PHYSICS WALLAH

CBSE SCIENCE PROJECT 45

Class 10th

Quick Revision Notes

CONTENTS

HUMAN EYE AND COLOURFUL WORLD

(i) Eyeball :- Approximately spherical. Diameter 2.3cm

(ii) Cornea :- • Thin transparent bulging membrane
• Most of the refraction happens
• Protects from dust, germs

(iii) Iris :- Controls the size of pupil.

(iv) Pupil :- Regulates and controls the amount of light entering the eye.

(v) Crystalline lens :- convex lens.
flexible focal length.
forms Real and Inverted image

(vi) Ciliary Muscles :- Adjust the focal length of eye lens.

(vii) Retina :- Screen

- Real Inverted Image is formed on Retina.
- has lots of light sensitive cells.
- Rods - vision in low light (light Intensity)
- Cones - vision in high light + colour vision
- Cells get activated when light falls on them and generates electrical signal.

(viii) optical nerve :- sends electrical signal to the brain.
(Light, Nerve fibre)

(ix)

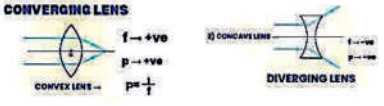
Aqueous Humour	Vitreous Humour
• water like fluid.	• Gel like substance.
• it is present between lens and Cornea.	• present between lens and Retina.
• Nutrition.	• Support and strength helps the eye to keep its shape.

Power of Accomodation

The ability of eyelens to adjust/change its focal length.

NEAR POINT :- The minimum distance from eye at which an object can be seen clearly and distinctly. it is also called least Distance of Distinct vision.
For normal vision (young adults) - 25cm

FAR POINT :- The farthest (sabse door) point upto which the eyes can see objects clearly.
For normal eyes → infinity.



To View closer objects

Ciliary muscle Contract

lens become thick (Curvature increases) θ↑ f↓

focal Length decreases Pt

To view distant (far) objects.

Ciliary muscle relaxes p = 1/f

lens becomes thin (curvature decreases) θ→ f

focal length Increases f↑ P↓

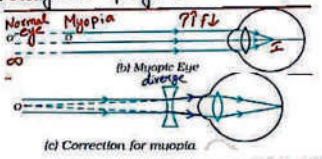
DEFECTS in HUMAN EYE And Corrections

(1) Myopia :- (Near Sightedness)

- can see nearby objects clearly.
- cannot see distant objects distinctly (clearly)
- Far point is less than infinity.

✡ image of distant object is formed in front (before) of Retina.

Reasons :-
(i) Excessive curvature of eyelens.
(ii) lens thick → focal length decreases
(iii) Elongation of eye ball.



Negative power lens — CORRECTION – CONCAVE LENS

trick-

MyoNi makes Elon Thick, went CAVE

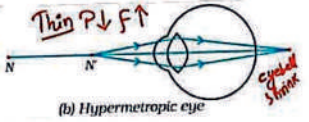
Myopia | Near Sightedness | Elongation of eyeball | (Fat) Lens Thick fat | Concave Lens f → -ve, p → -ve

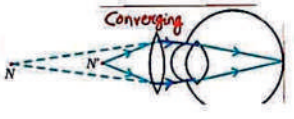
(2) Hypermetropia :- (far - Sightedness)

- can see distant (far) objects clearly.
- cannot see nearby objects distinctly (clearly)
- Near point is more than 25cm.

✡ Image of near by object is formed at a point behind retina.

Reason
Focal length of eye lens is too long (lens cannot get thick enough)
Eyeball has become too small.





CORRECTION – CONVEX LENS
+ve power lens

trick-

Fast Metro makes eye small, Face Large like Wax

Fast → Far Sightedness | Metro → Eyeball Small Shrink | Face → Focal Length Large thin | Wax → convex lens

(3) Presbyopia :-

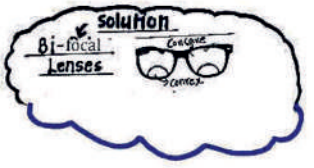
With ageing people find it difficult to see near by objects distinctly (clearly). Generally they also have trouble to view far objects.

Reasons :- (i) Weakening of ciliary muscle.
(ii) less flexibility of eye lens.

(iv) Cataract :- (lens becomes opaque)

- Sometimes at old ages
- Crystalline lens becomes milky and cloudy
- ↓
- Partial or complete loss of vision

Correction → CATARACT SURGERY

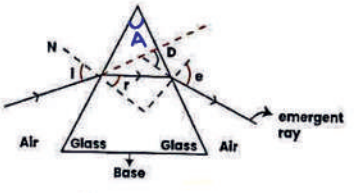


REFRACTION OF LIGHT & DEVIATION THROUGH A PRISM

Monochromatic light

∠i → incidence
∠r → Refraction
∠e → emergence
∠D → Deviation

angle of prism - A



✡ A prism bends a ray of light towards Base.

