X – PHYSICS – Slow Learners Material

UNIT – 1. LAWS OF MOTION

TWO MARKS

1. Define inertia. Give its classification:-

A body **to resist any change** in **its state of rest (or) the state of uniform motion**, unless it is influenced upon by an **external unbalanced force.**

i) Inertia of rest ii) Inertia of motion iii) Inertia of direction.

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

They can be classified into two types,

i) Like parallel force

ii) Unlike parallel force

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

$F_1 = 5N$,

$F_2 = 15N$,

Since, $F_2 > F_1$,

Resultant force $F_{net} = F_2 – F_1$

$= 15 - 5$

$\mathbf{F_{net}} = 10N$

Direction will be along 15 N

4. Define moment of a couple.

It is measured by the product of any one of the **forces** and **the perpendicular distance** between the lines of action of two forces.

Formula : $M = F \times S$, **Unit** : Nm.

5. State the principle of moments.

Moment in clockwise direction = Moment in anticlockwise direction.

$$\mathbf{F_1 \times d_1 = F_2 \times d_2}$$

6. State Newton's second law.

* **Force** is directly proportional to the **rate of change of linear momentum** of the body.

* **Formula** F = m x a , **SI Unit** : N

7. Define Impulse.

- A large force acting for a very short interval of time.
- (or) The product of force and time.

Formula J = F x t , **SI Unit** : Ns

8. Define linear momentum.

- The product of mass and velocity of a moving body.

Formula : P = m x v , **SI Unit**: Kg m s^{-1}

FOUR MARKS:-

1. Explain the types of force.

Two types force , (i) Like parallel force (ii) Unlike parallel force.

Like parallel force	Unlike parallel force
Two or more force of equal or unequal magnitude acting along the **same direction** parallel to each other.	Two or more force of equal or unequal magnitude acting along the **opposite direction** parallel to each other.

2. Application of Newton's law of gravitation:-

i) **Dimensions of the heavenly bodies** can be measured .Ex : M_E , R_E , g.

ii) Helps in discovering new **stars and planets.**

iii) Mass of the star can be calculated.

iv) Helps to predict the **path of the astronomical bodies.**

3. Differentiate mass and weight.

S.NO	MASS	WEIGHT
(i)	It is the amount of **matter** contained in a body	It is the **gravitational force exerted** on it due to the Earth's gravity
(ii)	**Fundamental q**uantity	**Derived** quantity
(iii)	It has **only magnitude**	It has **both magnitude and direction**
(iv)	**Scalar** quantity	**Vector** quantity
(v)	It is SI unit **Kg**	It is SI unit **N**
(vi)	Remains the same everywhere	Varies from place to place

SEVEN MARKS:

1.State Newton's laws of motion:

i) Newton's first law of motion:-

Every body continues to be in its state of rest (or) the state of uniform motion along a straight line unless it's acted upon by some external force.

ii) Newton's second law of motion:-

Force is directly proportional to the rate of change of linear momentum of the body.

Formula: $F = m \times a$, **SI Unit**: N (or) Kg m s^{-2}

(iii) Newton's third law of motion:-

For every action, there is an equal and opposite reaction.

Formula : $F_B = - F_A$

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

Let us consider ,

- m - mass of the body
- u - Initial velocity
- v - Final velocity

- t - time taken
- F - External force

proof: Initial momentum (P_i) = mu

Final momentum (P_f) = mv

.'. change in momentum (ΔP) = $P_f - P_i$

= mv – mu

= m(v –u)

According to Newton's second law of motion ,

F α rate of change in momentum

F α change in momentum / time

F α m (v – u) / t

F = k m (v –u) / t , k – is constant(k = 1)

F = m (v – u) / t

Acceleration (a) = (v – u) / t

F = ma

Force = mass x acceleration SI unit: N (or) Kg ms $^{-2}$

3. State and proof the law of conservation of linear momentum.

"There is no change in the linear momentum of a system of bodies as long as no net external force acts on them".

Proof: Let us consider ,

- u_1 , u_2 – Initial velocity
- v_1, v_2 - Final velocity
- m_1 , m_2 – masses of the body
- F_1, F_2 - Forces
- t – time taken
- A,B - Two bodies ($u_1 > u_2$)

