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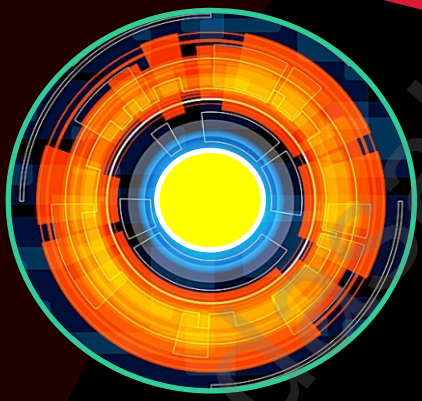

SCIENCE

ANBU NILAYAM
MADURAI - 625001

SELECTION

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SCIENCE

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TABLE OF CONTENTS

Bonding

SELECTION
NINETH STANDARD
⑨ SCIENCE

PHYSICS

UNIT - 1. Measurement

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. Choose the correct one

a) mm < cm < m < km b) mm > cm > m > km
c) km < m < cm < mm d) mm > m > cm > km **Ans : a) mm < cm < m < km**

2. Rulers, measuring tapes and metre scales are used to measure

a) Mass b) Weight c) Time d) Length **Ans : d) Length**

3. 1 metric ton is equal to

a) 100 quintals b) 10 quintals c) 1 / 10 quintals d) 1 / 100 quintals
Ans : b) 10 quintals

II. Fill in the blanks.

1. Metre is the unit of ..... **Ans : length**
3. Thickness of a cricket ball is measured by ..... **Ans : Vernier caliper**
4. Radius of a thin wire is measured by ..... **Ans : Screw gauge**

III. State whether True or False. If false, correct the statement :

1. The SI unit of electric current is kilogram. **Ans : False**

Correct statement : The SI unit of electric current is **Ampere**.

2. Kilometre is one of the SI units of measurement. **Ans : False**

Correct statement : **metre** is one of the SI units of measurement.

5. One Celsius degree is an interval of 1 K and zero degree Celsius is 273.15K.
Ans : True

6. With the help of vernier caliper we can have an accuracy of 0.1 mm and with screw gauge we can have an accuracy of 0.01 mm. **Ans : True**

IV. Match the following.

1.

1)	Length	a)	Kelvin
2)	Mass	b)	metre
3)	Time	c)	kilogram
4)	Temperature	d)	second

Ans :

1)	**Length**	**b)**	**metre**
2)	**Mass**	**c)**	**kilogram**
3)	**Time**	**d)**	**second**
4)	**Temperature**	**a)**	**Kelvin**

2.

1)	Screw gauge	b)	Coins
2)	Vernier caliper	d)	Cricket ball

Ans :

1)	**Screw gauge**	**b)**	**Coins**
2)	**Vernier caliper**	**d)**	**Cricket ball**

V. Assertion and reason type Questions.
Mark the correct answer as :

2. Assertion (A) : $0^{\circ}C$ = 273.16K. For our convenience we take it as 273K after rounding off the decimal.

Reason (R) : To convert a temperature on the Celsius scale we have to add 273 to the given temperature.

(a) Both A and R are true but R is not the correct reason.
(b) Both A and R are true and R is the correct reason.
(c) A is true but R is false.
(d) A is false but R is true.

Ans : (b) Both A and R are true and R is the correct reason.

3. Assertion (A) : Distance between two celestial bodies is measured in terms of light year.

Reason (R) : The distance travelled by the light in one year is one light year.

(a) Both A and R are true but R is not the correct reason.
(b) Both A and R are true and R is the correct reason.
(c) A is true but R is false
(d) A is false but R is true.

Ans : (b) Both A and R are true and R is the correct reason.

VI. Answer very briefly.

1. Define measurement.
Ans : Measurement is defined as the determination of the size or magnitude of a quantity.

2. Define standard unit.
Ans : SI System of units is the modernised and improved form of the previous system of units.

3. What is the full form of SI system ?
Ans : International system of units.

4. Define least count of any device.
Ans : The smallest length which can be measured by metre scale is called least count.

5. What do you know about pitch of screw gauge ?
Ans : Pitch of the Screw gauge : Pitch of the screw is the distance moved by the tip of the screw for one complete rotation of the head.

6. Can you find the diameter of a thin wire of length 2m using the ruler from your instrument box ?
Ans : No.
✶ Diameter of a thinwire of length 2 m cannot be measured by ruler.
✶ It can be measured by screwguage.

VII. Answer briefly.

2. Write the need of a standard unit.

Ans :

★ Earlier , different unit systems were used by people from different countries. So there is a necessity to use worldwide system of measurement called SI system of units.

★ Hence, SI (International System of Units) system of units was developed and recommended by General Conference on Weights and Measures at Paris in 1960 for international usage.

---

4. How will you measure the least count of vernier caliper ?

Ans : Least count of a vernier caliper (LC)

$$LC = \frac{\text{Value of one smallest main scale division}}{\text{Total number of vernier scale division}}$$

$$LC = \frac{1mm}{10} = 0.1mm = 0.01cm$$

VIII. Answer in detail.

1. Explain a method to find the thickness of a hollow tea cup.

Ans :

Thickness of a hollow tea cup can be found by vernier caliper.

1. First calculate the least count (LC) and the zero error (ZE) of the vernier caliper.
2. Now grip the hollow tea cup between the upper jaws to find the thickness.
3. Note the Main Scale Reading (MSR) just before the zero of the vernier.
4. Note the division of the vernier scale which coincides with a main scale division (VC).
5. The thickness of a hollow tea cup is found by the formula = MSR + (VC x LC) ± ZC

S.No.	Main scale Reading MSR X 10^{-2}m	Vernier scale Coincidence VC	Observed Reading OR = MSR + (VC X LC)	Corrected Reading CR = OR ± ZC

---

2. How will you find the thickness of a one rupee coin ?

Ans : The thickness of the one rupee coin can be found by screw gauge.

1. Determine the pitch, the least count and the zero error of the screw gauge.
2. Place the coin between the two studs.
3. Rotate the head until the coin is held firmly but not tightly, with help of the ratchat.
4. Note the reading of the pitch scale crossed by the head scale (PSR) and the head scale division that coincides with the pitch scale axis (HSC)
5. The thickness of the coin is given by PSR + CHSR (Corrected HSR). Repeat the experiment for different positions of the coin.
6. Tabulate the readings.
7. The average of the last column readings gives the thickness of the one rupee coin.

Table Z.E = (0) Z.C = Nil (0) LC = 0.01mm

S.No.	PSR (mm)	HSC (division)	CHSC = HSC ± ZC (division)	CHSR = CHSC x LC (mm)	Total Reading = PSR + CHSR(mm)
1.	1	32	32 x 0.01 = 0.32	1 + 0.32 = 1.32	1.32 + 0
2.	1	34	34 x 0.01 = 0.34	1 + 0.34 = 1.34	1.34 + 0
				Average	2.66 / 2 = **1.33**

The thickness of one rupee coin = 1.33mm

IX. Numerical problems.

1. Inian and Ezhilan argue about the light year. Inian tells that it is 9.46×10^{15} m and Ezhilan argues that it is 9.46×10^{12} km. Who is right ? Justify your answer.

Solution : Inian argue is right. Light year is the distance travelled by light in one year is vacuum.

Light travels 3×10^8 m in one second

1 year = 365 days

The total number of seconds is one year = $365 \times 24 \times 60 \times 60$

$= 3.153 \times 10^7$ second

1 light year = $3.153 \times 10^7 \times 3 \times 10^8$

1 light year = 9.46×10^{15} m

2. The main scale reading while measuring the thickness of a rubber ball using Vernier caliper is 7cm and the Vernier scale coincidence is 6. Find the radius of the ball.

Solution :

MSR = 7cm = 70 mm

Coincidence (VC) = 6

Radius = ?

Thickness (Diameter of the ball) = MSR + (VC x LC) - Z.E

= 70 + (6 x 0.1) - 0

= 70 + 0.6 = 70.6 mm

$$\text{Radius of the ball} = \frac{\text{Thickness}}{2} = \frac{70.6}{2} = 35.3 \text{ mm}$$

∴ The radius of the ball = 35.3mm

3. Find the thickness of a five rupee coin with the screw gauge, if the Pitch scale reading is 1 mm and its head scale coincidence is 68.

Solution :

Pitch Scale Reading (PSR) = 1mm

Head Scale Coincidence (HSC) = 68

Thickness of the coin = PSR + CHSR

Corrected HSC (CHSC) = HSC ± ZC

Z.E = 0 ; ZC = 0

CHSC = 68 + 0 = 68

CHSR = CHSC x LC

LC = 0.01mm

CHSR = 68 x 0.01 = 0.68mm

∴ Thickness of the coin = 1 + 0.68 = 1.68 mm

Additional Questions and Answers

I. Choose the best answer :

1. SI unit of Luminour intensity .....

a) ampere b) kelvin c) candela d) mole **Ans : c) candela**

2. 1 Metric tonne is equal to ..... kg

a) 100 kg b) 10 kg c) 1000 kg d) 10000 kg

Ans : c) 1000 kg

II. Fill in the blanks.

1. ..... is the unit of distance used to measure astronomical objects outside the solar system. **Ans : Parsec**
2. The value for 1 AU (Astronomical Unit) is ..... **Ans : 1.496×10^{11} m**
3. Larger unit for measuring time is ..... **Ans : millennium**

III. Short questions :

1. Define 'Units'.

Ans : A unit is a standard quantity with which the unknown quantities are compared. It is defined as a specific magnitude of a physical quantity that has been adopted by law or convention.