- We know that white light is made up of seven colours.
- A prism bends a ray of light
- ↓
- Angle of Deviation (∠D)
- ∠D is different for different Colours of light → some colours bends more than other

VIOLETS Bends MORE
RED Bends LEAST

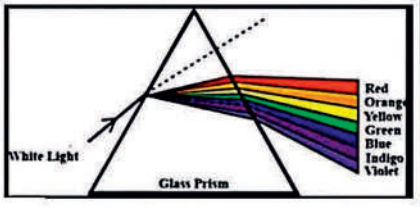
Refraction of white light (sunlight) through a PRISM.

Dispersion :-

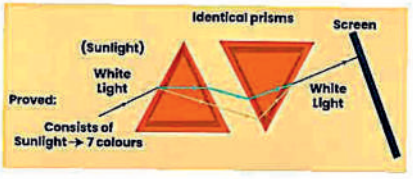
The splitting of white light into its component colours (7 colours).

Spectrum :-

The band of colour components of light (obtained on screen)

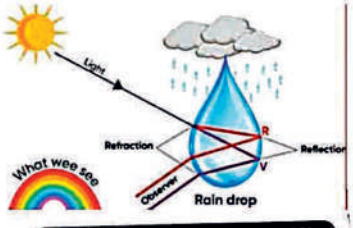


NEWTON'S PRISM EXPERIMENT (INVERTED PRISMS)

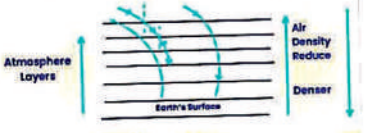


RAINBOW FORMATION

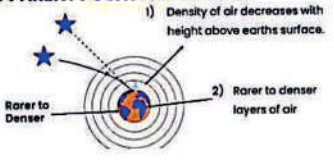
Dispersion + Refraction + Reflection



ATMOSPHERIC REFRACTION



APPARENT POSITION OF STARS



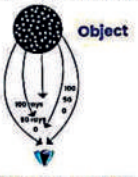
ADVANCE SUNRISE AND DELAY SUNSET

Twinkling of stars

(1) The physical conditions like temperature, pressure of earth's atmosphere keeps on varying.
(2) Due to this density of layers also keep changings.
(3) Stars are very far so they behave like point source of light.
(4) The path of ray of light coming from star keep's changing and Amount of starlight entering eyes flickers

Why Planets Do not twinkle

- Planets are near to Earth as compared to stars.
- Planets behave as extended source of light.
- Extended source can be imagined as collection of millions of point source of light.
- Now, the total varitions in the amount of light entering our eye from all the individual point-sized sources Averages out to zero and intensity of light entering eye remains almost same.



TYNDALL EFFECT

- The phenomenon of scattering of light by the colloidal particles.
- A colloid is a heterogenous mixture. The size of particles of a colloid is too small to be individually seen with naked eyes.
  Example- Milk, smoke, Dust in air
- The path of a beam of light passing through a true solution is not visible. But in colloidal passing through a true solutions colloidal solutions, colloids are big enough to scatter a beam of light passing through it and make its path visible.
- The colour of the scattered light depends on the size of the scattering particles.
  (1) very small particles scatter mainly blue light (smallest wave length)
  (2) Very large particles scatter all colour of light equally.

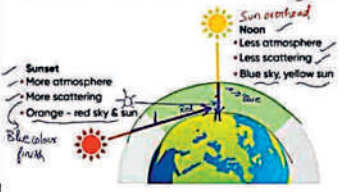
✡ Beam of sunlight enters a smoke filled room through a small hole.

✡ sunlight passes through a canopy of a dense forest. Tiny water droplets in the mist scatter light.

Blue colour of sky

(1) The molecules of air and other fine particles in the atmosphere have size smaller than the wavelength of visible light.
(2) scattering is more for light of shorter wavelength Hence Blue colour scatters more strongly than Red colour.
(3) Thus, scatters more strongly than Red colour.
Thus, scattered blue light enters our eyes and sky appears blue.

Reddening of the Sun at Sunrise & Sunset



(4) if the earth had no atmosphere there would not have been any scattering. Then the sky would have looked dark.
Astronauts – Dark

(5) The sky appears dark to passengers flying at very high altitudes. Explain
At high altitudes due to the absence of atmosphere, scattering of light do not take place and hence sky appears dark to passengers flying at high altitudes.

(6) Danger signal lights are red in colour. Explain.
Red light is least scattered by fog or smoke. Therefore, it can be seen in the same colour at a distance.

LIGHT REFLECTION AND REFRACTION

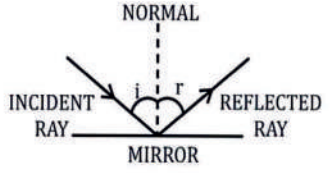
REFLECTION OF LIGHT

The Bouncing back of light when it hits a polished surface like mirror.

