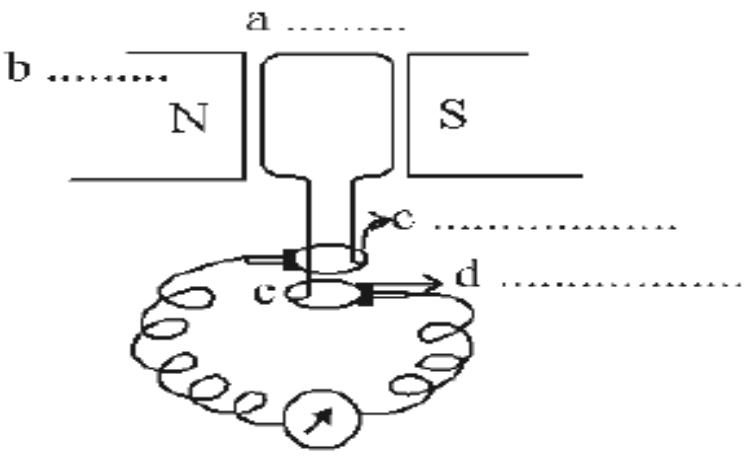
Points to Remember

- Electromagnetic Induction
- Energy change : Mechanical Energy to Electrical Energy
- Main Parts : Field magnet , Armature , Slip rings Brushes
- In an AC generator, the induced emf generated in the first half rotation in one direction and that generated in the second half rotation in the opposite direction together form the cycle of AC.
- The number of cycles per second is the frequency of AC.
- The frequency of AC generated for distribution in our country is 50 cycles per second or 50 Hz.

- If the frequency of AC is to be 50 Hz, the armature coil is to rotate fifty times per second.
- To overcome this practical difficulty the number of rotations is reduced by increasing the number of armature coils and the number of pole pieces of the field magnet in a generator.

Activity -3

Observe the given figure and answer the following questions:



(a) Identify the device shown in the figure.

(b) What is the working principle of this device.

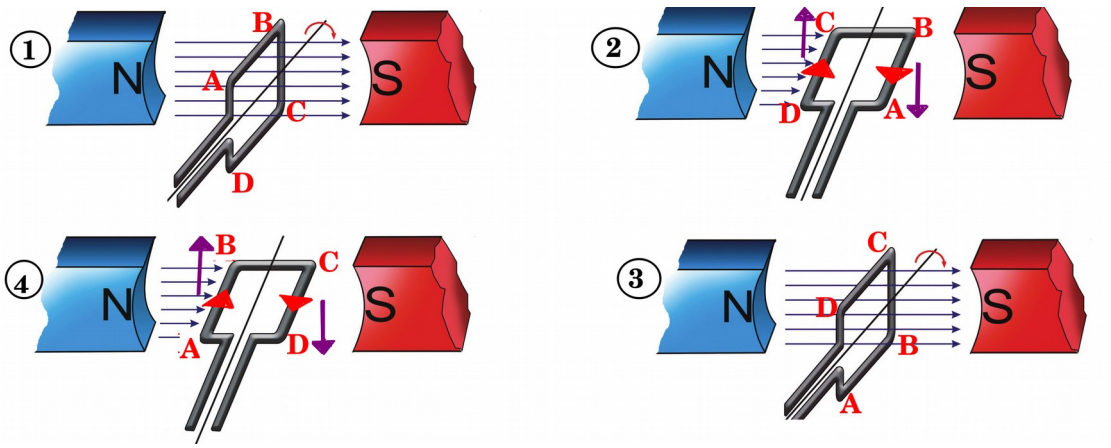
(c) Name the parts a, b, c, & d.

(d) Name the part used in this device to create magnetic flux

(e) Name the part moving to change the magnetic flux

(f) Name the type of electricity produced in this device

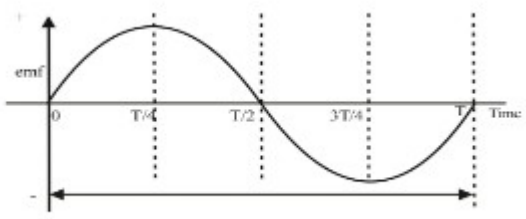
Activity 4



(i) Find out the positions of the armature in the figure which have zero induced current when it rotate in a magnetic field.

(ii) What is the frequency of AC generated in our country for distribution.

(iii) Analyse the given graph and find out find the instances at which the emf is maximum and minimum



Focus Point

DC generator – Structure and Working

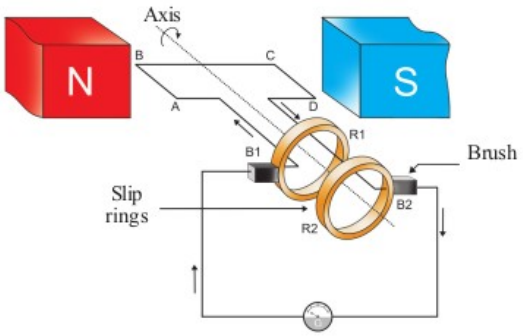
Points to Remember

- Main Parts of DC generator

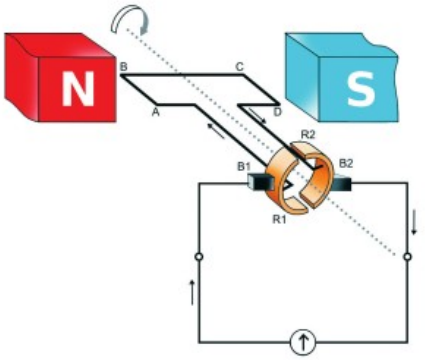
  Field magnet , Armature , Split ring commutator , Brushes
- The split ring commutator used in a DC generator is to convert AC into DC .

Activity 5

Observe the figure and write the difference in structure between the AC generator and a DC generator?



AC GENERTOR



DC GENERATOR

Activity 6

Graphic representation of the emf from AC generator , DC generator , Cell are given in the table below . Observe the figure and complete the table

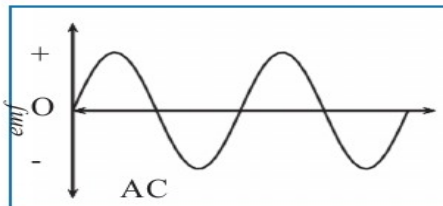
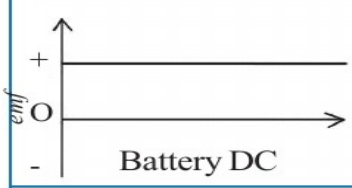
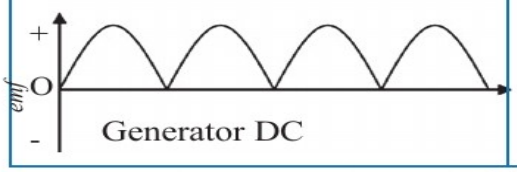
	• Direction changes continuously •
	• •
	• • emf increases and decreases.