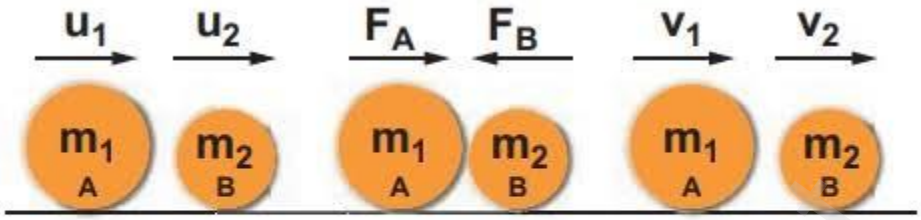


Figure 1.7 Conservation of linear momentum

(i) Force on body B due to A $\mathbf{F_A = m_2 (v_2 - u_2) / t}$

(ii) Force on body A due to B $\mathbf{F_B = m_1 (v_1 - u_1) / t}$

By, Newton's Third law of motion $F_B = - F_A$

$$m_1 (v_1 - u_1) / t = - m_2 (v_2 - u_2) / t$$

$$m_1 (v_1 - u_1) = - m_2 (v_2 - u_2)$$

$$\mathbf{m_1 v_1 + m_2 v_2 = m_1 u_1 + m_2 u_2}$$

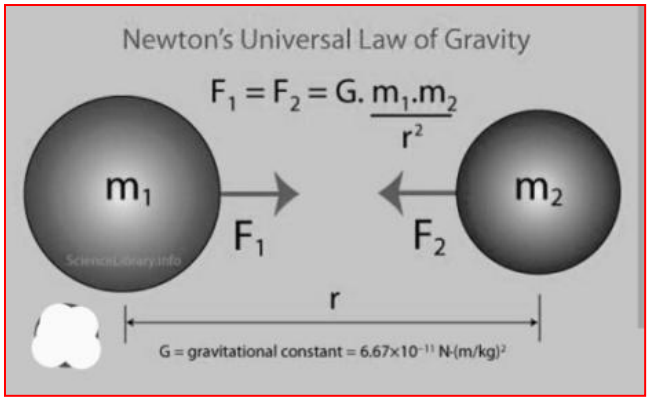
Absence of an external force, the algebraic sum of the momentum after collision is equal to sum of the momentum before collision. (or)

Sum of the momentum after collision = sum of the momentum before collision

4. Derive the universal law of gravitation.

Statement:

- Force is directly proportional to the product of their masses
- Force is inversely proportional to the square of the distance between the centre of masses.



Proof: Let us consider,

- A, B - Two bodies
- m_1 , m_2 - masses
- r - distance

Force, $\mathbf{F \alpha m_1 m_2}$ --------- 1

$\mathbf{F \alpha 1 / r^2}$ --------- 2

Combining equation 1 and 2

$F \alpha m_1 m_2 / r^2$

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

Where,

- G is universal gravitational constant,
- G value is $\mathbf{6.674x10^{-11} Nm^2 kg^{-2}}$
- SI unit of G is $\mathbf{Nm^2 kg^{-2}}$

UNIT -2.OPTICS

TWO MARKS:

1. What is refractive index?

It is defined as ratio of the **speed of light in air (or) vacuum** to **the speed of light in medium.**

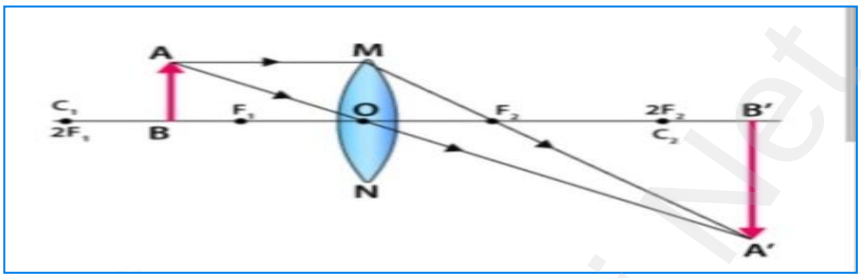
Formula: $\mu = c / v$

2. **State Snell's law.**

The **ratio** of sine of the angle of incidence and sine angle of refraction is equal to the **ratio** of refractive indices of two media.

Formula: $\text{Sin } i / \text{Sin } r = \mu_2 / \mu_1$

3. Draw a ray diagram convex lens: Object is placed between F and 2 F



4. What is dispersion of light.

When a beam of **white light** is refracted through any **transparent media** such as glass (or) water it **spilt into its component colors**.

5. State Rayleigh's law of scattering.

The **amount of scattering** is inversely proportional to the **fourth power of its wavelength**. Formula: $\mathbf{S \alpha 1 / \lambda^4}$

6. What is power of accommodation?

The **ability of the eye** lens to focus nearby as well as the **distant objects.**

7. Why does he sky appear in blue color?

- When sunlight passes through the atmosphere.
- **Blue colour (shorter wavelength**) is scattered to a **greater** than red colour(longer wavelength).