---

2. Define Astronomical unit

Ans : Astronomical unit (AU): It is the mean distance of the centre of the Sun from the centre of the Earth.

$1\,AU = 1.496 \times 10^{11}$ m

---

3. Define Light year.

Ans : Light year: It is the distance travelled by light in one year in vacuum and it is equal to 9.46×10^{15} m.

---

4. Define Atomic mass unit.

Ans : Atomic mass unit :

Mass of a proton, neutron and electron can be determined using atomic mass unit (amu).

1 amu = $(1/12)^{th}$ of the mass of C^{12} atom.

---

5. Define Temperature.

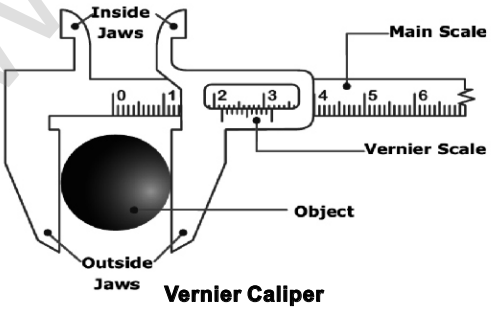
Ans : Temperature is the measure of hotness or coldness of a body.

SI unit of temperature is kelvin (K).

---

6. Draw and mark the parts of Vernier Caliper.

Ans :



Vernier Caliper

UNIT - 2. Motion

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. The area under velocity - time graph represents the

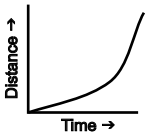
a) velocity of the moving object b) displacement covered by the moving object
c) speed of the moving object d) acceleration of the moving object

Ans : b) displacement covered by the moving object

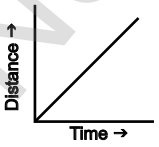
3. Which of the following graph represents uniform motion of a moving particle ?

a) 

b) 

c) 

d) 

Ans : b) 

II. Fill in the blanks.

1. Speed is a ..... quantity whereas velocity is a ..... quantity.
Ans : Scalar, Vector
2. The slope of the distance - time graph at any point gives ..... **Ans : speed**
3. Negative acceleration is called ..... **Ans : retardation**
4. Area under velocity - time graph shows ..... **Ans : displacement**

III. State whether true or false. If false, correct the statement.

1. The motion of a city bus in a heavy traffic road is an example for uniform motion.

Ans : False. Correct statement : The motion of a city bus in a heavy traffic road is an example for **Non-uniform motion.**

2. Acceleration can get negative value also. **Ans : True**

3. Distance covered by a particle never becomes zero but displacement becomes zero. **Ans : True**

5. If the velocity - time graph of a particle is a straight line inclined to X - axis then its displacement - time graph will be a straight line. **Ans : True**

IV. Assertion and Reason Type Questions.

Mark the correct Choice as :

1. Assertion : The accelerated motion of an object may be due to change in magnitude of velocity or direction or both of them.

Reason : Acceleration can be produced only by change in magnitude of the velocity. It does not depend the direction.

a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false.
d) If assertion is false but reason is true.

Ans : d) If assertion is false but reason is true.

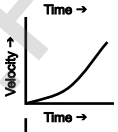
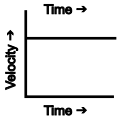
---

2. Assertion : The speedometer of a car or a motor - cycle measures its average speed.
Reason : Average velocity is equal to total displacement divided by total time taken.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false.
d) If assertion is false but reason is true.
Ans : b) If both assertion and reason are true but reason is not the correct explanation of assertion.

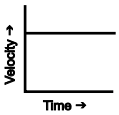
---

3. Assertion : Displacement of a body may be zero when distance travelled by it is not zero.
Reason : The displacement is the shortest distance between initial and final position.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false.
d) If assertion is false but reason is true.
Ans : a) If both assertion and reason are true and reason is the correct explanation of assertion.

V. Match the Following.

List I	List II
1. Motion of a body covering equal distances in equal interval of time	A 
2. Motion with non uniform acceleration	B 
3. Constant retardation	C 
4. Uniform acceleration	D 

Ans :

List I	List II
1. Motion of a body covering equal distances in equal interval of time	D 
2. Motion with non uniform acceleration	C 
3. Constant retardation	A 
4. Uniform acceleration	B 

VI. Answer briefly.
1. Define velocity.
Ans :
- Velocity is the rate of change of displacement.
- It is the displacement in unit time. It is a vector quantity.
- The SI unit of velocity is ms^{-1}
- Velocity = $\frac{\text{Displacement}}{\text{Time taken}}$

---

2. Distinguish distance and displacement.

Ans :

S.No.	Distance	Displacement
1.	The actual length of the path travelled by a moving body irrespective of the direction is called the distance travelled by the body.	It is defined as the change in position of a moving body in a particular direction.
2.	It is a scalar quantity having magnitude only.	It is a vector quantity having both magnitude and direction.
3.	It is measured in metre in SI system.	It is also measured in metre in SI system.

3. What do you mean by uniform motion ?

Ans : Uniform motion : An object is said to be in uniform motion if it covers equal distances in equal intervals of time.

4. Compare speed and velocity.

Ans :

S.No	Speed	Velocity
1.	Speed is the rate of change of distance or the distance travelled in unit time	Velocity is the rate of change of displacement.
2.	It is a scalar quantity	It is a vector quantity
3.	The SI unit of speed is ms^{-1}	The SI unit of velocity is ms^{-1}
4.	$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}}$	$\text{Velocity} = \frac{\text{Displacement}}{\text{Time taken}}$

ance travelled

5. What do you understand about negative acceleration ?

Ans : Negative acceleration :

✶ If final velocity is less than initial velocity, the velocity decreases with time and the value of acceleration is negative. It is called negative acceleration.

✶ Negative acceleration is called retardation or deceleration.

VII. Answer in detail.

2. Explain different types of Motion.

Ans :

Linear motion: Motion along a straight line.

Circular motion: Motion along a circular path.

Oscillatory motion: Repetitive to and fro motion of an object at regular interval of time.

Random motion: Motion of the object which does not fall in any of the above categories.

Uniform motion

An object is said to be in uniform motion if it covers equal distances in equal intervals of time howsoever big or small these time intervals may be.

Non-uniform motion

An object is said to be in non-uniform motion if it covers unequal distances in equal intervals of time.

VIII. Exercise Problems.

1. A ball is gently dropped from a height of 20m. If its velocity increases uniformly at the rate of $10ms^{-2}$ with what velocity will it strike the ground ? After what time will it strike the ground ?

Solution :

Distance (s) = 20 m
Acceleration(a) = $10\ ms^{-2}$
Here we have initial distance (u) = 0
Final velocity (v) = ?
Time (t) = ?

(a) calculation of final velocity, v - we know that,

$$v^2 = u^2 + 2as$$
$$v^2 = 0 + 2 \times 10 \times 20$$
$$v^2 = 400$$
$$v = \sqrt{400} = 20$$

$$\boxed{v = 20\ m/s}$$

∴ **Ball will strike the ground at a velocity of $20\ ms^{-1}$**

(b) Calculation of time, t - we know that,

$$v = u + at$$
$$20 = 0 + (10) \times t$$
$$t = \frac{20}{10} = 2s$$

$$\boxed{t = 2s}$$

∴ **Time taken to reach the ground = 2s**

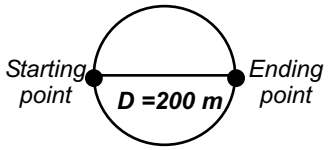
---

2. An Athlete completes one round of a circular track of diameter 200m in 40s. What will be the distance covered and the displacement at the end of 2m and 20s ?

Solution :

Diameter of circular track (D) = 200m

Radius of circular track (r) = $\frac{200}{2}$ = 100m



Time taken by the athlete for one round (t) = 40 s
Time after 2m 20 s = 2 x 60s + 20s = 140 s
Distance after 140 s = ?
Displacement after 140 s = ?
Circular track with diameter of 200 m
We know that,

$$\text{Velocity along a circular path} = \frac{\text{Circumference}}{\text{time}}$$

$$v = \frac{2\pi r}{40\ s}$$

$$v = \frac{2 \times 3.14 \times 100\,m}{40\,s}$$

$$v = \frac{628\,m}{40\,s} = 15.7$$

$$v = 15.7\,m/s$$

a) Distance after 140 s

We know that,

Distance = velocity x time

Distance = 15.7 m/s x 140 s

= 2198 m

b) Displacement after 2min 20s i.e. in 140 s

We know that,

Distance = velocity x time

Since rotation in 40s = 1

$\therefore$ Rotation in 1s = $\frac{1}{40}$

$\therefore$ Rotation in 140s = $\frac{1}{40} \times 140 = 3.5$

$\therefore$ In 3.5 rotation athlete will be just at the opposite side of the circular track.

i.e. at a distance equal to the diameter of the circular track which is equal to 200 m

$\therefore$ Distance covered in 2 min 20 s = 2198 m

min 20 s = 200 m Displacement after 2 min 20 s = 200 m

---

3. A racing car has a uniform acceleration of 4ms^{-2}. What distance it covers in 10s after the start ?

Solution : Initial velocity of the car (u) = 0ms^{-1}

Acceleration (a) = 4 /ms^2

Time (t) = 10 s

We know distance (s) = $ut + \frac{1}{2}at^2$

Distance covered by the car in 10S = $0 \times 10 + \frac{1}{2} \times (4) \times (10)^2$

$= 0 + \frac{1}{2} \times 400 = 200$

The distance covered in 10s is 200 m

Additional questions and answers

Part - I. (One mark)

I. Choose the correct answer.

1. In ..... motion the object moves along a straight line

a) circular motion b) linear motion
c) oscillatory motion d) random motion

Ans : b) linear motion

2. SI unit for accelerations is.....

a) m/s b) ms^2
c) ms^{-2} d) ms^3 **Ans : c) ms^{-2}**

II. Fill in the blanks

1. a) ..... is the rate of change of velocity.
   b) Speed is a ..... quantity.