Laws of Reflection :-

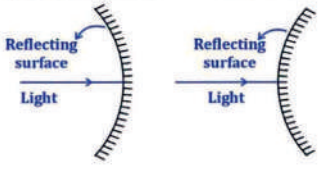
(i) $\angle i = \angle r$
Angle of incidence = Angle of Reflection

(ii) The incident ray, reflected ray, and the normal, all lie in the same plane.

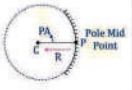


Spherical Mirrors :-

concave mirror | convex mirror



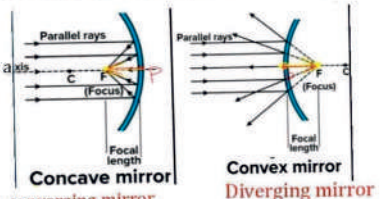
Pole :- Centre of reflecting surface of spherical mirror.
Centre of Curvature - Centre of the sphere of which the mirror is part of



Principal Axis - line joining P and C
Radius of Curvature - Distance PC

* Principal Axis is normal to mirror at Pole.

Principle Focus (F) and Focal length (f) :-

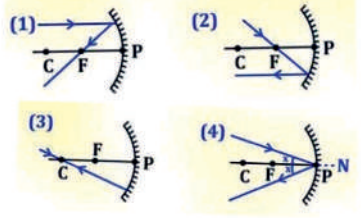


In our syllabus
R = 2f

Image formation and characteristics

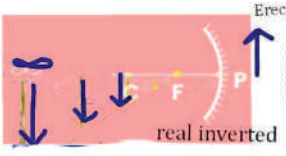
- if rays of light actually meet → Real
- if rays of light appear to meet → Virtual

image formation - Concave mirror



Position of object	Figure	Position of image	Nature of image
1. At infinity		At the principal focus or in the focal plane	Real, inverted, extremely diminished in size
2. Beyond the centre of curvature		Between the principal focus and centre of curvature	Real, inverted and diminished
3. At the centre of curvature		At the centre of curvature	Real, inverted and equal to object
4. Between focus and centre of curvature		Beyond centre of curvature	Real, inverted and bigger than object
5. At the principal focus		At infinity	Extremely magnified
6. Between the pole and principal focus		Behind the mirror	Virtual, erect and magnified

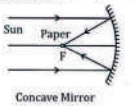
Erect, virtual magnified



object	Image
1) ∞	F
2) ∞ c	FC
3) C	C
4) C F	C ∞
5) F	∞
6) FP	

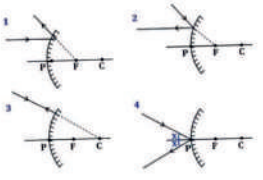
Uses of Concave Mirror

"To concentrates sunlight to produce heat → solar furnace"

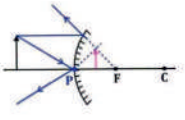


Concave Mirror

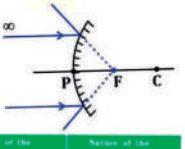
Image Formation : convex Mirror



Object at finite distance :-
(anywhere except ∞)
Characteristics
Image between F and P, virtual, erect, Diminished upright



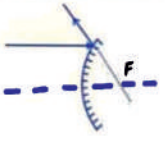
object at ∞ :-
Characteristics
Image at F
Virtual, Erect, Highly Diminished point size



Position of the object	Position of the image	Size of the image	Nature of the image
At infinity	At the focus F, behind the mirror	Highly diminished, point-sized	Virtual and erect
Between infinity and the pole P of the mirror	Between P and F, behind the mirror	Diminished	Virtual and erect

Use of Convex Mirror :-

- Rear-View mirrors -
  - Upright / Erect image
  - wider field of view

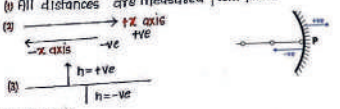


Summary - convex and Concave Mirror :-

* Concave Mirror
  - Inverted
  - Erect / Virtual upright, Enlarged (seedhi + Badi image)
* Convex Mirror
  - only Erect, Virtual Diminished (seedhi or chotti image)

Sign Convention

(i) All distances are measured from pole.

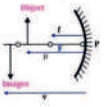


Mirror formula

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

u = object distance
v = Image distance

Note: u → -ve Always
f → +ve convex
convex → +



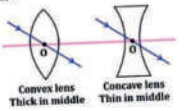
Magnification (m)

$m = \frac{h_i}{h_o}$ $m = \frac{v}{u}$

$h_i = m h_o$

Spherical lenses :-

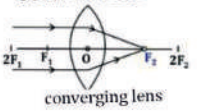
- Principal axis
- Optical Centre [O]