Table 3.5

Focus Point

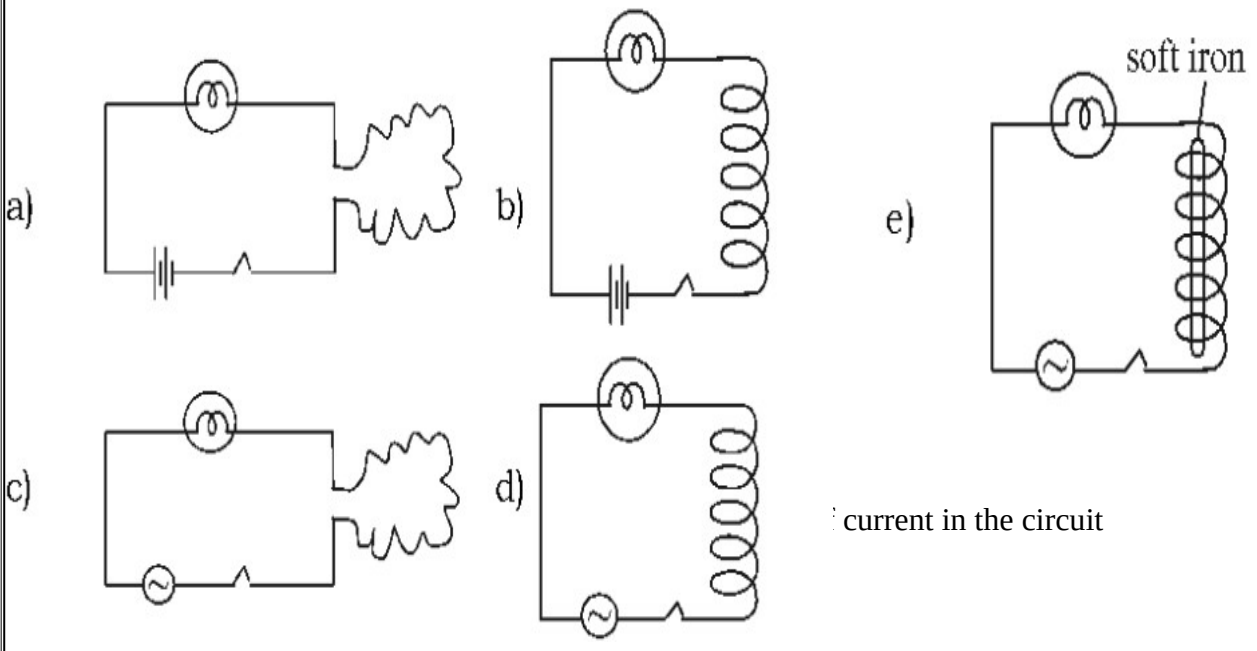
Self Induction

Points to Remember

- The change in magnetic flux due to the flow of an AC in a solenoid will generate a back emf in the same solenoid in a direction opposite to that applied to it. This phenomenon is known as the self induction.
- Inductor is a device which works on the principle of self Induction.

Activity 7

Copper wires of same length and thickness are connected as coiled or not coiled form to the below five circuits. Observe the circuits and answer the following questions



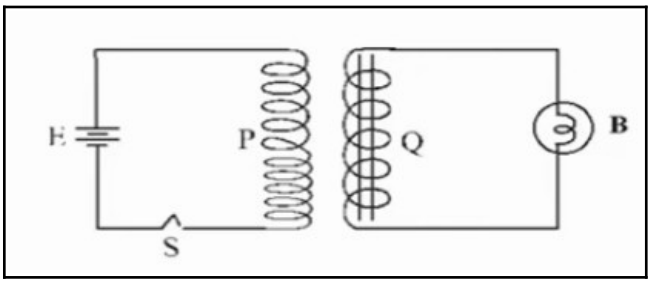
current in the circuit

Mutual Induction,

Points to Remember

- Consider two coils of wire kept side by side. When the strength or direction of the current in one coil changes, the magnetic flux around it changes. As a result,an emf is induced in the secondary coil. This phenomenon is called the mutual induction

Activity 8



when the switch S is turned on, the bulb suddenly glows and turns off

(a) Name and explain the phenomenon by which electricity passed through the second coil.

(b) Suggest a method for the continuous glowing of bulb.

(c) Name the coil P and Q in the circuit?

Focus Point

Transformer - Structure and Working

Points to Remember

- Mutual induction
- Transformer is a device for increasing or decreasing the voltage of an AC without any change in the electric power.
- Transformers are of two types
  Step up transformer ,Step down transformer

Activity 9

1. Transformer is a device used to change the voltage without changing the power.

Differentiate the statements given below suitable to the step-up and step-down transformers.

(a) Number of turns in primary coil is lesser than that of secondary coil.

(b) Number of turns in primary coil is greater than that of secondary coil.

(c) Input voltage is greater than output voltage.

(d) Output voltage is greater than input voltage.

(e) Thickness of primary coil is greater than that of secondary coil.

(f) Thickness of secondary coil is greater than that of primary coil.

(g) Input current is greater than output current.

(h) Output current is greater than input current.

Activity 10

Examine the Table and answer the following questions.

	Primary			Secondary		
Transformer	Total voltage Vp	No. of turns Np	Voltage in one turn (ε) Vp/Np	Total voltage Vs	No. of turns Ns	Voltage in one turn (ε) Vs/Ns
T1	500 V	100	5 V	50 V	10	5 V
T2	20 V	10	2 V	200 V	100	2 V
T	N p × ε	Np	ε	N s × ε	Ns	ε

1. What kind of transformers are T_1 and T_2 ?

2. What is the voltage in one turn when 500 V is given as input in T_1 primary?

3. Is there a change in one turn voltage of the same transformer when the output voltage decreases to 50 V?

4. Is there a voltage change in each turn of the primary and secondary in the step up transformer T_2?

5. How the ratio of voltages to the number of turns in each of the transformers, primary and secondary is related? Write this ratio in mathematical form.

6. What could be the reason for using thicker wire windings in the primary of a step up transformer and the secondary of a step down transformer?

Activity 11

In a transformer without any loss in power, there are 5000 turns in the primary and 250 turns in the secondary. The Primary voltage is 120V and the primary current is 0.1A. Find the voltage and current in the secondary

Focus Point

Moving Coil Microphone

Points to Remember

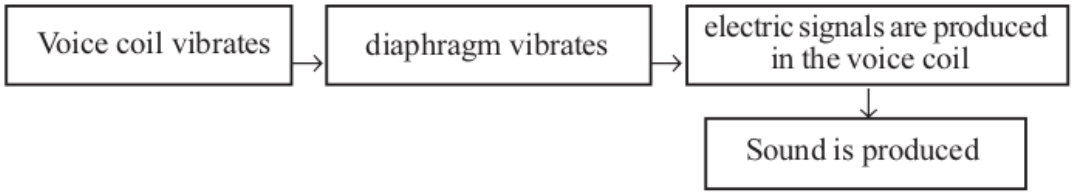
- Electromagnetic induction
- The energy transformation that takes place in a moving coil microphone is Mechanical energy - Electrical energy.
- The main parts of a moving coil microphone are

Diaphragm, Permanent magnet and voice coil.

Activity 12

In connection with the working of a microphone, a few statements are given in boxes.

Arrange them in the proper sequence.



Focus Point

Power Transmission in high voltage

Points to Remember

- When electricity is transmitted to distant places there is loss of energy in the conductors in the form of heat. This is known as transmission loss.
- In India electricity is produced at 11 kV (11000 V) in power stations.
- The methods to reduce the heat generated is
  1.Reduce current , 2. Reduce Resistance, 3. Reduce the time taken
- To reduce the current without change in power is by increasing the Voltage.

Activity 13

a) What is the method to reduce the transmission loss?

b) Which type of transformer is there in a power station?

c) Which type of transformer is there in a sub station?

d) Which type of transformer is a distribution transformer?

e) How many lines reach the distribution transformer?

f) How many lines go out of the distribution transformer?

g) What is the potential difference between 2 phase lines?

h) What is the potential difference between any one phase line and the neutral line?

i) What is the potential difference between the earth and the neutral line?

j) If a person standing on the earth touches a phase line, will she get an electric shock? Why?

k) Which are the lines essential for household electrification?

Focus Point

Electric Shock – Precautions and First aid

Points to Remember

First aid should be given only after disconnecting the victim from the electric wire.

"Saving electricity is equivalent to generating electricity"

Activity 14

a) What are the precautions to be taken to avoid electric shock.?

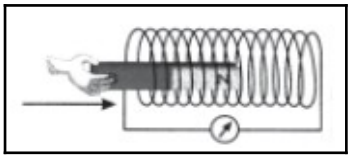
b) What happens to the viscosity of the blood when the temperature of body decreases while a person is electrocuted .

c) Briefly explain the first aid given to a person who are electrocuted

ANSWERS

Activity 1

a.

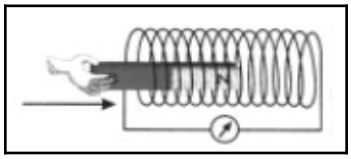
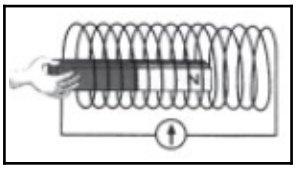
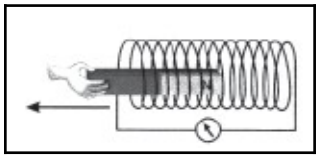


b. Electromagnetic Induction

c.Whenever there is a change in magnetic flux linked with a coil changes an emf is induced In the coil . This phenomenon is called electro magnetic induction.

IV)

Diagram	Activity	Observation

	Magnet is moved in to the solenoid	Galvanometer needle get deflected
	Magnet is stationary inside the solenoid	No deflection
	Magnet is moved out of the solenoid	Magnetic needle deflects in the opposite direction.

Activity 2

i) Electromagnetic Induction.

ii) Induced current.

iii) When ever there is a change in the magnetic flux linked with a coil, an emf is induced in the coil. This phenomenon is Electromagnetic induction.

iv) Increase the number of turns of the coil.
Increase the strength of the magnet.
Increase the movement of magnet or coil.