Ans : a) Acceleration b) scalar

2. a) Motion along a circular path.....
   b) The acceleration of an object is the change in..... per unit time.

Ans : a) circular motion b) velocity

III. Short answers

1. What is motion?

Ans :

Motion is a change of position, which can be described in terms of the distance moved or the displacement.

---

2. Define- acceleration.

Ans :

Acceleration is the rate of change of velocity.

UNIT - 3. Fluids

TEXT BOOK EXERCISES

I. Choose the correct answer:

1.The size of an air bubble rising up in water

a) decreases b) increases c) remains same d) may increase or decrease

Ans : b) increases

2. Clouds float in atmosphere because of their low

a) density b) pressure c) velocity d) mass **Ans : a) density**

3. In a pressure cooker, the food is cooked faster because

a) increased pressure lowers the boiling point
b) increased pressure raises the boiling point
c) decreased pressure raises the boiling point
d) increased pressure lowers the melting point

Ans : b) increased pressure raises the boiling point

4. An empty plastic bottle closed with an airtight stopper is pushed down into a bucket filled with water. As the bottle is pushed down, there is an increasing force on the bottom. This is because

a) more volume of liquid is displaced
b) more weight of liquid is displaced
c) pressure increases with depth
d) all the above

Ans : c) pressure increases with depth

II. Fill in the blanks.

1. The weight of the body immersed in a liquid appears to be.....than its actual weight.

Ans :lesser

2. The instrument used to measure atmospheric pressure is .....

Ans : barometer

3. The magnitude of buoyant force acting on an object immersed in a liquid depends on ..... of the liquid. **Ans : density**

4. A drinking straw works on the existence of .....

Ans : air pressure

III. State whether True or False. If false, correct the statement.

1. The weight of fluid displaced determines the buoyant force on an object.

Ans : True

2. The shape of an object helps to determine whether the object will float or not.

Ans : False

Correct Statement : The **density** of an object helps to determine whether the object will float.

3. The foundations of high - rise buildings are kept wide so that they may exert more pressure on the ground. **Ans : False**

Correct Statement : The foundations of high - rise buildings are kept wide so that they may exert less pressure on the ground.

4. Archimedes' principle can also be applied to gases. **Ans : True**

5. Hydraulic press is used in the extraction of oil from oil seeds. **Ans : True**

IV. Match the following.

1.	Density	-	a) h g
2.	1 gwt	-	b) Milk
3.	Pascal's Law	-	c) $\frac{\text{Mass}}{\text{Volume}}$
4.	Pressure exerted by a fluid	-	d) Pressure
5.	Lactometer	-	e) 980 dyne

Ans :

1.	**Density**	**-**	**c) $\frac{\text{Mass}}{\text{Volume}}$**
2.	**1 gwt**	**-**	**e) 980 dyne**
3.	**Pascal's Law**	**-**	**d) Pressure**
4.	**Pressure exerted by a fluid**	**-**	**a) h g**
5.	**Lactometer**	**-**	**b) Milk**

V. Answer in brief.

1. On what factors the pressure exerted by the liquid depends on?

Ans : Pressure exerted by a liquid at a point is determined by,
(i) depth (h)
(ii) density of the liquid ( )
(iii) acceleration due to gravity (g).

2. Why does a helium balloon float in air?

Ans : ★ Helium is lighter than ordinary air and this gives helium buoyancy.
★ Hence helium balloon floats in air.

3. Why it is easy to swim in sea water than in river water?

Ans : ★ Sea water's density is more than the density of river water.
★ Because sea water contains dissolved salts.
★ Due to high density buoyant force increases.
★ So, it is easy to swim in sea water that in river water.

4. What is meant by atmospheric pressure?

Ans : ★ An air occupies space and has weight, it also exerts pressure.
★ This pressure is called atmospheric pressure.

5. State Pascal's Law.

Ans : ★ The external pressure applied on an incompressible liquid is transmitted uniformly throughout the liquid.

VI. Answer in detail:

1. With an appropriate illustration prove that the force acting on a smaller area exerts a greater pressure.

Ans : ★ Stand on loose sand.
★ Your feet go deep into the sand.
★ Now, lie down on the sand.
★ You will find that your body will not go that deep into the sand.
★ In both the cases of the above activity, the force exerted on the sand is the weight of your body which is the same.

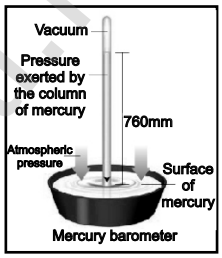
★ This force acting perpendicular to the surface is called thrust.
★ When you stand on loose sand, the force is acting on an area equal to the area of your feet.
★ When you lie down, the same force acts on an area of our whole body, which is larger than the area of our feet.
★ Therefore the effect of thrust, depends on the area on which it acts.
★ The effect of thrust on sand is larger while standing than while lying.
★ The force per unit area acting on an object concerned is called pressure.
★ Thus, we can say thrust on an unit area is pressure.

$$\text{Pressure} = \frac{\text{Thrust}}{\text{Area of contact}}$$

★ For the same given force, if the area is large pressure is low and vice versa.

---

2. Describe the construction and working of mercury barometer.
Ans : Mercury barometer :
Uses :
★ The instrument used to measure atmospheric pressure is called barometer.



Construction :
★ A mercury barometer, first designed by an Italian Physicist Torricelli, consists of a long glass tube (closed at one end, open at the other) filled with mercury and turned upside down into a container of mercury.
★ This is done by closing the open end of the mercury filled tube with the thumb and then opening it after immersing it in to a through of mercury.
it in to a through of mercury
Working :
★ The barometer works by balancing the mercury in the glass tube against the outside air pressure.
★ If the air pressure increases, it pushes more of the mercury up into the tub and if the air pressure decreases, more of mercury drains from the tube.
★ As there is no air trapped in the space between mercury and the closed end, there is vacuum in that space.
★ Vacuum cannot exert any pressure.
★ So the level of mercury in the tube provides a precise measure of air pressure which is called atmospheric pressure.

---

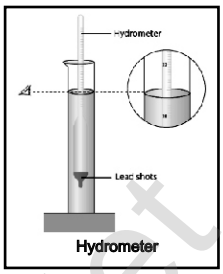
3. How does an object's density determine whether the object will sink or float in water?
Ans :
★ Whether an object will sink or float in a liquid is determined by the density of the object compared to the density of the liquid.
★ If the density of a substance is less than the density of the liquid it will float.
★ For example a piece of wood which is less dense than water will float on it. Any substance having more density than water (for example, a stone), will sink into it.

---

4. Explain the construction and working of a hydrometer with diagram.

Ans : Hydrometer :

Uses :



Hydrometer

★ A direct-reading instrument used for measuring the density or relative density of the liquid is called hydrometer.

★ Hydrometer is based on the principle of flotation, i.e., the weight of the liquid displaced by the immersed portion of the hydrometer is equal to the weight of the hydrometer.

Working :

★ Hydrometer consists of a cylindrical stem having a spherical bulb at its lower end and a narrow tube at is upper end.

★ The lower spherical bulb is partially filled with lead shots or mercury.

★ This helps hydrometer to float or stand vertically in liquids.

★ The narrow tube has markings so that relative density of a liquid can be read directly.

★ The liquid to be tested is poured into the glass jar. The hydrometer is gently lowered in to the liquid until it floats freely.

★ The reading against the level of liquid touching the tube gives the relative density of the liquid.

VII. Assertion and Reason type Questions.

Mark the correct answer as

1. Assertion : To float, body must displace liquid whose weight is equal to the actual weight.

Reason : The body will experience no net downward force in that case.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) If assertion is true but reason is false.

(d) If assertion is false but reason is true.

Ans : (a) If both assertion and reason are true and reason is the correct explanation of assertion.

2. Assertion : Pascal's law is the working principle of a hydraulic lift.

Reason : Pressure is thrust per unit area.

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) If assertion is true but reason is false.

(d) If assertion is false but reason is true.

Ans : (b) If both assertion and reason are true but reason is not the correct explanation of assertion.

VIII. Numerical Problems.

1. A block of wood of weight 200 g floats on the surface of water. If the volume of block is 300 cm^3 calculate the upthrust due to water.