Convex lens Thick in middle | Concave lens Thin in middle

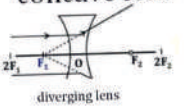
Principle Focus (F) and Focal length (f)

convex lens



converging lens

concave lens

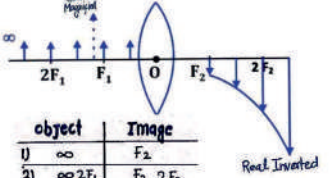


diverging lens

Note: They have two F F1 and F2 due to two curved surfaces

image formation → convex lens

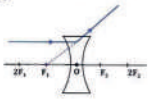
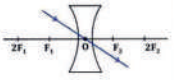
Ray diagram	Position of object	Position of image	Nature of image
	At infinity	At F	Real, inverted and highly diminished
	Between infinity and 2F	Between F and 2F	Real, inverted and diminished
	At 2F	At 2F	Real, inverted and same sized
	Between F and 2F	Beyond 2F	Real, inverted and enlarged
	At F	At infinity	Real, inverted and enlarged
	Between F and O	On the same side of the lens	Virtual, erect and enlarged



Real, Inverted

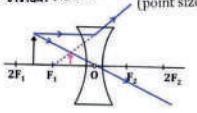
object	Image
1) ∞	F2
2) ∞ 2F1	F2 2F2
3) 2F1	2F2
4) 2F1 F1	2F2 ∞
5) F1	∞
6) F1 O	

Image Formation → Concave lens

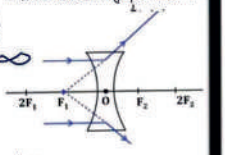
object at finite distance (anywhere except ∞)

characteristics of image
- Image between F_1 & O
- Virtual, Erect, highly diminished (point size)



object at ∞

characteristics of image
- Image at F_1
- Virtual, Erect, Highly Diminished



summary of convex and concave lens

convex lens → Inverted; Erect/upright magnified

Concave lens → Erect/Upright, Diminished (Seedhi + chotti)

Sign convention, Lens formula & Magnification

1) Here all distances are measured from O [optical centre]
2) Rest all same rule for sign.

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

$$m = \frac{h_1}{h_0} \qquad m = \frac{v}{u}$$

u ⟶ −ve
f ⟶ +ve
convex ⟶ +ve

Power of a lens

- Ability of a lens to converge or diverge Rays of light.
- it is defined as Reciprocal of focal length.

convex lens → +ve
f → +ve
P → +ve

$$P = \frac{1}{f}$$

Diaptore (D); always in metre; $\frac{cm}{100}$

power of combination

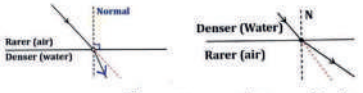
$$P = P_1 + P_2 + \dots$$

$$P = \frac{1}{f_1} + \frac{1}{f_2} \dots$$

D; f_1, f_2 → in metres

Refraction of Light :-

The Bending of light ray when its travels from one medium to another.



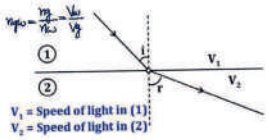
Rarer to Denser Medium Bends towards the normal { Denser to Rarer Medium Bends away from the normal

No change in medium No Bending

$$n_{21} = \frac{n_2}{n_1} = \frac{v_1}{v_2}$$

Refractive Index (R·I)

Measure of How dense a medium is



R·I of 2 w·r·t 1

$$n_{21} = \frac{n_2}{n_1} = \frac{v_1}{v_2}, \quad n_{gw} = \frac{n_g}{n_w} = \frac{v_w}{v_g}$$

Absolute Refractive index

When first medium is air and second medium is any medium.

R·I of water w·r·t Air

$$n_{wa} = \frac{n_w}{n_a} = \frac{v_a}{v_w}$$

n = 1
$v_a = c$

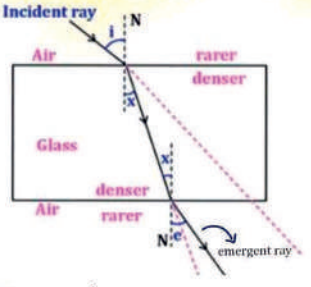
$$n_w = \frac{c}{v_w}$$

$$n_x = \frac{c}{v_x}$$

✓ R·I of glass is 1.5
✓ R·I of water is 1.33

✡ Which is more dense? Glass
✡ In which light travels faster → water

Refraction Through A Glass Slab



To remember
① emergent ray is parallel to incident ray.
② ∠e = ∠i

Laws of Refraction :-

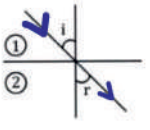
(i) The incident ray, Normal & the refracted ray lies on the same plane.
(ii) The ratio of sine of Angle of incidence to the sine of angle of refraction remains constant for a given pair of media.