Activity 3

a) AC Generator

b) Electromagnetic Induction: Whenever there is a change in the magnetic flux linked with a coil, an emf is induced in the coil.

c) a armature , b. Field magnet n c. Slip rings d. Brushes

d) Mechanical Energy to Electrical Energy

e) Filed Magnetic

f) Armature

g) alternating current

Activity 4

a) Fig 1 &Fig 3

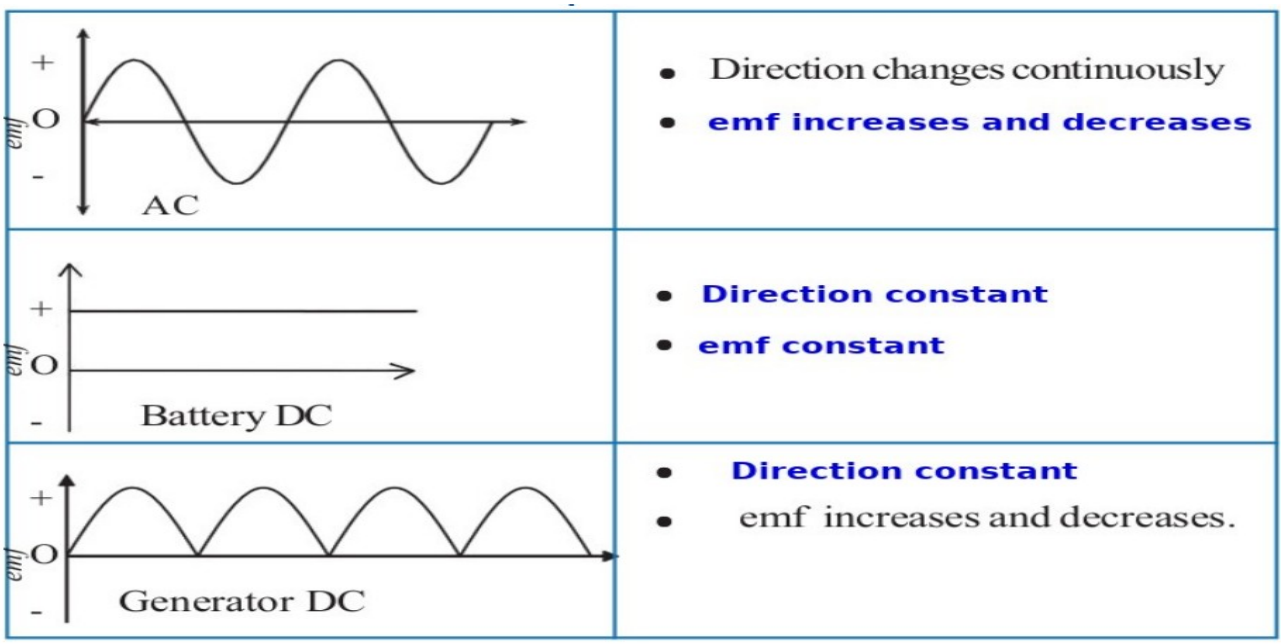
b) 50 HZ

c) Maximum - T/4 and 3T/4
Minimum - T/2 and T

Activity 5

1. AC Generator – Slip Rings
DC Generator - Split Ring Commutator

Activity 6



- Direction changes continuously
- **emf increases and decreases**
- **Direction constant**
- **emf constant**
- **Direction constant**
- emf increases and decreases.

Activity 7

(i) Bulbs in a, b, c are emitting same light.
Glow of d is lesser than a, b, c.
'e' has the least glow.

(ii) Self induction

(iii) Correct definition

(iv) Inductor

(v) Cannot use in DC circuits.

(iv) The presence of soft iron core leads to the increase in flux density. So back emf increases, which leads to the decrease in effective voltage.

Activity 8

a) Mutual induction
b) Give AC instead of DC
c) P – Primary Coil Q – Secondary Coil

Activity 9

Step-up	a, d, e, g
Step-down	b,c, f, h

Activity 10

T_1 – Step down transformer
T_2 – Step up transformer

2. 5 V
3. No change
4. No change
5. The voltage is directly proportional to the number of turns

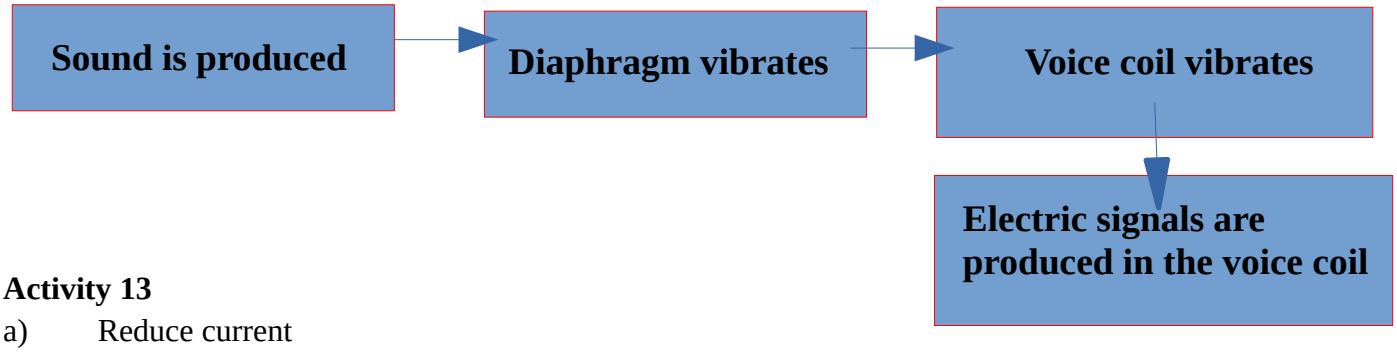
$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

6. The primary and secondary power of a transformer will be equal. Therefore the current in the primary of the step up transformer and the secondary of the step down transformer will be higher. So thicker wires will be used to prevent the coil from overheating. Thicker wires have less resistance.

Activity 11

Vs = 6V , Is = 2A

Activity 12



Activity 13

a) Reduce current
Reduce Resistance
Reduce the time taken
b) Step up transformer

c) Step down transformer
d) Step down transformer
e) 3 lines (11 KV)
f) 4 lines (3 Phase line and 1 neutral line)
g) 400 V
h) 230 V
i) 0 V
j) The person will get an electric shock because there is a potential difference(230 V) between phase and earth.
k) Phase line, Neutral line, and Earth line.

Activity 14

a)
• Never handle electric equipments or operate switches when the hands are wet.
• Insert plug pins into socket and withdraw them only after switching off.
• Do not operate devices of high power using ordinary sockets.
• Wear rubber footwear while operating electric devices.
• Do not touch the interior parts of the cable TV adapters. Ensure that there is an insulated cap for the adapters.
b) As a result of electric shock, the body temperature of the victim decreases, viscosity of blood increases and clotting of blood occurs.
c) • Raise the temperature of the body by massaging.
• Give artificial respiration.
• Massage the muscles and bring them to the original condition.
• Start first aid for the functioning of the heart (Apply pressure on the chest regularly)
• Take the person to the nearest hospital immediately.

UNIT 4
REFLECTION OF LIGHT

FOCUS AREA :

Reflection – Reflection of light

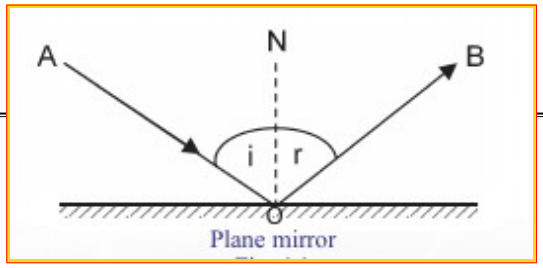
POINTS TO REMEMBER

- **Incident ray ,reflected ray and normal to the reflecting surface lie in the same plane.**
- **Angle of incidence (i) and angle of reflection (r) are same.**

i=r

Activity 1

- **A ray of light AO is falling on a plane mirror.**



➔

➔ **a) Find out the following from the figure.**

i) Incident ray ii) Reflected ray iii) Normal
iv) Angle of incidence v) Angle of reflection

b) Explain the phenomena reflection of light.

c) Write down laws of reflection.