FOUR MARK:

1. List any five properties of light.

- It is a form of energy.
- It is travels along a straight line.
- It is does not need any medium.
- The speed of light in air (or) vacuum is $c = 3x10^8\ ms^{-1}$

- ❖ It is the form of waves, $c = \nu \lambda$
- ❖ Different coloured light has different wavelength and frequency.
- ❖ Violet light – Lowest wavelength
- ❖ Red light – Highest wavelength

2. Difference between myopia and hypermetropia.

Myopia	Hypermetropia
(i) It is **short-sightedness**	It is **long** sightedness
(ii) It is occurs due to the **lengthening of eye ball**	It is occurs due to **shortening** of ye ball
(iii) Distant objects **cannot be seen** clearly	Distant objects **can be seen** clearly
(iv) Nearby objects **can be seen** clearly	Nearby objects **cannot be seen** clearly
(v) The focal length of the eye lens is **reduced**	The focal length of the eye lens is **increased**
(vi) The far point will not be **at infinity**	The near point will not be **at 25cm**
(vii) The far point has **come closer**	The near point has **moved farther**
(viii) The image is formed **before the retina**	The image is formed **behind** the retina
(ix) It can be corrected by using **concave lens**	It can be corrected by using **convex lens**
(x) Distance between **eye lens and retina increases**	Distance between eye lens and retina **decreases**

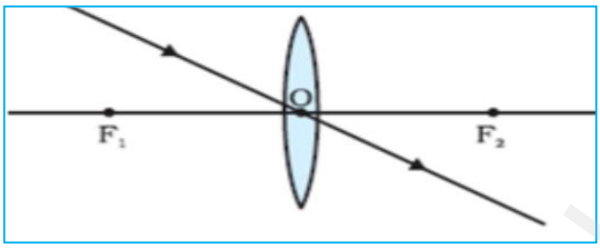
3. Different between convex lens and concave lens.

Convex Lens	Concave Lens
(i) It is **thicker in the middle** than at edges	It is **thinner in the middle** than at edges
(ii) It is a **converging** lens	It is a **diverging** lens
(iii) It produces mostly **real images**	It produces **virtual images**
(iv) It is used to treat **hypermetropia**	It is used to treat **myopia**

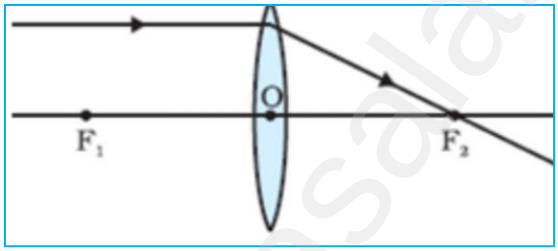
SEVEN MARKS:

1. Rules and ray diagram- convex lens.

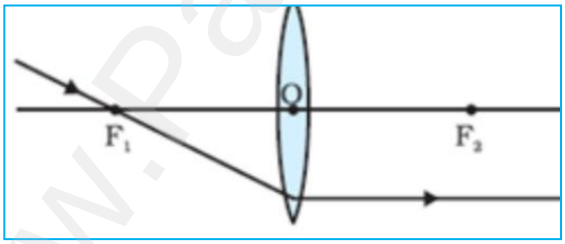
Rule – 1 : When a ray of light strikes the optical centre it continues to follow its path without any deviation.



Rule – 2 : When rays parallel to the principal axis strikes, the refracted rays are converged to the principal focus.



Rule – 3 : When a ray passing through the principal focus strikes, the refracted ray will be parallel to the principal axis.



UNIT – 3.THERMAL PHYSICS

TWO MARK:

1. Define one calorie.

The amount of heat energy required to raise the temperature of **1g of water through 1^0 C.**

2. Define co-efficient of cubical expansion.

The ratio of **increase in volume** of the body per **degree rise in temperature** to its unit volume, **unit: K^{-1}**

3. State Boyle's law.

- At a constant temperature,
- Volume is in **inversely proportional to the pressure.**
- **$V \alpha 1/P$** (or) **PV= Constant**

4. State law of volume (or) Charle's law.

- At a constant pressure,
- Volume is **directly proportional to the temperature.**
- **$V \alpha T$** (or) **V/T= constant**

5. Distinguish between Ideal Gas and Real Gas.

Ideal Gas	Real Gas
i) No intermolecular attraction force	Intermolecular attraction force.
ii) No definite volume	Definite volume.
iii) Elastic collision of particles	Non- elastic collisions between particles
iv) High pressure	Low pressure
v) Independent of factors like, T,P, and other gases	Interact with other gas and highly dependent.

6. What is co-efficient real expansion?

The ratio of the **true rise in the volume** of the liquid per degree rise in **temperature** to its unit volume**. SI unit: K^{-1}.**

7. What is co-efficient apparent expansion?

The ratio of the **apparent rise in the volume** of the liquid per degree rise in **temperature** to its volume. **SI unit: K^{-1}.**

SEVEN MARK:

1. Ideal gas equation.

(i) Boyles law: **PV = Constant ---------1**

(ii) Charles law: **V / T= Constant ---------2**

(iii) Avogadro's law **V / n = Constant --------3**

Combining equations 1 , 2 & 3 **PV / nT = Constant -----4**

Number of atoms $n = \mu N_A$,

$$\mathbf{PV / \mu N_A T = constant}$$

K_B is a Boltzmann constant , Where**, constant = K_B ,** ($K_B = 1.38 \times 10^{-23}$ JK^{-1})

$$PV / \mu N_A T = K_B$$

$$\mathbf{\therefore R = K_B \mu N_A}$$

Where, R is universal gas constant , R= 8.3 1 J mol^{-1} K^{-1}

PV = RT is called ideal gas equation

UNIT – 4. ELECTRICITY.