Snell's law :-

$$\frac{\sin i_1}{\sin r_1} = \frac{\sin i_2}{\sin r_2}$$

$$\frac{\sin i}{\sin r} = \text{constant}$$

i ⟶ change $i_1\ r_1$
r ⟶ change $i_2\ r_2$

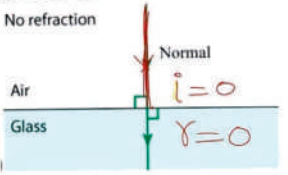


$$n_1 \sin i = n_2 \sin r$$

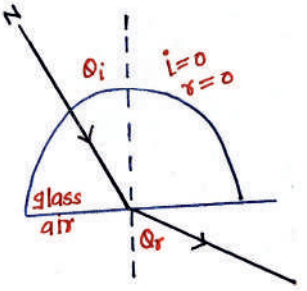
$$\frac{\sin i}{\sin r} = \frac{n_2}{n_1} = n_{12}$$

Case of NO Bending

1) Normal incidence



2) No medium change or no change in refractive index

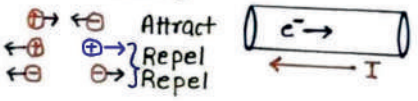


ELECTRICITY

CHARGE (Q) :-

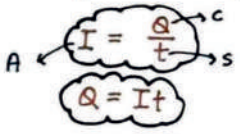
(i) Two types of charge ⊕ & ⊖
(ii) SI unit of charge Coulomb (C)
(iii) smallest independent charge Electron (e^-)

$1e^- = 1.6 \times 10^{-19} C$



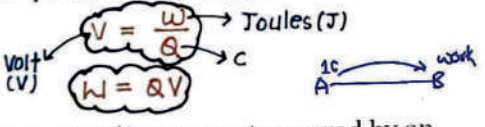
CURRENT (I) :-

* current is Rate of flow of charge. (flow of +ve charge)
* Direction of current :- opposite to direction of flow of electron.
* SI unit of current :- Ampere (A)

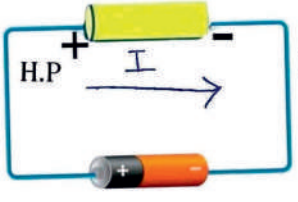


POTENTIAL DIFFERENCE [P.D] [V] :-

Potential Difference between two points is amount of work done in moving a unit charge (1C) from one point to the other.



- Potential difference measured by an instrument voltmeter
- Electric current (A) is measured by Ammeter.

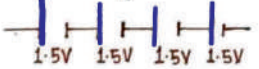


* Electron flows from lower potential to higher potential.

* current (I) flows from Higher potential to lower potential.

symbol :- (cell)
1.5V

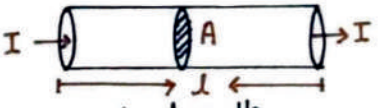
combination of cell
↓
Battery



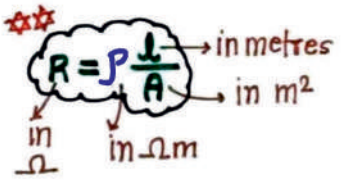
= 6V

RESISTANCE :-

obstruction offered to the flow of charges (current)
OR
property of conductor to obstruct flow of charges.



l = length
A = Area of cross section



Factors on which Resistance of (Conductor) Depends :-

(i) l — $R \propto l$
(ii) A — $R \propto \frac{1}{A}$

$R = \rho \frac{l}{A}$ (m, m^2, ohm Ω)

(iii) Material resistivity; property of material.
(iv) Temperature Temperature ↑ Resistance ↑

SI unit of R :- ohm (Ω)

Resistivity (ρ) :- unit = Ωm

(1) ρ is a property of the material.
(2) Metals and Alloys have low ρ → Good conductor of electricity.
copper and Aluminium are used for transmission lines.
(3) Insulators like Rubber and Glass have high ρ

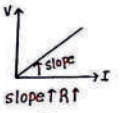
OHM'S LAW :-

The potential difference (V) across the ends of a metallic conductor is directly proportional to the current flowing through it provided its temperature remains the same.

$V \propto I$ • Temperature constant

$V = IR$ → I, R, V

Volt — Ampere — Ω ohm



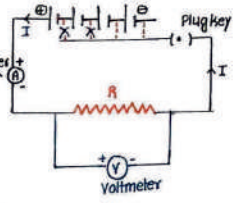
slope ↑ R ↑

V v/s I straight line pass origin

trick- VIRal

V=IR

Experimental setup-

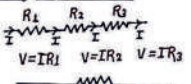


Combination of Resistors :-

[1] SERIES

I → same

V → Different

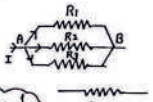


$R_e = R_1 + R_2 + R_3$

[2] Parallel :-

I → Different

V → same



$\frac{1}{R_e} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

Disadvantage of series combination

(1) if one device fails, all others devices in that series will not work.

(2) Devices of different types need different current. for e.g a bulb and heater needs different current and cannot be connected in series. this can be done with parallel combination.

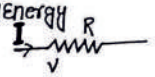
CIRCUIT DIAGRAM

CIRCUIT- Continuous & closed path of electric current.

Sl.No.	Components	Symbols
1	An electric cell	
2	A battery or a combination of cells	1V, 1V, 1V = 3V
3	Plug key or switch (open)	
4	Plug key or switch (closed)	
5	A wire joint	
6	Wires crossing without joining	
7	Electric bulb	or
8	A resistor of resistance R	
9	Variable resistance or rheostat	
10	Ammeter	A
11	Voltmeter	V

Electric Power :-

• Rate at which electrical Energy is consumed.