Solution :

Volume of block, V = 300 cm^3

1 Kilogram force = 1Kgf = $9.8\ ms^{-2}$
Weight of block = 200 gf
= 0.2 kgf
= 0.2 x 9.8
= 1.96 N
Block is floated in the water it is equated by upthrust force,
Upthrust due to water = **1.96 N**

---

3. The density of water is 1 g cm^{-3}. What is its density in S.I. units?
Solution :

Density of water at 4°C = $1000\ kgm^{-3}$
1 gram = 1×10^{-3} kg
1 cm = $1 \times 10^{-6}\ m^3$
Density of water in S.I. units = $\frac{1 \times 10^{-3}}{1 \times 10^{-6}}$
= $10^{-3} \times 10^{-6}$
= 10^{6-3}
= $1000\ kg/m^3$
∴ **Density of water in S.I unit = $1000\ kg/m^3$**

---

4. Calculate the apparent weight of wood floating on water if it weighs 100g in air.
Ans :
★ Archimedes principle states that "a body immersed in a fluid experiences a vertical upward buoyant force equal to the weight of the fluid it displaces"
★ Apparent weight of an object = The weight of the body in air - upthrust
= **100g - 100g =0**

IX. Higher Order Thinking Skills.
1. How high does the mercury barometer stand on a day when atmospheric pressure is 98.6 kPa?
Solution :

Atmospheric Pressure P = h g
98.6 kpa = h x 13600 x 9.8
$h = \frac{P}{g}$
$h = \frac{98.6}{13600 \times 9.8}$
$h = \frac{98600}{133280} = 0.7397$
∴ **Height of the mercury h =0.7397 mm (or) 740 mm**

---

2. How does a fish manage to rise up and move down in water?
Ans :
★ To reduce its overall density, a fish fills the bladder with oxygen collected from the surrounding water through the gills.
★ In this case, the forces of buoyancy and gravity cancel each other out, and the fish stays at that level.
★ Most fish rise and sink using this method.

---

3. If you put one ice cube in a glass of water and another in a glass of alcohol, what would you observe? Explain your observations.
Ans :
★ The density of ice cube is lesser than density of water.
★ So it floats in water.
★ But, the density of ice cube is greater than the density of alcohol.
★ So, it sinks in alcohol.
★ Density of water = $1 g/cm^3$
★ Density of ice = $0.917 g/cm^3$
★ Density of alcohol = $0.789 g/cm^3$

---

4. Why does a boat with a hole in the bottom would eventually sink?
Ans :
★ The water wins and rushes into the boat, that means the boat is heavier.
★ So, it starts to sink, trying to displace more water.
★ But the water keeps coming in because, the hydrostatic pressure at the hole is always higher than the atmospheric pressure, pushing down on the surface of the water in the boat.

Additional Questions & Answers

I. Choose the best answer.

1. Thrust acting normally to a unit area of a surface is called .....
a) Thrust b) Buoyancy c) Pressure d) Density
Ans :c) Pressure

2. The unit of pressure is .....
a) Nm^{-2} b) Nm^{-1} c) Nm^{-3} d) Nm^{2} **Ans :a) Nm^{-2}**

3. The atmospheric pressure of Mount Everest summit is .....
a) 106.7 kPa b) 101.3 kPa c) 33.7 kPa d) 37.3 kPa
Ans :c) 33.7 kPa

4. The value of 1 bar = ...
a) 1.3×10^7 Pa b) 1×10^5 Pa c) 1.5×10^3 Pa d) 1.7×10^5 Pa
Ans :b) 1×10^5 Pa

II. Fill in the blanks.

1. Both liquids and gases are called ..... . **Ans : fluids**
2. The formula for pressure due to a liquid column, P = ... **Ans : h g**
3. Human lung is well adapted to breathe at a pressure of sea level ..... **Ans: 101.3kPa**
4. The instrument used to measure atmospheric pressure is called .....
Ans : barometer
5. The value of 1 atm = ... **Ans : 1.013×10^5 Pa**
6. 1 atm = ... bar **Ans : 1.013**

7. In petrol bunks, the tyre pressure of vehicles is measured in a unit called .....
Ans : psi

8. psi stands for ..... **Ans : Pascal per inch**

9. The density of water is = ... **Ans : 1 g/ cm^3**

10. ..... is used for measuring higher levels of alcohol in spirits.
Ans : alcoholometer

III. Short questions.

1.Define Density.

Ans : The density of a substance is the mass per unit volume of a given substance.

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

SI unit of Density is kg / m^3

---

2. Define buoyancy.

Ans :

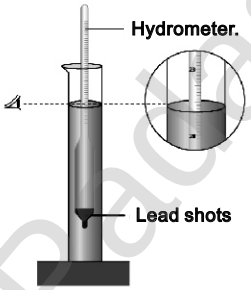
★ If a body partially or fully immersed in a fluid, the pressure is more at the bottom and less at the top of the liquid.

★ This pressure difference causes a force on the object and pushes it upward. This force is called buoyant force and the phenomenon is called buoyancy.

---

3. Draw and mark the parts of Hydrometer.

Ans :



Hydrometer.

UNIT - 4. Electric charge and Electric current

TEXT BOOK EXERCISES

I. Choose the correct answer

1. In current electricity, a positive charge refers to,
a) presence of electron b) presence of proton
c) absence of electron d) absence of proton
Ans : c) absence of electron

2. Rubbing of comb with hair
a) creates electric charge b) transfers electric charge
c) either (a) or (b) d) neither (a) nor (b)
Ans :b) transfers electric charge

3. Electric field lines..... from positive charge and..... in negative charge.
a) start; start b) start; end
c) start: end d) end; end **Ans : b) start; end**

4. Potential near a charge is the measure of its ..... to bring a positive charge at that point.
a) force b) ability
c) tendency d) work **Ans : d) work**

6. In an electrolyte the current is due to the flow of,
a) electrons b) positive ions
c) both (a) and (b) d) neither (a) nor (b) **Ans : c) both (a) and (b)**

8. Resistance of a wire depends on,
a) temperature b) geometry
c) nature of material d) all the above **Ans : d) all the above**

b) geometry

II. Match the following

1.	Electric Charge	(a)	ohm
2.	Potential difference	(b)	ampere
3.	Electric field	(c)	coulomb
4.	Resistance	(d)	newton per coulomb
5.	Electric current	(e)	volt

Ans :

1.	**Electric Charge**	**(c)**	**coulomb**
2.	**Potential difference**	**(e)**	**volt**
3.	**Electric field**	**(d)**	**newton per coulomb**
4.	**Resistance**	**(a)**	**ohm**
5.	**Electric current**	**(b)**	**ampere**

III. State whether True or False. If false correct the statement.

1. Electrically neutral means it is either zero or equal positive and negative charges.
Ans : True
2. Ammeter is connected in parallel in any electric circuit. **Ans : False**
Correct statement : Ammeter is connected in **series** in any electric circuit.
4. Current can produce magnetic field. **Ans : True**

IV. Fill in the blanks

1. Electrons move from..... potential to .....potential. **Ans :higher, lower**
2. The direction opposite to the movement of electron is called..... current.
Ans :Conventional
3. The e.m.f of a cell is analogues to ..... of a pipe line. **Ans : Pump**
4. The domestic electricity in India is an ac with a frequency of ..... Hz. **Ans : 50 Hz**

V. Conceptual questions

1. A bird sitting on a high power electric line is still safe. How?

Ans : A bird sitting on a transmission line does not complete the circuit. If the same bird keeps one leg on one line and another leg on another line, then it will get roasted.

---

2. Does a solar cell always maintain the potential across its terminals constant? Discuss.

Ans :

✶ Solar cell voltage does not remain constant just as long as. There is sufficient irradiance light from dull to bright sunlight, because solar cell works on the principle of photo voltaic effect.

✶ It is a form of photoelectric cell, defined as a device whose electrical characteristics, such as current, voltage or resistance, very when exposed to light.

VI. Answer the following

1. On what factors does the electrostatic force between two charges depend?

Ans : The numerical value (magnitude) of electric force between two charges depend on the, i. value of charges on them ii. distance between them and iii. nature of medium between them

---

2. What are electric lines of force?

Ans : The electric lines of force are straight or curved paths along which a unit positive charge tends to move in the electric field. Electric lines of force are imaginary lines.

---

3. Define electric field.

Ans : The region in which a charge experiences electric force forms **the 'electric field'** around the charge.

---

4. Define electric current and give its unit.

Ans :

✶ Current is the rate at which charges flow past a point on a circuit.

✶ The standard SI unit for current is ampere with the symbol A.

---

5. State Ohm's law.

Ans :

The electric potential difference across two points in an electric circuit is directly proportional to the current passing through it.

V is the potential difference I is the current; V I; V=IR

V=IR

R is the proportionality constant (or) Resistance

---

8. List the safety features while handling electricity.

Ans : (i) Ground connection (ii) Trip switch (iii) Fuse

VII. Exercises

1. Rubbing a comb on hair makes the comb get - 0.4C. (a) Find which material has lost electron and which one gained it. (b) Find how many electrons are transferred in this process.

Solution : (a) Hair has lost the electron. The comb has gained the electron.

(b) The charge received by comb q = -0.4 C.

electric charge q - ne

n - number of electrons in 1 coulomb

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

$q = ne$

$n = q/e$

$= \frac{0.4\,C}{1.6 \times 10^{-19}\,C}$; $0.25 \times 10^{19} = 2.5 \times 10^{18}$ electrons

So, 2.5×10^{18} electrons are transferred in this process.