TWO MARKS

1.Define the unit of current.

* Ampere **(A)** . 1 Ampere = **1 coulomb / 1 second.**

* A **charge of one coulomb flows** across any cross section of conductor in one second.

2. What happens to the resistance, as the conductor is made thicker?

* Resistance decreases , **R α 1 / A**

* **Resistance** is inversely proportional to **area of cross section.**

3. Why is tungsten metal used in bulbs, but not in fuse wire?

* Tungsten has a **very high melting point.**

* It will **not melt** when a large amount of current is passed through it and the appliance will be **damaged.**

4. Name any two devices, which are working on the heating effect of electric current.

* Electric heater * Electric iron

5. What is the role of the earth wire in domestic circuits?

* Whenever a **livewire accidently touches the body** of the metallic electric appliance the earth wire sends the **current** to the earth. (serves as a protective conductor , save us from electric shocks)

6. Ohm's laws

* **Constant temperature** , **current** is directly proportional to the **potential difference** between the two ends of the conductor. **Formula: V = I R**

7. What connection is used in domestic appliances and why?

*** Parallel** connection.

* **Reason** : Each appliances will get the **full voltage**. Each of them can be put **ON / OFF independently.**

FOUR MARKS.

1. Define electric potential and potential difference.

Electric potential	Electric potential difference
The amount of **work done** in moving a **unit positive** charge from **infinity** to that point against of electric force.	The amount of **work done** in moving a **unit positive** charge from **one point to another point** against of electric force.

2. Distinguish between the resistivity and conductivity of a conductor.

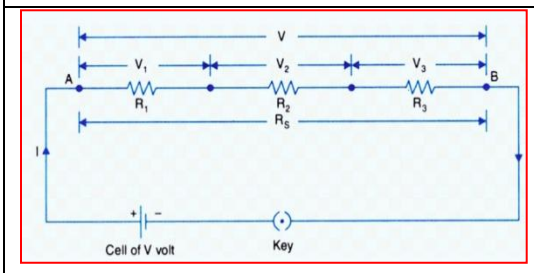
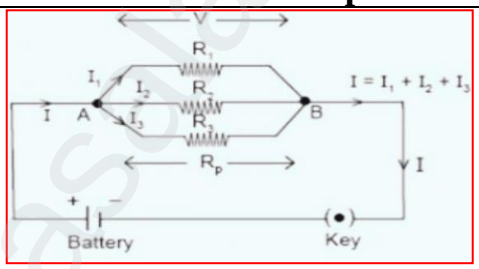
Resistivity	Conductivity
The resistance of a conductor of unit length and unit area of cross section	The reciprocal of electrical resistivity
Unit : Ohm meter	Unit : ohm^{-1} $meter^{-1}$
$\rho = RA / L$	$\sigma = 1 / \rho$

3. Difference between series and parallel

CRITERIA	SERIES	PARALLEL
Equivalent resistance	Highest resistance	Lowest resistance
Amount of current	Current is less as effective resistance is more	Current is more as effective resistance is less
Switch on/off	If one appliance is disconnected, others also do not work	If one appliance is disconnected, others will work independently

SEVEN MARK:

1. With the help of a circuit diagram derive the formula for the resultant resistance of three resistances connected.

Resistors in series	Resistors in parallel
	
R_1, R_2 and R_3 are connected in **series.** **current -same , voltage -different**	R_1, R_2 and R_3 are connected in **parallel.** **current - different , voltage – same different**
According to Ohm's law V=IR $V = V_1 + V_2 + V_3$ $V_1=IR_1$, $V_2 = IR_2$, $V_3=IR_3$ $V=IR_S$.'.$IR_S= IR_1+IR_2+IR_3$ **$R_S=R_1+R_2+R_3$** Effective resistance is equal to the sum of the individual resistance. "n" Resistors **$R_S=nR$**	According to Ohm's law I=V /R $I = I_1+I_2+I_3$ $I_1=V / R_1$, $I_2=V / R_2$, $I_3=V / R_3$, $I = V /R_P$.'. $V / R_P = V/R_1 + V/ R_2 +V/R_3$ **$1/R_P = 1/R_1 + 1/ R_2 +1/R_3$** The sum of reciprocals of the individual resistances is equal to the reciprocal of the effective "n"Resistors **$1 / R_P= n / R$ (or) $R_p =R/n$**

2. a. What is meant by electric current?