① $P = VI$ → Ampere

watt ↓ Volt

② $P = I^2R$ ③ $P = \frac{V^2}{R}$

✲ $V = IR$

✲ $I = \frac{V}{R}$

Electrical Energy (E) :-

↘ supplied by cell

Generally E → S.Iunit → Joules

$1 Kwh = 3.6 \times 10^6 J$ but, generally E is measured in KWh

$E = P \times t$ → in hour

kwh (electrical energy)

in kw, watt / 1000

Bijli ka Bill Banao :- (Electric Energy cost)

Energy ka Paisa

Electric Meter ⇒ 1 unit of energy

1unit = 1kwh

Bill = no. of units x price of unit

↓

Energy in kwh

(kitni energy use ki kwh mein)

Heating Effect of Electric current :-

When an electric current passes through a conductor or an electric device, the conductor becomes hot after some time and produce heat. This is called Heating effect of electric current.

Practical Application of Heating Effect of electric current ex- bulb, toaster, mobilephone, fan

Alloys → High resistivity ⇒ Heat ↑

→ High Melting point

→ Do not oxide

$R = \frac{\rho l}{A}$ $H = I^2Rt$

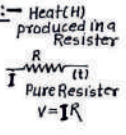
Joule's law of Heating :- Heat(H) produced in a Resister

$H \propto I^2$

$H \propto R$

$H \propto t$

$H = I^2Rt$ — J, A, Ω, s



Electric Bulb :-

• filament Tungsten (High melting point) is Heated and it emits light. Most of energy consumed appears as heat, only small part as light tungsten has very high melting point.

Electric Fuse - Safety Device :-

• Electrical fuse is used to prevent short circuit. fuse has low melting point.
so, when high current passes through it melts and stop the flow of current.

• Fuse wire in series with the appliance.

• Fuse wire - Alloy of Al, Cu, lead, iron

✲ Fuse wire should have → High resistivity ↓ Resistance ↑

↓ Heat ↑ Temperature ↑ & melt

↓ low melting point

• If high current flows (more than required) fuse wire gets heated and melts.
Rating of fuse - 1A, 2A, 3A, 4A, 5A, 10A etc

• Rating of fuse wire → maximum current

Our Environment

Ecosystem:- Ecological system

Components of ecosystem

(Abiotic) Non-living component of Ecosystem

Physical or climatic factor
- Soil
- Water
- Air
- Light
- Temperature
- Rainfall
- pH

Biotic (living component of Ecosystem)

Producer (Autotrophic)
- Green plants
- cyanobacteria

→ Synthesize own food

Consumer
- Herbivores
- Carnivores
- Omnivores

→ Primary Consumer
→ Secondary "
→ Tertiary Consumer
→ Quaternary "

Decomposer (Saprotrophic)
- Microorganisms (bacteria and fungi)

Types of Ecosystem

Natural:-

(1) Terrestial Ecosystem (land-based ecosystem)

Ex- Desert, Grassland, forest, Mountain

(2) Aquatic Ecosystem (water-based Ecosystem)

Ex- River, pond, lakes (fresh water ecosystem), sea ocean (Marine-water Ecosystem).

Artificial / Man made Ecosystem:-

✓ made by human beings
✓ Efforts require to maintain these type of ecosystem

Ex- Cropfield (Agriculture land), Garden, Aquarium, poultary farms, zoo

Natural Ecosystem

Pond Ecosystem

Desert Ecosystem

Manmade / Artificial Ecosystem

Aquarium

Garden

Decomposers:-

✓ organisms which feed on dead and decay matter.
✓ convert complex organic material into simpler inorganic forms.
✓ Help in nutrient cycling.
✓ Help in cleaning of environment by decompositing biodegradable waste.

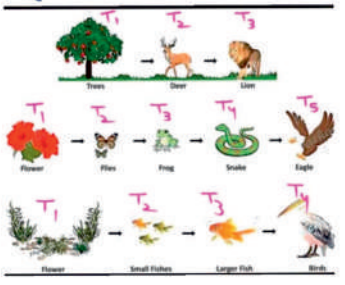
Functioning of Ecosystem

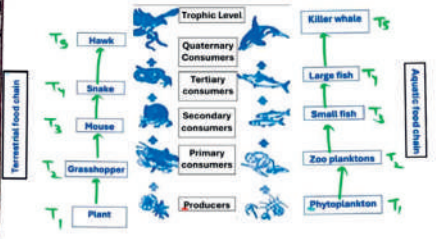
1. The producers, synthesise complex food with the help of solar energy, carbon dioxide sunlight and minerals (soil).
2. The consumers eat up plants and other animals as food, so energy is tranferred to next organism.
3. When plants and animals die, then decomposers act/feed on dead remains of their body and decompose them into simple materials like CO_2, Water and minerals

Foodchain:-

The sequence of living organisms in which one organisms consume another organism to transfer food energy.