---

2. Calculate the amount of charge that would flow in 2 hours through an element of an electric bulb drawing a current of 2.5A

Solution : Time 't' = 2 hours

= 2x60x60 = 7200 s

Current 'I' = 2.5A

The amount of charge, q = ?

I = q/t ; q = I X t = 2.5x7200 = 18,000

Amount of charge q = 18000C

---

3. The values of current (I) flowing through a resistor for various potential differences V across the resistor are given below. What is the value of resistor?

Solution :

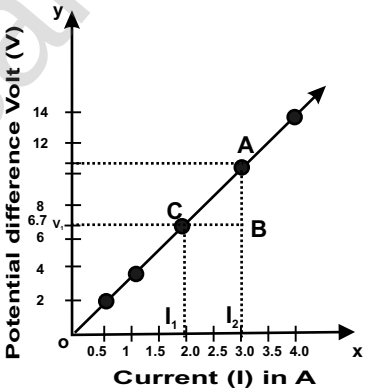
I (ampere)	0.5	1.0	2.0	3.0	4.0
V (volt)	1.6	3.4	6.7	10.2	13.2

[Hint: plot V-I a graph and take slope]

R, Slope = $\frac{V_2 - V_1}{I_2 - I_1}$

R, Slope = $\frac{10.2 - 6.7}{3 - 2}$; R = $\frac{3.5}{1} = 3.5$

The value of resistor R = 3.5



Additional Questions

I. Choose the best answer.

1. If an electron removed from the atom, the atom becomes .....charged

(a) negative (b) positive (c) neutral (d) non of them

Ans: (b) positive

2. The amount of charge on 1 electron is .....

(a) 6.25×10^{18}C (b) 1.6×10^{-19}C (c) 6.25×10^{-19}C (d) 1.6×10^{-18}C

Ans: (b) 1.6×10^{-19}C

3. An electric current is formed by .....

(a) moving electrons (b) rest electrons

(c) free electrons (d) both a and b **Ans: (a) moving electrons**

4. ..... is an instrument used to measure the electric current

(a) Voltmeter (b) Ammeter (c) Ohm meter (d) Galvanometer

Ans: (b) Ammeter

5. The formula of electromotive force is .....

(a) = w/q (b) = q/t (c) = V/I (d) none of these

Ans: (a) = w/q

6. To measure the potential difference across a component in a circuit, the voltmeter must be connected in .....
(a)series (b) parallel (c) continuous (d) both a and b
Ans: (b) parallel

7. ..... is a good conductor of electricity
(a) copper (b) glass (c) polymer (d) plastic
Ans: (a) copper

8. ..... is a insulator
(a) glass (b) copper (c) aluminium (d) polymer
Ans:(a) glass

9. ..... discovered the relation between potential difference, current and resistance.
(a) George simon ohm (b) Ampere (c) Einstein (d) none of them
Ans: (a) George simon ohm

10. ..... is a electronic device which works on direct current (dc)
(a) Television (b) Electric fan (c) Cell phone (d) Micro wave
Ans:(c) Cell phone

11. The device used to convert dc in to ac is called .....
(a)rectifier (b) inverter (c) Transformer (d) Battery eliminator
Ans: (b) Inverter

II. Match the following

Devices	Symbols
a) Cell	
b) Light bulb	
c) Fuse	
d) Earth connector	

Ans:

Devices	**Symbols**
a) Cell	
b) Light bulb	
c) Fuse	
d) Earth connector	

III. Short questions.

1. Define electric force?
Ans: The force existing between the charges is called 'electric force'

---

2. Define Electric potential?
Ans: Electric potential is a measure of the work done on unit positive charge to bring it to that point against all electrical forces.

---

3. Differentiate e.m.f and potential difference

Ans:

e.m.f.	**Potential difference**
The e.m.f. refers to the voltage developed across the terminals of an electrical source when it does not produce current in the circuit	Potential difference refers to the voltage developed between any two points in an electric circuit when there is current in the circuit

UNIT - 5. Magnetism and Electromagnetism

TEXT BOOK EXERCISES

I. Choose the correct answer

1. Which of the following converts electrical energy into mechanical energy ?
a) motor b) battery c) generator d) switch **Ans : a) motor**

3. The part of the AC generator that passes the current from the armature coil to the external circuit is
a) field magnet b) split rings c) slip rings d) brushes **Ans :d) brushes**

4. The unit of magnetic flux density is
a)weber b) weber/metre
c) weber/meter^2 d) weber . meter^2 **Ans : c) weber/meter^2**

II. Fill in the blanks

1. The SI Unit of magnetic field induction is ..... **Ans : Tesla**
3. An electric motor converts ..... **Ans : electric energy into mechanical energy**
4. A device for producing electric current is ..... **Ans :electric generator**

III. Match the following :

1.	Magnetic material	(a)	Oersted
2.	Non-magnetic material	(b)	iron
3.	Current and magnetism	(c)	induction
4.	Electromagnetic induction	(d)	wood
5.	Electric generator	(e)	Faraday

(e) Faraday

Ans :

1.	**Magnetic material**	**(b)**	**iron**
2.	**Non-magnetic material**	**(d)**	**wood**
3.	**Current and magnetism**	**(a)**	**Oersted**
4.	**Electromagnetic induction**	**(e)**	**Faraday**
5.	**Electric generator**	**(c)**	**induction**

IV. State whether True or False . If false, correct the statement.

1. A generator converts mechanical energy into electrical energy. **Ans : True**
2. Magnetic field lines always repel each other and do not intersect. **Ans : True**
3. Fleming's Left hand rule is also known as Dynamo rule. **Ans : False**

Correct statement : Fleming's **Right** hand rule is also known as Dynamo rule.

4. The speed of rotation of an electric motor can be increased by decreasing the area of the coil. **Ans : False**

Correction statement : The speed of rotation of an electric motor can be increased by **increasing** the area of the coil.

V. Answer in brief :

1. State Fleming's Left Hand Rule.

Ans : The law states that while stretching the three fingers of left hand in perpendicular manner with each other, if the direction of the current is denoted by the middle finger of the left hand and the second finger is for direction of the magnetic field, then the thumb of the left hand denotes the direction of the force or movement of the conductor .

---

2. Define magnetic flux density.

Ans :

✶ The number of magnetic field lines crossing unit area kept normal to the direction of field lines is called magnetic flux density.

✶ Its units is Wb/m^2

---

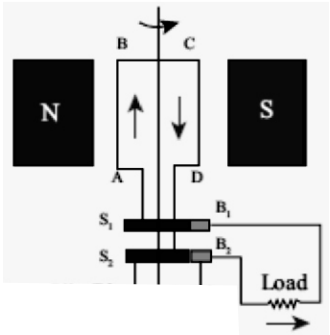
3. List the main parts of an electric motor.

Ans : (i) Permanent magnet
(ii) Carbon Brush
(iii) Commutator
(iv) Coil

---

4. Draw and label the diagram of an AC generator.

Ans : AC generator



ABCD - Coil (armature)
NS - Permanent magnet
S_1, S_2 - Slip rings
B_1, B_2 - Carbon brushes

---

5. State the advantages of ac over dc.

Ans :

✶ The voltage of AC can be varied easily using a device called transformer.
✶ The AC can be carried over long distances using step up transformers.
✶ The loss of energy while distributing current in the form of AC is negligible.
✶ DC cannot be transmitted as such.
✶ The AC can be easily converted into DC
✶ Generating Ac is easier than DC
✶ The AC can produce electromagnetic induction which is useful in several ways.

---

8. State Faraday's laws of electromagnetic induction.

Ans :

✶ Whenever there is a change in the magnetic flux linked with a closed circuit an emf is produced and the amount of emf induced varies directly as the rate at which the flux changes.

✶ This emf is known as induced emf and the phenomenon of producing an induced emf due to change in the magnetic flux linked with a closed circuit is known as electromagnetic induction.

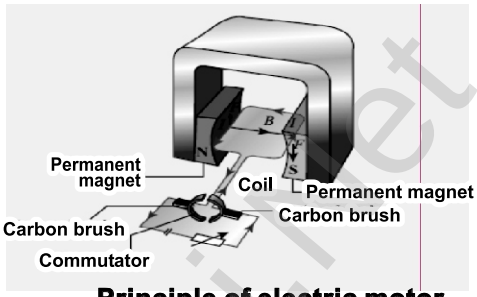
VI. Answer in detail.

1. Explain the principle, construction and working of a dc motor.

Ans :

Electric Motor : An electric motor is a device which converts electrical energy into mechanical energy.

Principle : When electric current is passed through a conductor placed normally in a magnetic field, a force is acting on the conductor and this force makes the conductor to move.



Principle of electric motor

Construction :

✶ A simple coil is placed inside two poles of a magnet.

✶ An electric motor consists of a rectangular coil ABCD of insulated copper wire.

✶ The coil is placed between the two poles of a magnetic field such that the arm AB and CD are perpendicular to the direction of the magnetic field.

✶ The ends of the coil are connected to the two halves of the split rings.

✶ The external connectings edges of the split rings touch two conducting stationary brushes X and Y.

✶ Current in the coil ABCD enters from the source through conducting brush X and flows back to the battery through brush Y.

Working:

✶ Now look at the current carrying conductor segment AB.

✶ The direction of the current is towards B, whereas in the conductor segment CD the direction is opposite.

✶ As the current is flowing in opposite directions in the segments AB and CD, the direction of the motion of the segments would be in opposite directions according to Fleming's left hand rule.