* The rate of flow of charges in a conductor. $I = Q / t$

b. Name and define its unit.

* Ampere (A) . 1 Ampere = 1 coulomb / 1 second.

* A **charge of one coulomb flows** across any cross section of conductor in one second

c. Which instrument sis used to measure the electric current? How should it be connected in a circuit?

* Ammeter

* Series connection

3. a. State Joule's law of heating.

$H = I^2 R t$

$H \alpha I^2$ → Directly proportional to the square of the current passing through the resistor.

$H \alpha R$ → Directly proportional to the resistance of he resistor.

$H \alpha t$ → Directly proportional to the time for which the current is passing through the resistor.

b. An alloy of nickel and chromium is used as the heating element. Why?

* High resistivity. * High melting point. * Not easily oxidized.

c. How does a fuse wire protect electrical appliances?

* When a large current passes through the circuit, he fuse wire **melts** due to **Joule's Heating effect** and hence the circuit gets **disconnected.**

* The electric appliances are saved from any **damage.**

4. **a. What are the advantages of LED TV over the normal TV?**

* It has **brighter picture** quality.

* It is **thinner in size.**

* It uses **less power** and consumer very less energy.

* Its **life span** is more.

* It is more **reliable**.

b. List the merits of LED bulb.

* It has no filament; there is **no loss of energy** in the form of heat.

* In comparison with the fluorescent light, it has significantly **low power** requirement.

* It is **not harmful** to the environment.

* A wide range of **colours** is possible here.

* It is **cost-efficient** and energy efficient.

*** Mercury** and other **toxic materials are not required**.

UNIT – 5.ACOUSTICS

TWO MARK:

1. What is a longitudinal wave?

The particles of a medium vibrate along the direction of propagation of the wave**.**

2. What is the audible range of frequency? Ans : Between 20 Hz and 20,000 Hz.

3. What is the minimum distance needed for an echo?

Ans : 17.2 m.

4. Name three animals, which can hear ultrasonic vibrations.

Ans : Mosquito, dogs, bats.

5. Mention two cases in which there is no Doppler effect in sound?

- Source and listener **both are at rest.**
- Source and listener are moving in **mutually perpendicular directions.**

FOUR MARK:

1. Why does sound travel faster on a rainy day than on a dry day? Effect of relative humidity?

- During rainy day the **humidity increases**, the speed of **sound increases.**
- Hence, we can hear sound from long distances **clearly during rainy seasons.**
- This shows that, sound travels faster on a rainy day than on a dry day.

2. Why does an empty vessel produce more sound than a filled one?

- Sound in a vessel is produced by the vibration of the vessel.
- The sound in a vessel **increases with vibration, amplitude and frequency.**
- An empty vessel will be in a condition of allowing more amplified vibration because of the more free space available in the vessel.

3. Explain why, the ceilings of concert halls are curved?

- Ceilings of corner halls are **curved** so that the sound after **reflection reaches every corner** of the concert hall and the audience can listen the sound clearly.
- The **Intensity** of the reflected waves is changed.
- **Multiple reflections** of sound waves.

SEVEN MARKS:

1. What are the factors that affect the speed o sound in gases?

* Effect of density. * Effect of temperature. * Effect of relative humidity.

- **Effect of density: $V \alpha \sqrt{1/d}$**

  * Velocity **is inversely proportional to the square root of the density.**

  * Velocity decreases as the density increases.

- **Effect of temperature: $V \alpha \sqrt{T}$**

***** Velocity **is directly proportional to the square root of its temperature**.

* Velocity increases temperature increase.

* Velocity at temperature (T) $V_T = (V_o + 0.61\ T)\ ms^{-1}$ At 0^0 C $V_0 = 331\ ms^{-1}$

- **Effect of relative humidity:**

* **Humidity increases, speed of sound increases**.

* We can hear sound from long distances clearly during rainy seasons.

2. a) What do you understand by the term 'ultrasonic vibration'?

Ans: The frequency greater than 20 kHz. (> 20 kHz)

b) State three uses of ultrasonic vibrations.

Tracking a satellite:

- The frequency of radio waves emitted by a satellite **decreases** as the satellite **passes away** from the Earth.
- By measuring he change in the frequency of the radio waves, the location of the **satellites** is studied.

RADAR (Radio Detection And Ranging):

- From the frequency change, the **speed** and **location** of the aeroplanes and aircrafts are tracked.

SONAR (Sound Navigation And Ranging):

- It has determined the change in the frequency between the sent signal and received signal, the **speed** of **marine animals** and **submarines.**

c) Name three animals which can hear ultrasonic vibrations.

- Mosquito, dogs, bats**.**

3. What is an echo?

The sound reproduced due to the **reflection** of the **original sound**.

Ex: Mountains

a. State two conditions necessary for hearing an echo.