FOCUS AREA :

Characteristics of image formed by concave and convex mirrors

POINTS TO REMEMBER:

- ➔ **Features of image formed by a concave mirror depends on position of the object.**
- ➔ **Image formed by a convex mirror is always erect ,diminished and virtual.**
- ➔ **Convex mirrors form wider field of view.**
- ➔ **Convex mirror is used as rear view mirror in vehicles.**

Activity 2
The position of image and the features of
image when an object is placed at different positions in front of a concave mirror is
is tabulated. Fill up the blanks suitably.

A	B	B
Object between C and F	a.....	image beyond C
Object at C	Size of the image is same as that of the object	b.....
Object beyond C	c.....	Image between C and F
Object between F and mirror	Image is in the mirror	d.....

FOCUS AREA :

Mirror equation

POINTS TO REMEMBER:
1/f = 1/v +1/u
or
f= uv/u+v

Activity 3

The image of a vehicle appear in a rear view mirror of the car at a distance 12 m behind the mirror. The actual distance of the vehicle from the rear view mirror of the car is 20 m.

(a) Identify which type of mirror?

(b) Why do such mirrors are used as the rear view mirrors?

(c) What will be the focal length of the mirror?

FOCUS AREA :

Magnificaion (m)
POINTS TO REMEMBER:

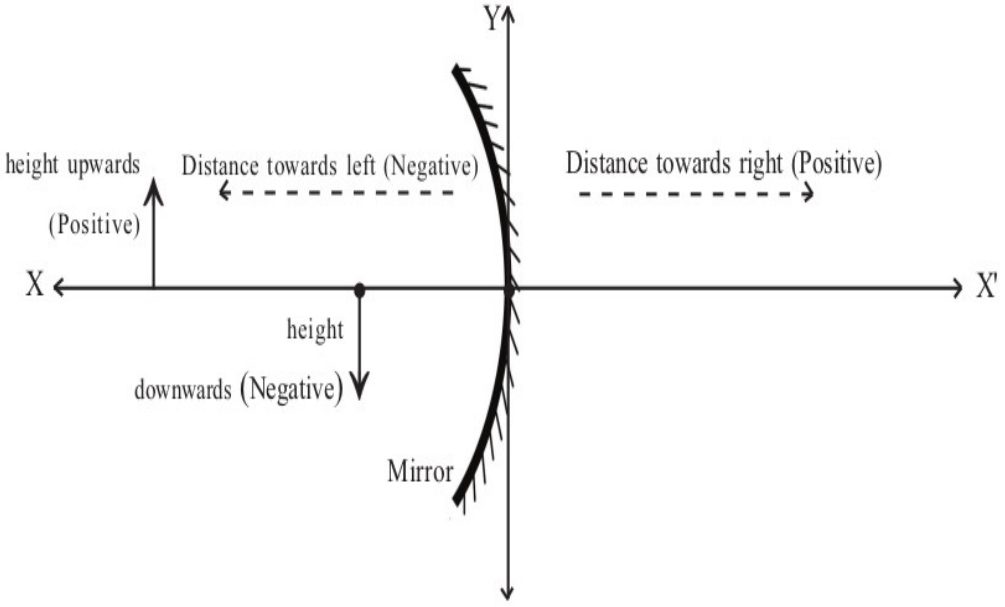
Magnificaion, $m= h_i/h_o$
or
$m= -v/u$

Activity 4
An object of height 6cm is placed at a distance of 8cm in front of a concave mirror.A real image is formed at a distance of 16cm from the mirror.

a) Find height of the image
b) What is the magnification of the image?

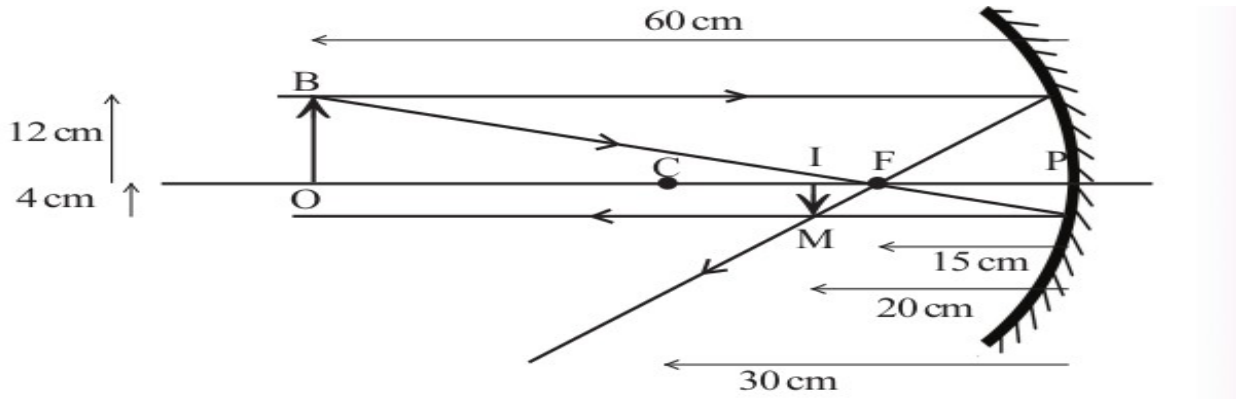
FOCUS AREA :
New Cartesian sign convention

POINTS TO REMEMBER:



Activity 5

The given figure shows the image formation by a concave mirror. Analyse the figure and write down different measures using New Cartesian Sign Convention.



Distance of object from the mirror, (u)	-60 cm
Distance of image from the mirror, (v)	
Focal length (f)	
Radius of curvature (r)	-30 cm
Height of object (OB)	+12 cm
Height of image (IM)	

Answer key

Activity 1

a) i) AO ii) OB iii) ON iv) <AON v) <NOB

b) light falling on the surface of an object comes back to the same medium.This is reflection of light.

c) Incident ray ,reflected ray and normal to the reflecting surface lie in the same plane.

Angle of incidence (i) and angle of reflection (r) are same.

I = r

Activity 2

a) magnified image
b) Image at C
c) diminished image
d) virtual image

Activity 3
a) convex mirror
b) Image formed by a convex mirror is always erect ,diminished and virtual.Convex mirrors form wider field of view.
Convex mirror is used as rear view mirror in vehicles.
c) u = -20m ,v = =12m

$f = uv/u+v$

$= \frac{-20x12}{-20+12}$

$= \frac{-240}{-8}$

$= 30\ m$

Activity 4

a) $h_o = 6cm$ $u = -8cm$

$v = -16\ cm$

$h_i/h_o = -v/u$

$\frac{h_i}{6} = \frac{-(16)}{-8}$

$h_i = -6 \times 2 = -12cm$

b)

$m = h_i/h_o$

$= -12/6 = -2$

Activity 5

v = -20 cm , f = -15 cm , h_i = -4 cm

UNIT 5

REFRACTON OF LIGHT

Focus area

Relation between Speed of light and optical density

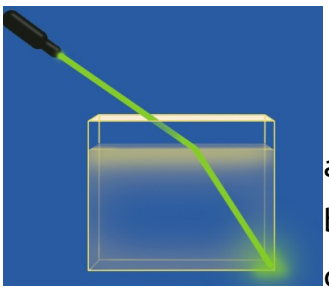
Points to Remember

- The speed of light through various media differs.
- As the optical density of a medium increases, the speed of light through it decreases and vice - versa.

Activity 1

Observe the given figure and answer the following questions

Light from a laser torch passes through water in a beaker



a. What happens to the path of light?

b. Which are the media involved here?

c. Name the phenomenon responsible for the deviation of the path of light?

d. Give a definition of this phenomenon?

Activity 2

Analyse the table and answer the following questions

Medium	Speed of light (m/s)
Vacuum/air	3×10^8 m/s
Water	2.25×10^8 m/s
Glass	2×10^8 m/s (*approximately*)
Diamond	1.25×10^8 m/s

a. Which are the medium having highest and lowest velocity of light?

b. Find the speed of light in water from the table?

c. Arrange the medium in the descending order of their optical density?

d. What is meant by optical density?

e. What is the relation between optical density and velocity of light?

Focus Area

Refraction of light

Points to Remember

When a ray of light entering obliquely from one transparent medium to another, its path undergoes a deviation at the surface of separation. This is refraction.