✶ When two ends of the coil experience force in opposite direction, they rotate.

✶ If the current flow is along the line ABCD, then the coil will rotate in clockwise direction first and then in anticlockwise direction.

✶ If we want to make the coil rotate in any one direction, say clockwise, then the direction of the current should be along ABCD in the first half of the rotation and along DCBA in the second half of the rotation.

✶ To change the direction of the current, a small device called split ring commutator is used.

✶ When the gap in the split ring commutator is aligned with terminals X and Y, there is no flow of current in the coil.

✶ But, as the coil is moving, it continues to move forward bringing one of the split ring commutator in contact with the carbon brushes X and Y.

✶ The reversing of the current is repeated at each half rotation, giving rise to a continuous rotation of the coil.

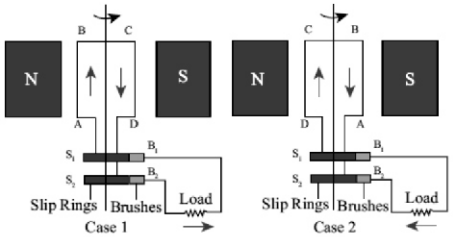
3. Draw a neat diagram of an AC generator and explain its working.

Ans :

Construction :

✶ An alternating current (AC) generator, as shown in Figure, consists of a rotating rectangular coil ABCD called armature placed between the two poles of a permanent magnet.

✶ The two ends of this coil are connected to two slip rings S_1 and S_2.
✶ The inner sides of these rings are insulated.
✶ Two conducting stationary brushes B_1 and B_2 are kept separately on the rings S_1 and S_2 respectively.
✶ The two rings S_1 and S_2 are internally attached to an axle.
✶ The axle may be mechanically rotated from outside to rotate the coil inside the magnetic field.



AC generator

✶ Outer ends of the two brushes are connected to the external circuit.

Working :

✶ When the coil is working rotated, the magnetic flux linked with the coil changes.
✶ This change in magnetic flux will lead to generation of induced current.
✶ The direction of the induced current, as given by Fleming's Right Hand Rule, is along ABCD in the coil and in the outer circuit it flows from B_2 to B_1.
✶ During the second half of rotation, the direction of current is along DCBA in the coil and in the outer circuit it flows from B_1 to B_2.
✶ As the rotation of the coil continues, the induced current in the external circuit is changing its direction for every half a rotation of the coil.

Additional Questions and Answers

I. Choose the best answer.

1. The formula for magnetic force is.....
(a) F=ILB (b) F = IL (c) F =LB (d) F = NB
Ans
Ans : (a) F=ILB

2. Electromagnetism is discovered by .....
(a) ampere (b) farad (c) newton (d) oersted
Ans : (d) oersted

II. Fill in the blanks

1. The strongest natural magnet is ..... **Ans : lodestone magnetite**
2. The magnetic field lines start at .....pole and ends at .....pole.
Ans : north, south

III. Short questions.

1. What is the magnetic effect of current?
Ans : When current passes through a wire a magnetic field is set up around the wire. This effect of current is called magnetic effect of current.

2. Define Magnetic field.
Ans : The space surrounding a bar magnet in which its influence in the form of magnetic force can be detected, is called magnetic field.

3. What do you mean by magnetic field lines?
Ans : The path along which a free magnetic north pole will move in a magnetic field is called magnetic field lines.

UNIT - 6. Light

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. A ray of light passes from one medium to another medium, Refraction takes place when angle of incidence is

a) 0° b) 45° c) 90° **Ans : c) 90°**

3. We can create enlarged, virtual images with

a) concave mirror b) plane mirror c) convex mirror

Ans : a) concave mirror

5. When a beam of white light passes through a prism it gets.

a) Reflected b) only deviated c) deviated and dispersed

Ans : c) deviated and dispersed

6. The speed of light is maximum in

a) vacuum b) glass c) diamond **Ans : a) vacuum**

II. State Whether True or False . If false correct the statement.

1. The angle of deviation depends on the refractive index of the glass.

Ans : False. The angle of deviation depends on the **velocity of light** in the glass.

2. If a ray of light passes obliquely from one medium to another, it does not suffer any deviation.

Ans : False. If a ray of light passes obliquely from one medium to another it **suffers** deviation.

3. The convex mirror always produces a virtual, diminished and erect image of the object.

Ans : True

4. When an object is at the centre of curvature of concave mirror the image formed will be virtual and erect.

Ans : False : When an object is at the centre of curvature of concave mirror the image formed will be **Real and Inverted.**

III. Fill in the blanks

1. In going from a rarer to denser medium, the ray of light bends _____

Ans : towards the normal

3. The angle of deviation of light ray in a prism depends on the angle of _____

Ans : incidence

4. The radius of curvature of a concave mirror whose focal length is 5cm is _____

Ans : 10cm

IV. Match the following

1.	Ratio of height of image to height of object.	C.	Magnification
3.	Coin inside water appearing slightly raised	E.	Refraction

Ans :

1.	**Ratio of height of image to height of object.**	**C.**	**Magnification**
3.	**Coin inside water appearing slightly raised**	**E.**	**Refraction**

V. Assertion & Reason type Questions.

Mark the correct choice as:

2. Assertion: Incident ray is directed towards the centre of curvature of spherical mirror. After reflection it retraces its path.

Reason: Angle of incidence (i) = Angle of reflection (r) = 0°.

a) If both assertion and reason are true and reason is the correct explanation.
b) If both assertion and reason are true and reason is not the correct explanation.
c) If assertion is true but reason is false.
d) If assertion is false but reason is true.

Ans : (a) If both assertion and reason are true and reason is the correct explanation

---

VI. Answer very briefly.

1. According to cartesion sign convention, which mirror and which lens has negative focal length?

Ans : Concave mirror and concave lens

---

2. Name the mirror(s) that can give (i) an erect and enlarged image, (ii) same sized, inverted image

Ans : i) concave mirror, ii) concave mirror

---

3. If an object is placed at the focus of a concave mirror, where is the image formed?

Ans : Image is formed at infinity.

---

4. Why does a ray of light bend when it travels from one medium to another?

Ans : Due to the change in the velocity of light in the different medium.

---

5. What is speed of light in vacuum?

Ans : Speed of light in vacuum = 3×10^8 ms^{-1}

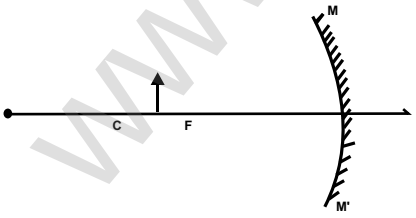
VII. Answer briefly.

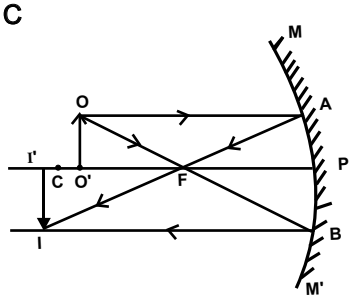
1. a) Complete the diagram to show how a concave mirror forms the image of the object.

b) What is the nature of the image?

Ans : a) When the object is in between the centre of curvature C and principal focus F

Position of image : The image is beyond C





b) Nature of image : It is real inverted and magnified

---

3. State the direction of incident ray which after reflection from a spherical mirror retraces its path. Give reason for your answer.

Ans :

The incident ray is directed towards the centre of curvature

Reason : A ray passing through the centre of curvature (c) is reflected back along its own path. So, $\angle i = 0$, $\therefore \angle r = 0$

---

4. What is meant by magnification? Write its expression. What is its sign for real image and virtual image ?

Ans :

Magnification : The ratio of the height of the image(h_I) to the height of the object(h_o) is called magnification.

$$m = \frac{h_I}{h_o} = -\frac{v}{u}$$

m - magnification, h_I - height of the image, h_o - height of the object, v - image distance, u - object distance

real image = negative sign (-)

virtual image = positive sign (+)

---

5. Write the spherical mirror formula and explain the meaning of each symbol used in it.

Ans : Spherical mirror formula

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

f - focal length

u - distance of the object

v - distance of the image

VIII. Answer in detail .

1. a) Draw ray diagrams to show how the image is formed using a concave mirror, when the position of object is : i) at C ii) between C and F iii) between F and P of the mirror.

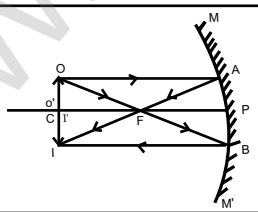
b) Mention the position and nature of image in each case.

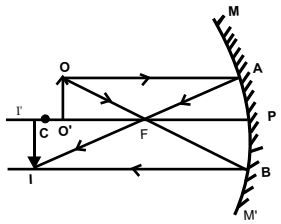
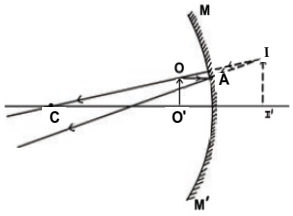
i) at C

ii) between C and F

iii) between F and P of the mirror.