- The Persistence of hearing for human ears is **0.1 Second.**
- Velocity = Distance travelled by sound / time taken
- v = 2d / t d = v x t /2
- t = 0.1 s, d= v x 0.1 / 2 = 344/20 = 17.2 m

b. What are the medical application of echo?

- The principle of echo is used in obstetric **Ultrasonography.**
- Safe testing tool.

c. How can you calculate the speed of sound using echo?

Speed of sound = distance travelled / time taken, V= 2d / t

UNIT- 6. NUCLEAR PHYSICS

TWO MARK:

1. Define critical mass.

- The minimum mass of a fissile material necessary to **sustain** the **chain reaction.**
- Depends on the **nature, density** and the size.

2. Define one roentgen.

- The quantity of radioactive substance which produces a charge of

2.58×10^{-4} coulomb in 1 kg of air at STP and humidity.

3. Give the function of control rods in a nuclear reactor.

- Control rods are used to control the number of neutrons in order to have **sustained chain reaction.**
- They **absorb** the **neutrons.**

4. What is stellar energy?

Fusion reaction that takes places in the **cores** of the sun and other stars results in an **enormous** amount of **energy.**

5. Give any two uses of radio isotopes in the field of agriculture?

- **Radio isotope of P^{32} – Increase the productivity of crops.**
- **Radio isotopes** can be used to **kill** the **insects** and **parasites.**

FOUR MARK:

1. Write any three features of natural and artificial radioactivity.

	Natural radioactivity	**Artificial radioactivity**
1.	It cannot be controlled	It can be controlled
2.	**Spontaneous** process	**Induced process**
3.	**Alpha, beta** and **gamma**	**Elementary particles**-neutron Positron
4.	**Z > 83**	**Z < 83**

2. State Soddy and Fajan's displacement law.

- When a radioactive element emits an **alpha particle,** a daughter nucleus is formed whose **mass number** is **less** by **4 units** and the **atomic number** is less by **2 units.**
- A radioactive element emits a **beta particle,** a daughter nucleus is formed whose **mass number** is the **same** and the **atomic number** is **more** by **1 unit.**

3. In Japan, some of the new born children are having congenital diseases. Why?

* Nuclear bomb blast at Hiroshima and Nagasaki during World War II.

* Chronic illness – heart defects * Disability - club foot

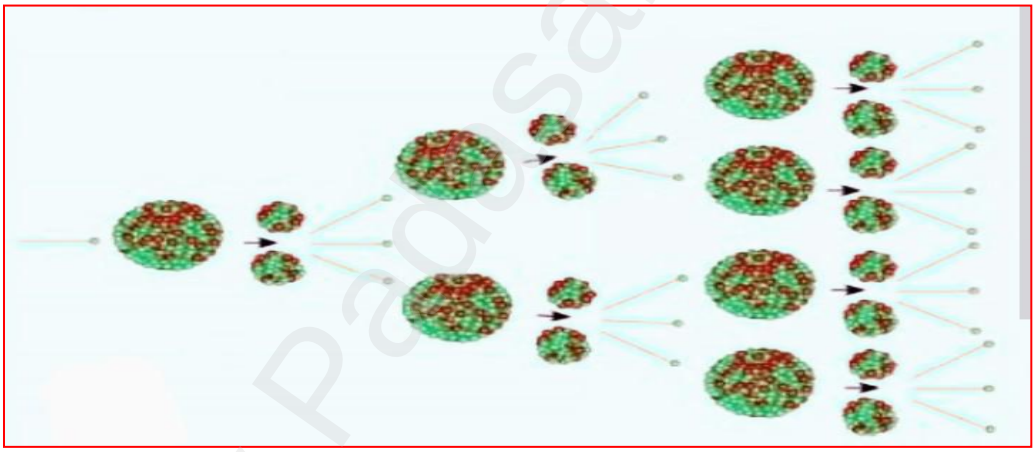
* Down syndrome.

SEVEN MARKS:

1. Explain the process of controlled and uncontrolled chain reactions.

- In the controlled chain reaction the number of neutrons released is maintained to be one.
- This is achieved by **absorbing** the **extra neutrons** with a **neutron absorber** leaving only one neutron to produce further fission.
- Sustained in a controlled manner.
- Utilized for constructive purposes.
- To produce energy in a sustained and controlled manner.

Uncontrolled chain reaction:



- In the uncontrolled chain reaction he number of neutrons multiplies **indefinitely** and causes fission in a large amount of the fissile material.
- The release of a **huge amount** of **energy** within a fraction of a second.
- **atom bomb** to produce an explosion.