Activity 3

Observe the given figure

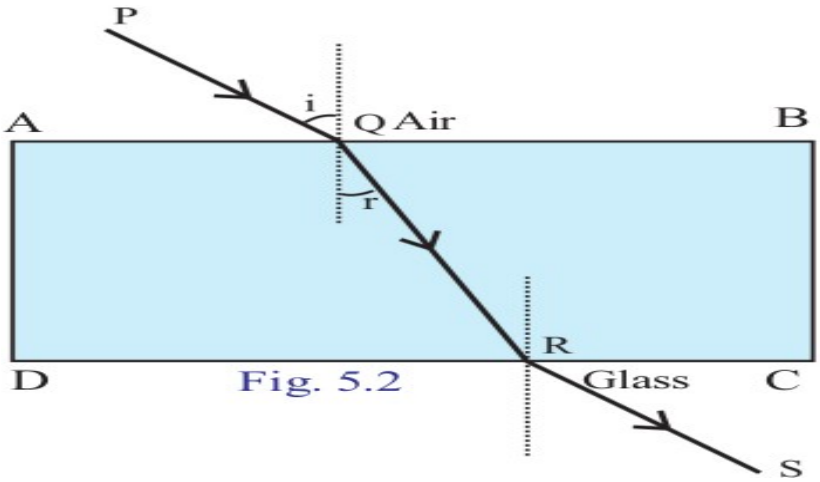


Fig. 5.2

a. Find the incident ray on the surface of separation CD

b. Which are the refracted rays?

c. What are “i” and “r” here?

d. The angle between the incident ray and the normal is called the angle of incidence. if so what is meant by angle of refraction?

Activity4

Observe the given figure

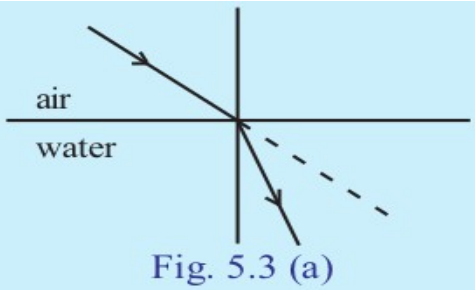


Fig. 5.3 (a)

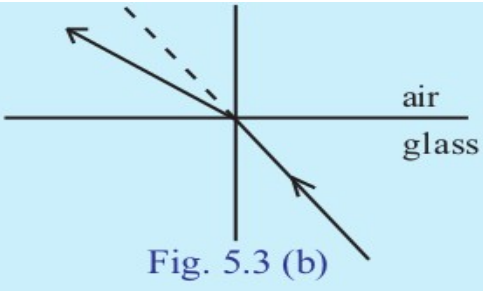


Fig. 5.3 (b)

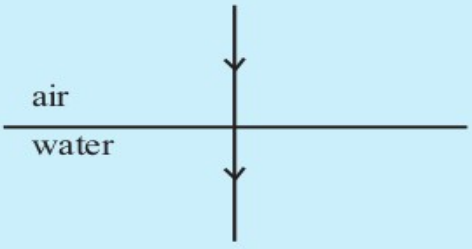


Fig. 5.3 (c)

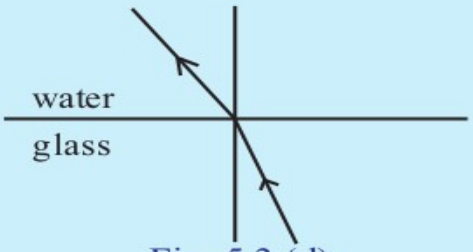


Fig. 5.3 (d)

a. Which of the figures indicates the path of light from air to water?

b. Which of the figure indicates the path of light from glass to water?

c. In which figures refracted ray move away from the normal?

d. Which figure represent the refracted ray deviates towards the normal?

Focus Area

Total Internal Reflection

Points to Remember

When a ray of light passes from a medium of higher optical density to a medium of lower optical density at an angle of incidence greater than the critical angle, the ray is reflected back to the same medium without undergoing refraction. This phenomenon is known as total internal reflection.

Activity 5

Match the following

Refraction	Refracted ray grazes through the surface of the medium	Dioptre
Total internal reflection	Velocity of light	Optical density
Power	Virtual image	Endoscope
Critical angle	1/f	Image is not formed on the screen
Concave lens	Optical Fibre	Angle of incidence in the denser medium corrosponding to the angle of refraction 90^0

Focus Area

. Lenses -technical terms - image formation -ray diagrams - characteristics of image.

Points to Remember

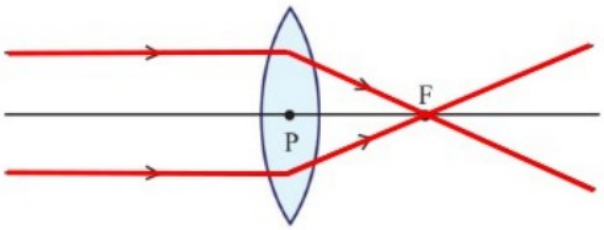
- *Principal axis : Principal axis is the imaginary line that passes through the optic centre joining the two centres of curvature.*
- *Principal focus : Light rays incident parallel and close to the principal axis after refraction converges to a point on the principal axis of a convex lens. This point is the principal focus of a convex lens*
- *The principal focus of a convex lens is real*
- *The convex lens has two focuses.*
- *Principal focus of concave lens : Light rays incident parallel and close to the principal axis*
- *diverge from one another after refraction. These rays appear to originate from a point on the same side. This point is the principal focus of a concave lens.*
- *The principal focus of a concave lens is virtual.*
- *The concave lens has two focuses.*
- *Focal length : Focal length is the distance from the optic centre to the principal focus. This is denoted by the letter f'.*

Formation of image using a Convex lens

Position of object	Position of image	Nature of image/ size		
		Real/ virtual	Inverted/ erect	Magnified/ diminished/ same size
1. At infinity	At F	Real	Inverted	Diminished
2. Beyond 2 F	Between 2F and F	Real	Inverted	Diminished
3. At 2 F	At 2F	Real	Inverted	Same size
4. Between 2F and F	Beyond 2 F	Real	Inverted	Magnified
5. At F	At infinity	Real	Inverted	Very much magnified
6. Between F and lens	At behind the lens	Virtual	Erect	Magnified