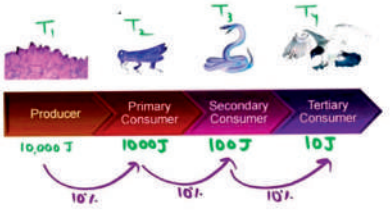
Trophic level:- position of an organism in a food chain.



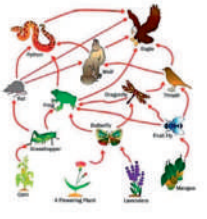


10% (Ten percent) law of Energy Transfer

According to this law only 10% of energy is transferred from one trophic level to next successive trophic level



Foodweb:- The network of interlinked food chains

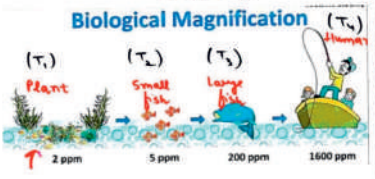


Food Chain	Food web
A food chain is a linear sequence of organisms through which nutrients and energy flows from one organism to another.	A network of different food chains is called food web.
It consists of only one straight chain.	It consists of many interconnected food chains.
If one group of an organism disturbs, the whole chain will become unstable.	The food web does not become unstable by the removal of one group of organisms.

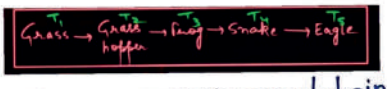
Biomagnification :— it is the increase in the concentration of toxins or non biodegradable substances in the body tissues of organisms as it moves from one trophic level to the next.

Non biodegradable and toxic chemicals such as —
- insecticides
- Pesticides
- Heavy metals, etc

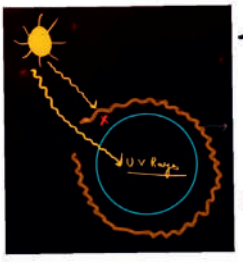
Toxin/chemical enter into water ↓



Please Note:—



- Flow of energy in a food chain is always unidirectional.
- Generally consist of only four or five steps.
- In a food chain :
  - Highest energy – first Trophic level
  - lowest energy – last trophic level
  - Highest concentration of biomagnified chemical – last trophic level.
  - lowest concentration of biomagnified chemical – first trophic level.



→ stratosphere ↓ ozone layer (Protect from harmful U·V rays) ↓ made up of oxygen gas (O_3)

Ozone formation in stratosphere

$O_2 \xrightarrow{\text{Ultra Violet Rays}} O + O$

$O_2 + O \longrightarrow O_3$ (ozone layer)

Environmental problem and its management

Ozone layer depletion

Step 1: Chlorofluorocarbon (CFC) emissions reach the ozone layer.

Step 2: CFCs are broken down by the Sun's ultraviolet (UV) rays, releasing chlorine atoms into the ozone layer.

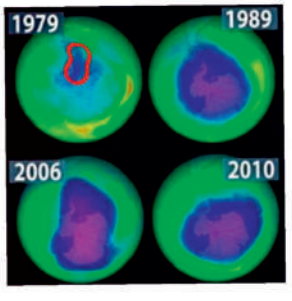
Step 3: Active chlorine atoms break down the ozone molecules, causing ozone layer depletion.

Step 4: More ultraviolet rays reach the Earth, threatening human health.

Causes of ozone layer depletion
- chlorofluorocarbon (CFC)
- Hydrochlorofluorocarbon
- Methyl bromide
- Methyl chloroform

Effects of ozone layer Depletion
- skin cancer, cataract,
- DNA damage, sunburns,
- Reduced immunity
- low crop productivity
- Destruction of marine life

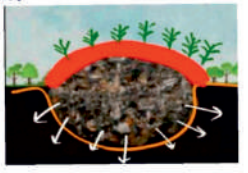
In 1987, an agreement was formulated by the united Nations environment programme (UNEP) to freeze the production of "CFCs" to prevent depletion of "OZONE LAYER".



Waste Management

preparation of compost:— Biodegradable wastes can be converted into compost and by burying in a pit.

Landfills:— Disposal of wastes by putting it in low lying area of ground and covering it with soil.



Incineration:— Burning of waste substances at high temperature to form ash.

Sewage treatment:-
- When sewage water is treated, it becomes clean water that can be discharged in river.
- it also produce manure and sewage gas (biogas).

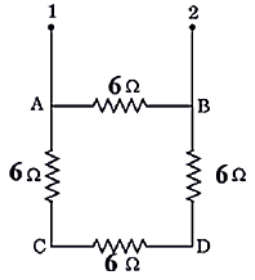
Recycling:— solid wastes like paper and metals can be recycled.