2. Compare the properties of alpha, beta and gamma radiations.

	Properties	α rays	β rays	γ rays
1.	Definition	Helium nucleus ($_2He^4$) 2 P, 2 N	**Electrons ($-_1e^0$)**	**Photons**(Electromagnetic waves)
2.	Charge	**Positive charge = +2e**	**Negative charge = -e**	**Neutral = 0**
3.	Ionizing power	**High** (α > 100 times β rays > 10,000 γ rays)	**Low** (β rays > γ rays)	**Very low** (γ < β < α)
4.	Penetrating power	**Low** (α < β < γ) stop thick paper	**High** (β > γ) thin metal foil	**Very high** (γ > β > α) thick metal block
5.	Effects of electric and magnetic field	Deflected by **both** the **fields**	Deflected by **both** the **fields**	Not deflected by **both** the **fields**
6.	Speed	Ranges from **1 / 10 to 1/20** times the speed of light	Up to **9/10** times of speed of light	They travel with the **speed** of **light**

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Department of Physics

X – Physics – Important Questions

Unit-1. LAWS OF MOTION

2 mark:

1. Define inertia and give its types.
2. State Newton's first, second and third law of motion
3. What are the types of force?
4. Define linear momentum
5. Define Impulse
6. Define Torque or moment of a force
7. State laws of gravitation
8. What is meant by weightlessness?
9. What is apparent weight?
10. State principle of moments
11. If a 5 N and 15 N forces are acting opposite to one another. Find the resultant force and the direction of action of the resultant force.
12. Why a spanner with a long handle is preferred to tighten screws in heavy vehicles?
13. While catching a cricket ball the fielder lowers his hands backwards. Why?
14. How does an astronaut float in a space shuttle?
15. Define moment of a couple and give its unit.
16. Define equilibrant.
17. Write the examples of Newton's third law.
18. State the law of conservation of linear momentum.

4 mark:

1. Explain the types of force
2. Write the application of Torque
3. Derive the relation between g and G
4. Explain the different possibilities of the apparent weight 'R' of the person that arise, depending on the motion of the lift; upwards, downwards, rest and falling down freely.
5. Difference between mass and weight
6. Give the applications of universal law gravitation.
7. Describe rocket propulsion.

7 mark:

1. What are the types of inertia? Give an example for each type.
2. State Newton's laws of motion?
3. Deduce the equation of a force using Newton's second law of motion.
4. State and prove the law of conservation of linear momentum.
5. State the universal law of gravitation and derive its mathematical expression.

Unit-2. OPTICS

2 mark:

1. What is refractive index?
2. State Snell's law.
3. Draw a ray diagram to show the image formed by a convex lens when the object is placed between F and 2F.
4. Define dispersion of light
5. State Rayleigh's law of scattering
6. Differentiate convex lens and concave lens.
7. What is power of accommodation of eye?
8. What are the causes of 'Myopia'?
9. What is Tyndall scattering or Tyndall effect?
10. What is Raman line? Explain their types.
11. Difference between a convex and concave lens
12. What are the uses of convex lens and concave lens?
13. Define power of a lens.
14. What are the uses of simple microscope?
15. What are the advantages and disadvantages of the telescope?
16. Why does the sky appear in blue colour?
17. Why are traffic signals red in colour?
18. What is meant by refraction of light?
19. What are the types of scattering?
20. What is Rayleigh scattering?
21. What is Raman scattering or Raman effect?

4 mark:

1. List any five properties of light
2. Differentiate the eye defects: Myopia and Hypermetropia.
3. What are the advantages and disadvantages of telescope?
4. Explain the structure of human eye.
5. Draw a neat diagram human eye and explain the working of human eye.
6. Explain the simple microscope.
7. What is the type of telescope? Explain.

7 mark:

1. Explain the rules for obtaining images formed by a convex lens with the help of ray diagram.
2. Explain the construction and working of a 'Compound Microscope'.
3. Draw a ray diagram to show the image formed by a convex lens when the object is placed i) At infinity ii) Beyond or before C (>2F) iii) At C or 2F iv) between F and 2F or C v) At F
4. Draw a neat diagram human eye and explain the structure of the human eye.

Unit-3. THERMAL PHYSICS

2 mark:

1. Define one calorie.
2. What is co-efficient of cubical expansion?
3. State Boyle's law
4. State-the law of volume
5. Distinguish between ideal gas and real gas.
6. What is co-efficient of real expansion?
7. What is co-efficient of apparent expansion?
8. What is meant by a thermal equilibrium?
9. Define Thermal energy.
10. Define one kilocalorie.
11. What is meant by thermodynamic temperature?
12. Define linear, areal and cubical expansions.