Ray diagram of formation of images by convex lenses

1. Object at infinity



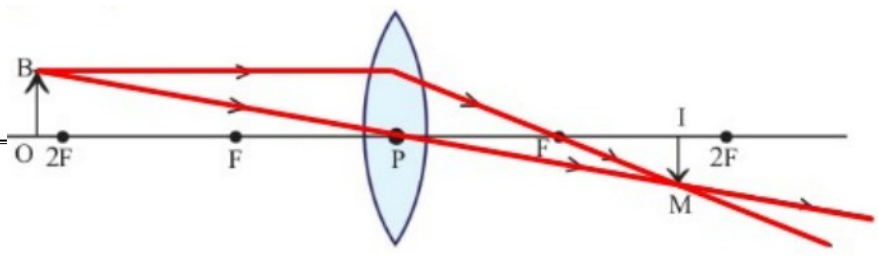
The characteristics of the image

Position of the image : At F

Nature of the image : Real, Inverted

Size of the image : Diminished

2. Object beyond 2F



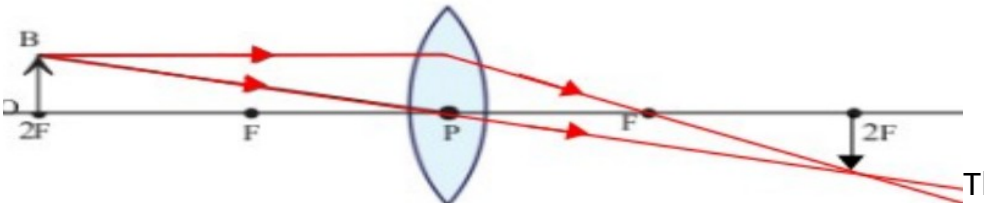
The characteristics of the image

Position of the image : Between F and 2F

Nature of the image : Real, Inverted

Size of the image : Diminished

3. Object at 2F



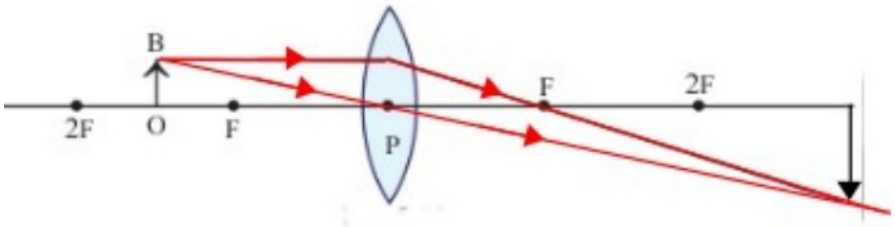
The characteristics of the image

Position of the image : 2F

Nature of the image : Real, Inverted

Size of the image : Same size

4. Object between F and 2F



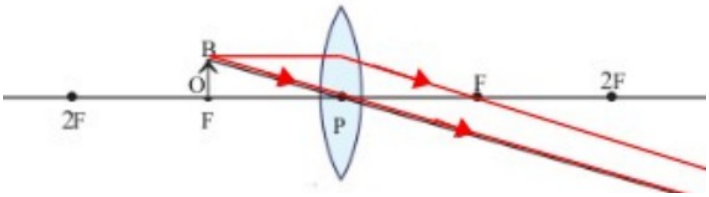
The characteristics of the image

Position of the image :Beyond 2F

Nature of the image : Real, Inverted

Size of the image : Magnified

5. Object at F



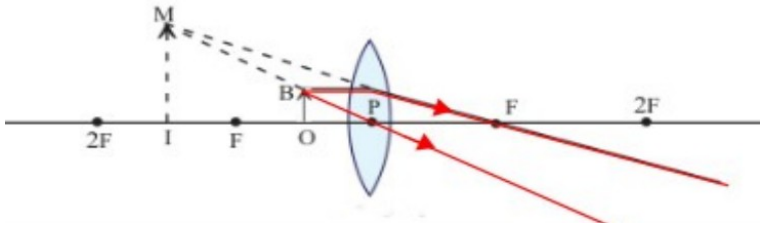
The characteristics of the image

Position of the image : At infinity

Nature of the image : Real, Inverted

Size of the image : Magnified

6. Object between F and lens



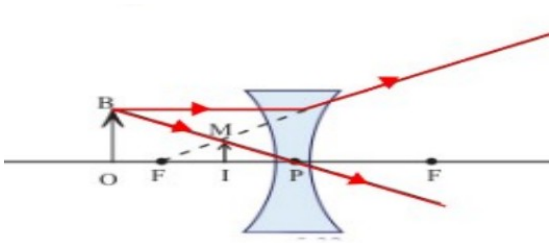
The characteristics of the image

Position of the image : At behind the lens

Nature of the image : Virtual, Erect

Size of the image : Magnified

Ray diagram of formation of images by concave lenses



The characteristics of the image

Position of the image : At behind the lens

Nature of the image : Virtual, Erect

Size of the image : Diminished

Activity 6

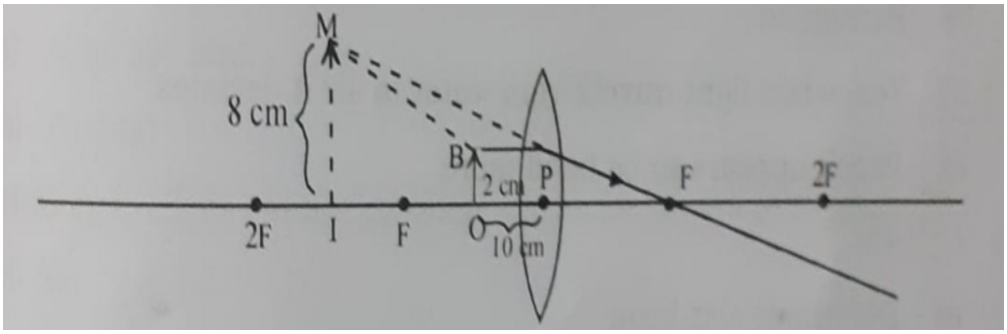
When an object of height 2cm is placed at a distance 20cm away from a lens, a real image is formed 40 cm away from the lens.

a. Find the height of the image

b. Which type of lens is this ?

c. What are the other characteristics of the image

Activity 7



a) Observe the figure and find the magnification of the image.

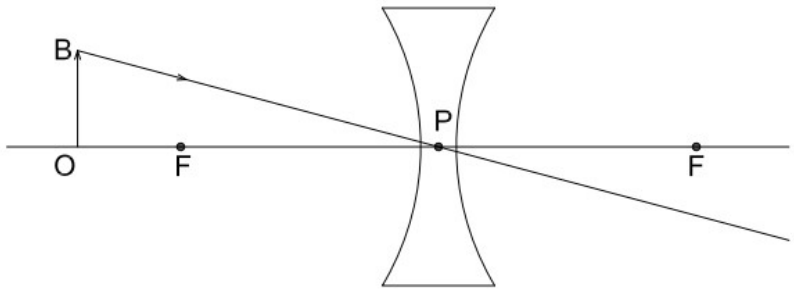
b) Whether magnification is +ve or –ve?

c) Find the position of the image

d) What are the other properties of the image?

Activity 8

a. Complete the ray diagram related to the image formation



b. Which lens is shown in the figure ?

c. Where is the position of the image in this figure ?

d. Write the characteristics of the image in this figure ?

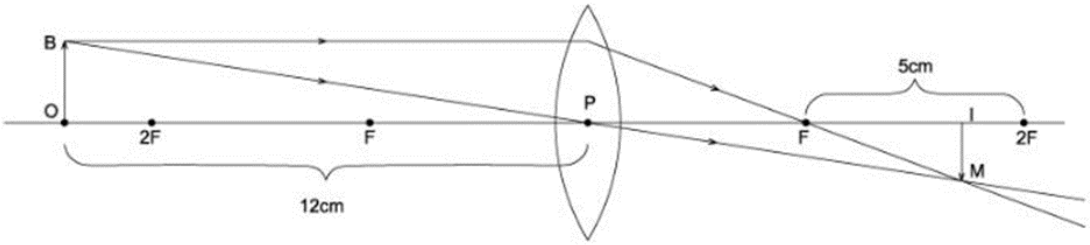
e. Which lens form real image ?

f. Where is the position of the object in front of a convex lens to obtain the same size image as that of the object ?

g .What is the position of an object in front of a convex lens to obtain a virtual image?

Activity 9

Analyse the following figure and answer the questions given below



a. What is the focal length of the lens ?

b. Write the value of ' u ' in the figure , including sign ?

c. Is the value of ' v ' positive or negative. Why ?

d. Calculate the distance to the image ?

ANSWER KEY

Acivity 1

a. path of light deviates ,b.air,water , c.Refraction

d.When a ray of light entering obliquely from one transparent medium to another,its path undergoes deviation from the surface of separation. This is Refraction.

Activity 2

a.Highest velocity of light-air/vaccum Lowest-diamond

b.2.25x10^8m/s

c.diamond,glass,water,air

d.Ability of a medium to influence the velocity of light

e.When optical density increases velocity of light decreases(inversely propotional)

Activity 3

a.QR

b.QR,RS

c.i - angle of incidence

r-angle of refraction

d.The angle between the refracted ray and the normal

Activity 4

a.fig 5.3(a),fig 5.3(c)

b.fig 5.3(d)

c.fig 5.3(b),fig 5.3(d)

d.fig 5.3(a)

Activity5

Refraction	Velocity of light	Optical density
Total internal reflection	Optical fibre	Endoscope
Power	1/f	Dioptre
Critical angle	Refracted ray grazes through the surface of the medium	Angle of incidence in the denser medium corrosponding to the angle of refraction 90^0
Concave lens	Virtual image	Image is not formed on the screen

Activity 6

a) u= -20cm

v=+40cm

ho=2cm

Magnification, m=v/u=40/-20= -2

M=hi/ho

-2=hi/2

hi =2*-2= - 4cm

b) Here the magnification is negative and the image is real . So it is a convex lens.