REUSE
REDUCE
RECYCLE

50 Most Important Question

PHYSICS

1. Four identical resistors of 6 Ω each are connected in series to form a square ABCD as shown in the figure. The resistance of the network between the two points 1 and 2 is:



(A) 24 Ω
(B) 12 Ω
(C) 4.5 Ω
(D) 7.5 Ω

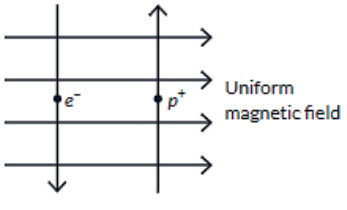
Ans. (Hint): (C)

2. If the absolute refractive indices of two media P and Q are $\frac{5}{4}$ and $\frac{7}{6}$ respectively, then the refractive index of Q with respect to P is:

(A) $\frac{24}{35}$
(B) $\frac{35}{24}$
(C) $\frac{30}{28}$
(D) $\frac{28}{30}$

Ans. (Hint): (D)

3. A uniform magnetic field exists in the plane of paper as shown in the diagram. In this field, an electron (e−) and a positron (p+) enter as shown. The electron and positron experience forces



(A) both pointing into the plane of the paper
(B) both pointing out of the plane of the paper
(C) pointing into the plane of the paper and out of the plane of the paper respectively
(D) pointing out of the plane of the paper and into the plane of the paper respectively.

Ans. (Hint): (A)

4. Consider the following statements:

(i) Myopia can be corrected by using a concave lens.
(ii) In hypermetropia, the image of a nearby object is formed in front of the retina.
(iii) Presbyopia is caused by reduced flexibility of the eye lens and weakening of ciliary muscles with age.
(iv) A person suffering from both myopia and hypermetropia uses bifocal lenses.

The correct statements are –

(A) (i) and (ii)
(B) (i) and (iii)
(C) (i), (iii) and (iv)
(D) (ii), (iii) and (iv)

Ans. (Hint): (C)

5. A ray of light of red colour travelling in air enters into water $\left[n = \frac{4}{3}\right]$. Is colour will becomes/remain

(A) Red
(B) Blue
(C) Yellow
(D) Green

Ans. (Hint): (A)

6. Two thin lenses of focal lengths -20 cm and +25 cm are placed in contact. Find the effective power of the combination.

Ans. (Hint):

As $P = \frac{100}{(f \text{ in cm})}$

So, $P_1 = \frac{100}{20} = -5$ D

and $P_2 = \frac{100}{25} = 4$ D

⇒ Effective power of combination is given by

$P = P_1 + P_2 = -5 + 4 = -1$ D

7. A person suffering from an eye defect uses lenses of power 2 D. Name the defect of vision and list its two causes. State the nature (converging/diverging) of the corrective lens.

Ans. (Hint):

Defect: Hypermetropia (long-sightedness).

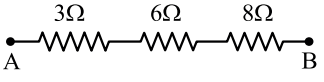
Causes (any two):

1. Eyeball too short.
2. Eye lens has insufficient converging power (less curvature / weak ciliary muscles).

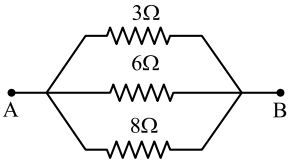
Corrective lens: Convex (converging) lens of power +2 D.

8. Three resistors of 3 Ω, 6 Ω and 8 Ω are connected in (i) series, and (ii) parallel. Draw the arrangements of the resistors and find the equivalent resistance of each arrangement.

Ans. (Hint):



$R_T = 3 + 6 + 8 = 17$ Ω

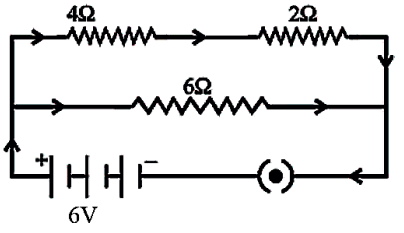


$\frac{1}{R_T} = \frac{1}{3} + \frac{1}{6} + \frac{1}{8}$

$\frac{1}{R_T} = \frac{8+4+3}{24}$

$R_T = \frac{24}{15} = 1.6$ Ω

9. In a circuit below, calculate



(i) Calculate total effective resistance

(ii) The total current through the circuit

(iii) Potential difference across the 4Ω and 2Ω.

Ans. (Hint):

(i) 3 Ω

(ii) 2 A

(iii) V across 4 ohm = 4 V

V across 2 ohm = 2 V

10. (a) Distinguish between the terms 'overloading' and 'short-circuiting' as used in domestic circuits.

(b) Why are the coils of electric toasters made of an alloy rather than a pure metal?

Ans. (Hint):

(a) Overloading:

- Occurs when too many appliances are connected to a single circuit.
- Excess current flows because total load exceeds the circuit capacity.

Short-circuiting:

- Occurs when live and neutral wires come into direct contact.
- Causes sudden, very high current due to almost zero resistance.

PHYSICS WALLAH PUBLICATION

ALR2511270595

To Buy PW Books
SCAN ME!

To share Feedback
SCAN ME!

₹149/-

ISBN 978-93-7467-555-7

9 789374 675557