4 mark:

1. Write the characteristic features of heat energy transfer.

2. Distinguish between linear, areal and superficial expansion.

7 mark:

1. Derive the ideal gas equation.

2. Explain the experiment of measuring the real and apparent expansion of a liquid with a neat diagram.

3. Explain the three fundamental laws which connect the relation between pressure, volume and temperature.

Unit-4. ELECTRICITY

2 mark:

1. Define electric current

2. Define unit of electric current

3. Define electric potential and potential difference.

4. Define resistance of a conductor.

5. Define unit of resistance of a conductor.

6. Difference between series and parallel circuit.

7. State Joule's law of heating.

8. Define electric power?

9. Define unit of electric power?

10. What is the role of the earth wire in domestic circuits?

11. State Ohm's law.

12. What happens to the resistance, as the conductor is made thicker?

13. Why is tungsten metal used in bulbs, but not in fuse wires?

14. Name any two devices, which are working on the heating effect of the electric current.

4 mark:

1. Distinguish between the resistivity and conductivity of a conductor.

2. Explain the equivalent resistance of a series.

3. Explain the equivalent resistance of a parallel.

4. Write the applications of heating effect.

5. Write the merits of a LED pulb.

6. Write the advantages of LED television.

7. Explain the series connection of parallel resistors.

8. Explain the parallel connection of series resistors.

7 mark:

1. With the help of a circuit diagram derive the formula for the resultant resistance of three resistances connected: a) in series and b) in parallel

2. a) What is meant by electric current?

b) Name and define its unit.

c) Which instrument is used to measure the electric current? How should it be connected in a circuit?

3. a) State Joule's law of heating.

b) An alloy of nickel and chromium is used as the heating element. Why?

c) How does a fuse wire protect electrical appliances?

4. Explain about domestic electric circuits. (Circuit diagram not required)

5. a) What are the advantages of LED TV over the normal TV?

b) List the merits of LED bulb.

6. A piece of wire having a resistance R is cut into five equal parts.

a) How will the resistance of each part of the wire change compared with the original resistance?

b) If the five parts of the wire are placed in parallel, how will the resistance of the combination change?

c) What will be ratio of the effective resistance in series connection to that of the parallel connection?

Unit-5. ACOUSTICS

2 mark:

1. What is a longitudinal wave?
2. What is the audible range of frequency?
3. What is the minimum distance needed for an echo?
4. What will be the frequency sound having 0.20 m as its wavelength, when it travels with a speed of 331 ms–1?
5. Name three animals, which can hear ultrasonic vibrations.
6. Distinguish between the sound and light waves.
7. Define Laws of reflection.
8. What are the difference between the sound and light waves?
9. Define Doppler Effect.
10. Define echo.

4 mark:

1. Why does sound travel faster on a rainy day than on a dry day?
2. Why does an empty vessel produce more sound than a filled one?
3. Air temperature in the Rajasthan desert can reach 46°C. What is the velocity of sound in air at that temperature? (V_o= 331 ms–1).
4. Explain why, the ceilings of concert halls are curved.
5. Mention four cases in which there is no Doppler effect in sound?
6. Write the categories of sound waves based on their frequencies.
7. Explain the velocity of sound waves.
8. What are the applications of reflection of sound?
9. Explain the application of Doppler Effect.

7 mark:

1. What are the factors that affect the speed of sound in gases?
2. What is mean by reflection of sound?

Explain:

a) Reflection at the boundary of a rarer medium

b) Reflection at the boundary of a denser medium

c) Reflection at curved surfaces

3. a) What do you understand by the term 'ultrasonic vibration'?

b) State three uses of ultrasonic vibrations.

c) Name three animals which can hear ultrasonic vibrations.

4. What is an echo?

a) State two conditions necessary for hearing an echo.

b) What are the medical applications of echo?

c) How can you calculate the speed of sound using echo?

5. Explain the measuring velocity of sound by echo method.
6. Explain the Doppler Effect.

Unit-6. NUCLEAR PHYSICS

2 mark:

1. Write any three features of natural and artificial radioactivity.
2. Define critical mass.
3. Define one roentgen.

4. State Soddy and Fajan's displacement law.

5. Give the function of control rods in a nuclear reactor.

6. In Japan, some of the new born children are having congenital diseases. Why?

7. Mr. Ramu is working as an X - ray technician in a hospital. But, he does not wear the lead Aprons. What suggestion will you give to Mr. Ramu?

8. What is stellar energy?

9. Give any two uses of radio isotopes in the field of agriculture?

10. Define radioactivity.

11. Define alpha decay, beta decay, gamma decay.

12. Define nuclear fission and fusion.

13. X – rays should not be taken often'. Give the reason.

14. Cell phone towers should be placed far away from the residential area – why?

4 mark:

1. Write the features of nuclear fission and nuclear fusion.

2. What are the uses of medical application of isotopes?

3. Explain the atom bomb.

4. Explain the safety measures are permitted range and preventive measures.

5. Write the uses of nuclear reactor.

6. State Soddy and Fajan's displacement law.

7. Explain the conditions necessary for nuclear fusion.

7 mark:

1. Explain the process of controlled and uncontrolled chain reactions.

2. Compare the properties of alpha, beta and gamma radiations.

3. What is a nuclear reactor? Explain its essential parts with their functions.

4. Explain the uses of radioactivity.

All units solved and numerical problems and hot questions

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