C) Larger than the object (magnified), Inverted, real

Activity 7

a) ho=+2cm

hi=+8cm

m=hi/ho=+8/+2=+4

b) Magnification ispositive

c)m=+4

u=-10

m=v/u

+4=v/-10

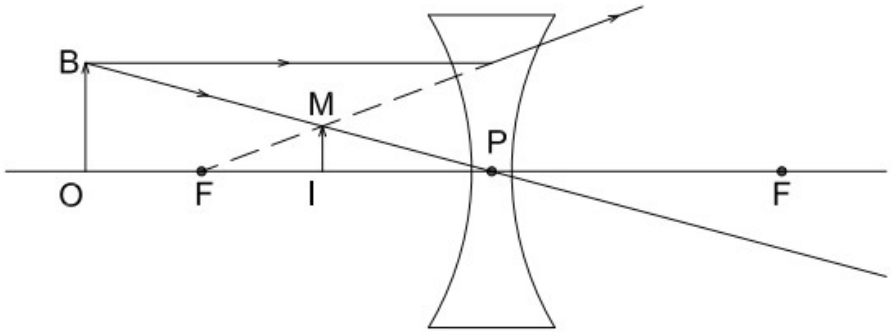
V=+4*-10=-40cm

The image is 40 cm away in front of the lens

d) Large than the object, erect, virtual

Activity 8

a.



b. Concave

c. Between F and P

d. Diminished, erect,virtual

e. Convex

f. At 2F

g.Between F and P

OR

Between F and lens

Activity 9

a. +5 cm

b. u = -12 cm

c. Value of ' v ' is positive.Because the distance measured along the direction of incident light is taken as positive.

d. $u = -12\,cm$

$f = +5\,cm$

$v = ?$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$$

$$\frac{1}{v} = \frac{1}{+5} + \frac{1}{-12}$$

$$\frac{1}{v} = \frac{1}{5} - \frac{1}{12}$$

$$\frac{1}{v} = \frac{12-5}{12*5}$$

$$\frac{1}{v}=\frac{7}{60}$$

$$v=\frac{60}{7}$$

$$ie\, v=8.57\, cm$$

VISION AND THE WORLD OF COLOURS

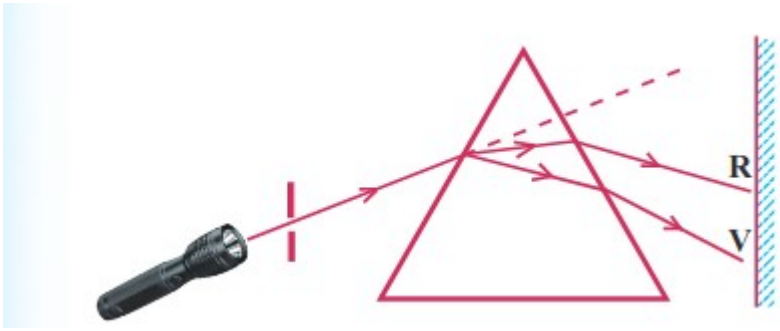
Focus Area : Dispersion

Points to remember:

Dispersion is the phenomenon of splitting up of a composite light into its constituent colours. The regular array of colours formed by dispersion is the visible spectrum.

Activity 1 :

Affix a black paper on the glass cover of a torch.Make a small hole at the centre of the black paper.Arrange a screen, and place a prism between the torch and the screen. Let the beam of white lightfrom the torch fall obliquely on the prism.



a) Which are the colours formed on the screen?

b) Aren't these colours the same as the component colours obtained from the sunlight?

c) Name the phenomenon

d) Which colour deviates the most due to dispersion?

e) Which colour deviates least?

f) What is the relation between deviation and wavelength of colours?

Focus Area : Recombination of colours

Points to remember:

Any light that is composed of more than one colour is a composite light

Activity 2

The teacher asked to plan an experiment to prove the recombination of colours.

(a) Summarise the experimental procedure.

(b) What will be your observations?

Focus Area

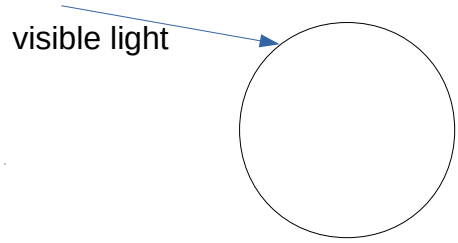
: Formation of rainbow

Points to remember:

Sunlight, when it passes through water droplets, undergoes refraction and internal reflection. The light ray emerging from the water droplets which make the same angle with the line of vision have the same colour. These droplets appear in the form of an arc of a particular colour. Thus there is red colour at the upper edge and violet colour at the lower edge. All the other colours are seen in between, depending on their wavelengths.

Activity 3

Dispersion occur when sunlight passes through the droplets of water.



(a) Complete the diagram.

(b) What happens to the sun light, when it passes through water droplets

(c) Which colour is seen in the outer edge of Rainbow?

(d) Watching from an aeroplane the Rainbow will seen in ------ shape.

(e) When the Rainbow is seen in the east, the Sun will be at _____.

(f) Which colour is seen in the inner edge of Rainbow?

Focus Area

: Persistence of vision

Points to remember:

When an object is viewed by a person, its image remains in the retina of the eye for a time interval of 0.0625s or (1/16)s after seeing it. This phenomenon is called persistence of vision. If more than one scene is viewed within 0.0625s, the effect of all these scenes will be felt by the eye simultaneously.

Activity 4

A glowing agarbathi when rotated fast we feel that there is a continuous glowing circle.

(a) Which peculiarity of eye is the reason behind this?

(b) Explain this phenomenon.

Focus Area

: Scattering of light

Points to remember:

Scattering is the change in direction brought out by the irregular and partial reflection of light when it hits the particles of the medium.

Activity 5

Even though light travels in straight lines, we get light in our rooms during day time. What is the reason?

Activity 6

The teacher asked to plan an experiment to prove the scattering of light.

(a)List the materials needed to perform the test?

(b)Summarise the test procedure.

Focus Area

: Scattering and wavelength

Points to remember:

Rate of scattering and the size of the particles are interrelated. As the size of the particle increases, the rate of scattering also increases. If the size of the particles is greater than the wavelength of light, then the scattering is same for all colours.

Activity 7

Write the component colours in white light in ascending order of scattering rate?

Answers
UNIT 6
VISION AND THE WORLD OF COLOUR

Activity 1

(a) violet, Indigo, Blue, Green, Yellow, Orange, Red

(b) yes

(c) dispersion of light

(d) violet

(e) Red

(f) When wavelength increases deviation of light decreases.

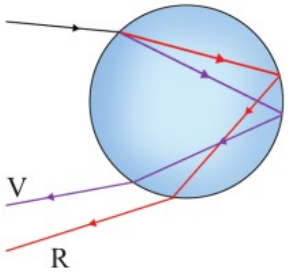
Activity 2

(a) Pass white light through a prism and obtain the constituent colours on a screen. A prism similar to the first is placed in inverted position, adjacent to the first.

(b) When the white light is passed through the first prism, it is dispersed into seven colours. But when the second prism is placed near the first prism the colour of light coming out from the second prism is white

Activity 3

(a)



(b) Sunlight under goes refraction and internal reflection.

(c) Red

(d) circle

(e) west

(f) violet

Activity 4

(a) Persistence of vision

(b) When an object is viewed by a person, its image remains in the retina of the eye for a time interval of 0.0625 second (1/16 s) after seeing it. This phenomenon is called persistence of vision. If more than one scene is viewed within 0.0625 s, the effect of all these scenes will be felt by the eye simultaneously.

Activity 5

Due to the scattering of light

Activity 6

(a)Beaker, Water, Torch, Sodium thiosulphate, Hydrochloric acid, Screen

(b)Dissolve sodium thio sulphate in water taken in a beaker. Add two drops of hydrochloric acid to it. Monitor the change in light between the solution and the screen. From this we can understand the scattering of light.

Activity 7

Red, Orange, Yellow, Green, Blue, Indigo ,Violet

UNIT -7

ENERGY MANAGEMENT

Focus Point

Fossil Fuels – Coal, C N G, L N G, L P G

Points to remember

Fossil Fuels

* Fossil fuels are formed by the transformation of plants and animals that went under the earth's crust millions of years ago. The transformation took place in the absence of air under high pressure and high temperature.

* Coal, petroleum and natural gases are fossil fuels.

Coal

* Coal is the most abundant fossil fuel on the earth.

* The main component of coal is carbon. Based on the carbon content, it is classified into four groups as peat, lignite,anthracite and bituminous coal.

* When coal is distilled in the absence of air, the substances obtained are ammonia, coal gas, coal tar and coke.

Petroleum

The products obtained from fractional distillation of petroleum are

* Petrol ,Diesel,Kerosene , Naphtha , Grease

Natural gases (CNG, LNG)

* liquefied natural gas (LNG) and compressed natural gas (CNG) from thenatural gas obtained along with petroleum.

* The main component of all these is methane.

* These are used as fuels in vehicles, industries and thermal power stations.

* The importance of LNG is that natural gas can be liquefied and transported to distant places conveniently. It can again be converted into gaseous form at atmospheric temperature and distributed through pipe lines.

LPG

* The full form of LPG is liquefied petroleum gas.

* This is a colourless, odourless gas obtained through the fractional distillation of petroleum.

* Domestic LPG produces an odour since ethyl mercaptan is added as an indicator to detect gas leakage.

* The main constituent of LPG is butane.