Ans :

Object placed location	Ray diagrams	Position of Image	Nature of Image
i) at C		At C	Real and same size

ii) between C and F		Beyond C	Real inverted and magnified
iii) between F and P of the mirror.		Behind the mirror	virtual, erect and magnified

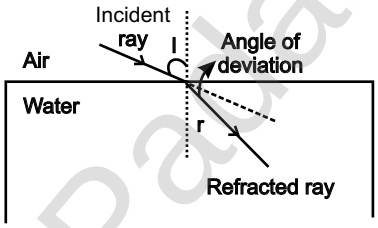
2. Explain with diagrams how refraction of incident light takes place from a) rarer to denser medium b) denser to rarer medium c) normal to the surface separating the two media.

Ans : Refraction of Light : The bending of light rays when they pass obliquely from one medium to another medium is called refraction.

a) Refraction of light from rarer to denser medium.

Ans : When a ray of light travels from optically rarer medium to optically denser medium, it bends towards the normal.

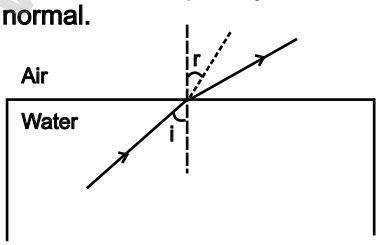
Incident



Light ray travelling from rarer to denser medium.

b) Denser to rarer medium.

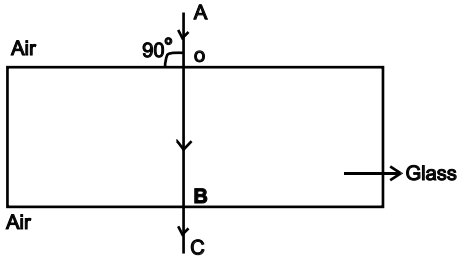
Ans : When a ray of light travels from an optically denser medium to an optically rarer medium it bends away from the normal.



Light ray travelling from denser to rarer medium.

c) Normal to the surface separating the two media.

Ans : A ray of light incident normally on a denser medium, goes without any deviation.



Incident of light ray in denser medium

IX. Numerical problems .

1. A concave mirror produces three times magnified real image of an object placed at 7 cm in front of it. Where is the image located? (Ans: 21 cm infront of the mirror)

Solution :

Object distance (u) = 7cm
magnification, (m) = 3
Image distance (v) = ?

$$\text{Magnification (m)} = \frac{-v}{u}$$

$-v = 3 \times u$

$-v = 3 \times 7 = 21\text{cm}$

$v = -21$cm

image is located is 21cm infront of the mirror.

---

2. Light enters from air into a glass plate having refractive index 1.5. What is the speed of light in glass? (Ans: 2×10^8 ms^{-1})

Solution : refractive index of glass $_g = 1.5$

speed of light in vacuum $c = 3 \times 10^8$ ms^{-1}

speed of light in glass v =?

$$= \frac{c}{v}$$

$$v = \frac{c}{}$$

$$= \frac{3 \times 10^8}{1.5} \quad v = 2 \times 10^8 \text{ ms}^{-1}$$

Speed of light in glass $v = 2 \times 10^8$ ms^{-1}

---

3. The speed of light in water is 2.25×10^8 ms^{-1}. If the speed of light in vacuum is 3×10^8 ms^{-1}, calculate the refractive index of water. (Ans:1.33)

Solution :

speed of light in water, $v = 2.25 \times 10^8$ ms^{-1}

speed of light in vacuum $c = 3 \times 10^8$ ms^{-1}

refractive index of water, = ?

refractive index of water = $\frac{\text{speed of light in vacuum}}{\text{speed of light in water}}$

$= \frac{c}{v}$

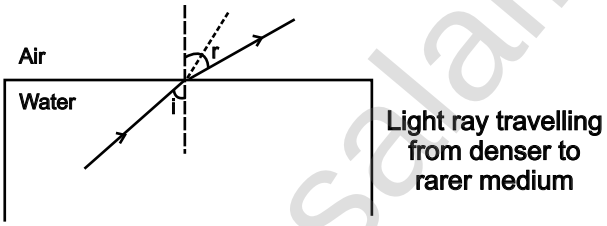
$= \frac{3 \times 10^{8}}{2.25 \times 10^{8}}$

= 1.33 (no unit)

X. Higher Order Thinking Skills :

1. Light ray emerges from water into air. Draw a ray diagram indicating the change in its path in water.

Ans : When a ray of light travels from an optically denser medium to an optically rarer medium it bends away from the normal.



asses from air into glass, is the angle of refraction greater than 2. When a ray of light or less than the angle of incidence?

Ans :

✶ When a ray of light passes from air into glass, the angle of refraction is lesser than angle of incidence.

✶ Hence, the angle of refraction is less than the angle of incidence.

3. What do you conclude about the speed of light in diamond. If the refractive index of diamond is 2.41?

Solution :

The refractive index of diamond = 2.41

Speed of light is air $c = 3 \times 10^{8}\ ms^{-1}$

Speed of light in diamond, v = ?

$= \frac{c}{v}$

$v = \frac{c}{\quad}$

$= \frac{3 \times 10^{8}}{2.41}$

The speed of light in diamond $v = 1.24 \times 10^{8}\ ms^{-1}$

The speed of light is diamond is lesser than the speed of light in air (v<c)

Additional questions & answers

I. Choose the correct answer.

1. The mirror used in astronomical telescopes.

a) Plane mirror b) Convex mirror
c) Concave mirror d) Curved mirror **Ans : c) Concave mirror**

II. Fill in the blanks

1._____is a form of energy which travels as electromagnetic waves. **Ans : Light**

2. The formula for magnification is _____ **Ans :** $m = \frac{h_I}{h_o}$

III. Answer briefly.

1. Define reflection of Laws.

Ans : The incident ray, the reflected ray and the normal at the point of incidence, all lie in the same plane. Th e angle of incidence is equal to angle of reflection.

---

2. Define mirror equation.

Ans : The expression relating the distance of the object (u), distance of the image (v) and the focal length (f) of a spherical mirror is called the mirror equation. It is given as:

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

---

3. Define the laws of refraction of light.

Ans : The incident ray, the refracted ray and the normal to the interface of two transparent media at the point of incidence, all lie in the same plane.

The ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant for a light of given colour and for the given pair of media.

---

4. Define Light.

Ans : Light is a form of energy which travels as electromagnetic waves.

---

5. What is a concave mirror.

Ans : Concave Mirror : Part of a hollow sphere whose outer part is slivered and / or inner part is the reflecting surface.

---

6. What is a convex mirror.

Ans : Convex Mirror : Part of a hollow sphere whose inner part is slivered and / or outer part is the reflecting surface.

UNIT - 7. Heat

TEXT BOOK EXERCISES

I. Choose the correct answer.

1.Calorie is the unit of

a) heat b) work c) temperature d) food **Ans : a) heat**

3. Two cylindrical rods of same length have the area of cross section in the ratio 2:1. If both the rods are made up of same material, which of them conduct heat faster?

a) Both rods b) Rod-2 c) Rod-1 d) None of them **Ans : b) Rod - 2**

4.In which mode of transfer of heat, molecules pass on heat energy to neighbouring molecules without actually moving from their positions?

a) Radiation b) Conduction c) Convection d) Both B and C

Ans : b) Conduction

5.A device in which the loss of heat due to conduction, convection and radiation is minimized is

a) solar cell b) solar cooker c) thermometer d) thermos flask

Ans : d) thermos flask

II. Fill in the blanks.

1. The fastest mode of heat transfer is ..... **Ans : radiation**
2. During day time, air blows from ..... to ..... **Ans :Sea to land**
3. Liquids and gases are generally ..... conductors of heat. **Ans : convection**

III. Assertion and Reason type questions.

Mark the correct choice as:

1. **Assertion:** Food can be cooked faster in vessels with copper bottom.
   Reason: Copper is the best conductor of heat.
   a. If both assertion and reason are true and reason is the correct explanation of assertion.
   b. If both assertion and reason are true but reason is not the correct explanation of assertion.
   c. If assertion is true but reason is false.
   d. If assertion is false but reason is true.

Ans : a. If both assertion and reason are true and reason is the correct explanation of assertion.

2. **Assertion**: Maximum sunlight reaches earth's surface during the noon time.
   Reason : Heat from the sun reaches earth's surface by radiation.
   a. If both assertion and reason are true and reason is the correct explanation of assertion.
   b. If both assertion and reason are true but reason is not the correct explanation of assertion.
   c. If assertion is true but reason is false.
   d. If assertion is false but reason is true.

Ans : b. If both assertion and reason are true but reason is not the correct explanation of assertion.

3. **Assertion** When water is heated up to 100°C, there is no raise in temperature until all water gets converted into water vapour.
Reason: Boiling point of water is 10°C.
a. If both assertion and reason are true and reason is the correct explanation of assertion.
b. If both assertion and reason are true but reason is not the correct explanation of assertion.
c. If assertion is true but reason is false.
d. If assertion is false but reason is true.
Ans : b. If both assertion and reason are true but reason is not the correct explanation of assertion.

IV. Answer briefly.

1. Define conduction

Ans :

The process of transfer of heat in solids from a region of higher temperature to a region of lower temperature without the actual movement of molecules is called conduction.

---

2. Ice is kept in a double-walled container. Why?

Ans : Ice is kept in a double-walled container because there is a vacuum present in between the space. So, the heat cannot pass inside and the space absorbs it.

---

3. How does the water kept in an earthen pot remain cool?

Ans : In an earthen pot, water gets evaporated quickly through the pores. Cooling is caused by evaporation.