Activity 1

1. Which are the products obtained from fractional distillation of petroleum?

2. Classify the following fuels in to solid, liquid and gas?

Firewood, Petrol, naphtha, Ammonia, Kerosene, Coke, LNG, Nuclear fuel, Biogas

3. Match the following.

LPG	Methane
CNG	Coke
COAL	Ethyl Mercaptan

Focus Point

L P G and Safety

Points to Remember

Precautions are to be taken to avoid accidents due to LPG leakage

* Examine the rubber tube at regular intervals and ensure that it does not have a leakage.

* Turn on the knob of stove only after the regulator is turned on.

* Always store the LPG cylinder in an upright position and away from other combustible and flammable material.

* Check for gas leaks regularly by applying soap solution on cylinder joints and suraksha pipes

* If you are convinced that there is a gas leak, disconnect electricity from outside the home (switch off the main switches).

* Switch off the regulator and shift the cylinder to an empty space. Keep the windows and doors open.

* Request help from the Fire Force by calling in the toll free number 108.

* Well trained rescue operators can put out the fire by covering the top end of the cylinder with wet sack to prevent the contact with oxygen.

* If the fire is in flat or the top storey, then one should not try to escape using lifts.

Only staircase should be used.

* Cover the nose and the mouth with soft cloth to avoid the intake of smoke or gases.

Activity 2

1.Never switch on or switch off electricity when there is a leakage of LPG. Why?

2.If there is a leakage of LPG does it rise up or come down in the atmosphere? Why?

3.What precautions are to be taken to avoid accidents due to LPG leakage?

4. If a gas leak is suspected or if the fire spreads on a cylinder, what else could be done?

Focus Point

Green Energy and Brown Energy

Points to Remember

* Green energy is the energy produced from natural sources that does not cause environmental pollution.
* All the energy produced from renewable sources belong to this category.
* The renewable sources like solar energy, wind energy, energy from waves and energy from biomass are considered as green energy.
* This is also referred to as clean energy.
* The energy produced from non renewable sources such as petroleum and coal, and the nuclear energy are named brown energy.
* These are sources which cause environmental problems including global warming.

Activity 3

1. Classify the following into “green energy” and “brown energy”?

Tidal energy, Thermal power plant,Windmill, Hydro-power station

Nuclear power station, Solar power, Diesel engines, Geothermal energy

Focus Point

Energy Crisis – Reasons and Solutions.

Points to Remember

1. Judicious utilisation of energy.

2. Maximum utilisation of solar energy.

3. Minimising the wastage of water.

4. Making use of public transportation as far as possible.

5. Construction and beautifying of houses and roads in a scientific manner.

6. Controlling of the street lamps with LDR (Light Dependent Resistor).

7.Timely maintenance of machines.

8. Limiting the size of newly constructed buildings.

9. Ensuring of maximum efficiency of the machines used.

Activity 4

What can be done for reducing energy crisis as far as possible?

ANSWERS

Activity 1

1. Petrol – Diesel- Kerosene - Naphtha – Fuel oil - Grease – Wax

2.

Solid	Liquid	Gas
Firewood	Naphtha	LNG
Nuclear fuel	petrol	Biogas
Coke	Kerosene	Ammonia

3.

LPG	Ethyl Mercaptan
CNG	Methane
COAL	Coke

Activity 2

1. It is because the fumes of gas are highly flammable and even smallest of sparks can ignite a huge fire.

2. Come down in the atmosphere. LPG is denser than air, so any leakage will sink to the ground and accumulate in low lying areas and may be difficult to disperse.

3.

* Examine the rubber tube at regular intervals and ensure that it does not have a leakage.

* Turn on the knob of stove only after the regulator is turned on.

* Always store the LPG cylinder in an upright position and away from other combustible and flammable material.

* Check for gas leaks regularly by applying soap solution on cylinder joints and suraksha pipes

4.

* If you are convinced that there is a gas leak, disconnect electricity from outside the home (switch off the main switches).

* Switch off the regulator and shift the cylinder to an empty space. Keep the windows and doors open.

* Request help from the Fire Force by calling in the toll free number 108.

* Well trained rescue operators can put out the fire by covering the top end of the cylinder with wet sack to prevent the contact with oxygen.

* If the fire is in flat or the top storey, then one should not try to escape using lifts. Only staircase should be used.

* Cover the nose and the mouth with soft cloth to avoid the intake of smoke or gases.

Activity 3

1. **Green energy**

Tidal energy

Windmill

Hydro-power plant

Solar power

Geothermal energy

Brown energy

Thermal power station

Nuclear energy

Diesel engine

Activity 4

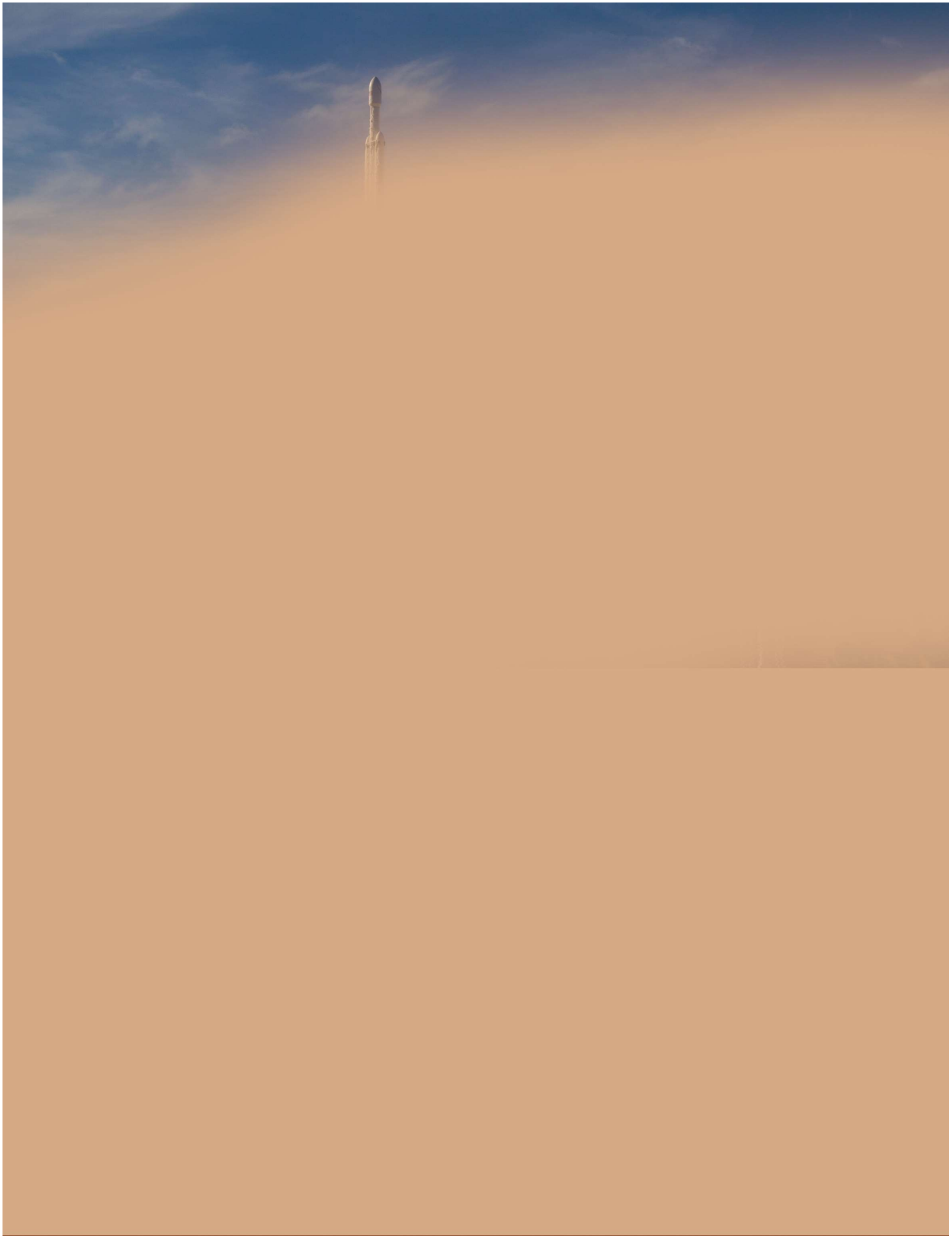
(1) Judicious utilisation of energy.

(2) Maximum utilisation of solar energy.

(3) Minimising the wastage of water.

(4) Making use of public transportation as far as possible.

(5) Construction and beautifying of houses and roads in a scientific manner.



GENERAL EDUCATION DEPARTMENT

SAMAGRA SHIKSHA, KERALA