---

4. Differentiate Convection and Radiation.

Ans :

S.No.	Convection	Radiation
1.	Convection is the flow of heat through a fluid from places of higher temperature to places of lower temperature by movement of the fluid itself.	Radiation is the flow of heat from one place to another by means of electromagnetic waves.
2.	It cannot occur in vacuum	It cannot even in vacuum
3.	It need matter to be present	It does not require matter or particles

---

5. Why do people prefer wearing white clothes during summer?

Ans :

- ✶ White clothes are good reflectors of heat.
- ✶ It does not allow heat
- ✶ They keep us cool during summer

V. Answer in detail.

1. Explain convection in daily life.

Ans : Convection :Convection is the flow of heat through a fluid from places of higher temperature to places of lower temperature by movement of the fluid itself.

Convection in daily life

Hot air balloons :

Air molecules at the bottom of the balloon get heated by a heat source and rise. As the warm air rises, cold air is pushed downward and it is also heated. When the hot air is trapped inside the balloon, it rises.

Breezes :

During day time, the air in contact with the land becomes hot and rises. Now the cool air over the surface of the sea replaces it. It is called sea breeze. During night time, air above the sea is warmer. As the warmer air over the surface of the sea rises, cooler air above the land moves towards the sea. It is called land breeze.

Winds :

Air flows from area of high pressure to area of low pressure. The warm air molecules over hot surface rise and create low pressure. So, cooler air with high pressure flows towards low pressure area. This causes wind flow.

Chimneys :

Tall chimneys are kept in kitchen and industrial furnaces. As the hot gases and smoke are lighter, they rise up in the atmosphere.

---

2. What are the changes of state in water? Explain.

Ans : Change of State:

The process of changing of a substance from one physical state to another at a definite temperature is defined as change of state

as change of state

Changes of state in water:

Water molecules are in liquid state at normal temperature

Evaporation :

When water is heated to 100^0c, it becomes steam which is a gaseous state of matter. This process is called evaporation.

Condensation :

On reducing the temperature of the steam it becomes water again. This is called condensation.

Freezing :

If we reduce the temperature of further to 0^0c, it becomes ice which is a solid state of water

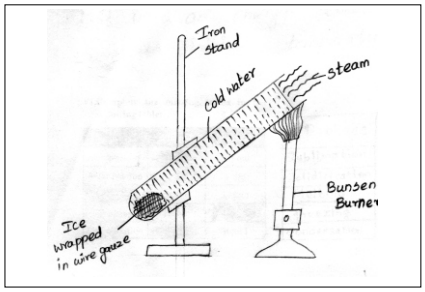
Melting :

Ice on heating, becomes water again. Thus, water changes its state when there is a change in temperature

---

3. How can you experimentally prove water is a bad conductor of heat? How is it possible to heat water easily while cooking?

Experiment to prove that water is a bad conductor of heat :



Ans :

a) ✶ Take a hard glass test tube and drop in it a tiny cube of ice, wrapped in wire gauze. Fill 3/4 of the test tube with ice cold water and then set up the apparatus as shown in the diagram. Heat the test tube near its mouth.

✶ The water soon begins to boil at the top but the ice below has still not fully melted.
✶ This experiment shows that water is poor conductor of heat.

b) Copper is used for heating water quickly while cooking.

VI. Numerical Problems:

1. What is the heat in joules required to raise the temperature of 25 grams of water from 0°C to 100°C? What is the heat in Calories? (Ans : 10450 J)
(Specific heat of water = 4.18 J/g°C)

Solution : Mass of water (m) = 25 grams
Change in temperature (T) = 100°C - 0°C = 100°C
Specific heat capacity of water (c) = 4.18 J/g°c
Heat (Q) = mc T; = 25X4.18X100 = 10450J

2. What could be the final temperature of a mixture of 100 g of water at 90°C and 600g of water at 20°C. (Ans : 30° C)

Solution :

After mixing the water the total 700g will an equilibrium temperature T
The water at 90°c will lose an amount of heat (Q) = Cx100X (90°C - T)
This same amount of heat will be absorbed by the water at 20°c to raise its temperature

(Q) = CX600 (T-20°C)
Heat lost = Heat gained
CX100((90°C-T) = CX600 (T-20°C)
$\frac{600}{100}$ (T-20°C)
90°C-T = 6 (T-20°C)
90°C-T = 6 (T-20°C)
90°C-T = 6T-120°C
90°C+120°C = 6T+T
210°C = 7T
$\frac{210°C}{7}$ = 30°C
T = 30°C

3. How much heat energy is required to change 2 kg of ice at 0°C into water at 20°C? (Specific latent heat of fusion of water = 3,34,000J/kg, Specific heat capacity of water = 4200JKg^{-1}K^{-1}). (Ans : 836000 J)

Solution: Mass of ice at 0°c = 2 kg
Specific latent heat of fusion of water (L) = 334000J/kg
Mass of water at 20°c(M) = 2 kg
Specific heat capacity of water (C) = 4200JKg^{-1}K^{-1}
Change in temperature (T) = 20°C - 0°C = 20°C
Heat energy (Q) = mL + MC T
= (2X334000)+(2x4200x20)
= 668000+168000
Q = 836000J

Additional Questions and Answers

I. Choose the correct answer.

1. When heat energy is added to a substance the kinetic energy of its particles .....

(a) Increases (b) Decreases (c) Do not change (d) None of them

Ans :(a) Increases

2. ..... are good conductors of heat

(a)Metals (b) Non-metals (c) Metalloids (d) Both a and b

Ans : (a) metals

3. Transfer of heat energy from the sun reaches us in the form of.....

(a)Conduction (b) Convection (c) Radiation (d) Sublimation

Ans : (c) Radiation

4. ..... surface absorbs more heat

(a)White (b) Black (c) Green (d) Blue

Ans : (b) Black

5. Melting point of water is .....

(a) 10°c (b) 0°c (c) 150°c (d) 180°c **Ans :(b) 0°c**

6. Condensation of water is.....

(a)0°c (b) 100°c (c) 150°c (d) 180°c **Ans :(b) 100°c**

7 The process in which a solid is converted to gaseous state is called .....

(a)Freezing (b) Condensation (c) Sublimation (d) Vaporization

Ans : (c) Sublimation

II. Short questions.

1. How does heat transfer?

Ans :

Heat transfer takes place in three ways

1. Conduction
2. Convection
3. Radiation

---

2. Define Sublimation.

Ans :

The process in which a solid is converted to gaseous state is called sublimation.

(Ex.) Dry ice, Iodine.

UNIT - 8. Sound

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. Which of the following vibrates when a musical note is produced by the cymbals in a orchestra?

a) stretched strings b) stretched membranes
c) air columns d) metal plates **Ans : d) metal plates**

2. Sound travels in air:

a) if there is no moisture in the atmosphere.
b) if particles of medium travel from one place to another.
c) if both particles as well as disturbance move from one place to another.
d) if disturbance moves. **Ans : d) if disturbance moves**

3. A musical instrument is producing continuous note. This note cannot be heard by a person having a normal hearing range. This note must then be passing through

a) wax b) vacuum
c) water d) empty vessel **Ans : b) vacuum**

4. The maximum speed of vibrations which produces audible sound will be in

a) sea water b) ground glass
c) dry air d) human blood **Ans : b) ground glass**

5. The sound waves travel faster

a) in liquids b) in gases
c) in solids Ans d) in vacuum **Ans : c) in solids**

II. Fill in the blanks :

2. Number of vibrations produced in one second is _____. **Ans : frequency**
3. The velocity of sound in solid is _____than the velocity of sound in air. **Ans : greater**
4. Vibration of object produces _____. **Ans : sound**

III. Match the following :

1.	Tuning fork	a)	The point where density of air is maximum
2.	Sound	b)	Maximum displacement from the equilibrium position
3.	Compressions	c)	The sound whose frequency is greater than 20,000 Hz
4.	Amplitude	d)	Longitudinal wave
5.	Ultrasonics	e)	Production of sound

Ans :

1.	**Tuning fork**	**e)**	**Production of sound**
2.	**Sound**	**d)**	**Longitudinal wave**
3.	**Compressions**	**a)**	**The point where density of air is maximum**
4.	**Amplitude**	**b)**	**Maximum displacement from the equilibrium position**
5.	**Ultrasonics**	**c)**	**The sound whose frequency is greater than 20,000 Hz**

IV. Answer briefly :

1. Through which medium sound travels faster, iron or water? Give reason.

Ans :

✶ Sound travels faster through iron.

Reason :

✶ Sounds travels faster in solids than in liquids.

✶ In any medium the speed of sound increases if we increase the temperature of the medium.

---

2. Name the physical quantity whose SI unit is 'hertz'. Define.

Ans : Frequency :

✶ The number of vibrations produced in one second is called frequency of the wave. It is denoted as 'n'.

✶ The SI unit of frequency is s^{-1} (or) hertz (Hz).

---

3. What is meant by supersonic speed?

Ans :

✶ When the speed of any object exceeds the speed of sound in air (330 m s^{-1}) it is said to be travelling at supersonic speed.

---

5. You and your friend are on the moon. Will you be able to hear any sound produced by your friend?

Ans :

✶ No, I will not be able to hear any sound produced by my friend.

✶ Sound needs a medium for its propagation.

atmosphere. ✶ In the moon there is no atmosphere.

✶ So sound cannot travel.

V. Answer in detail.

3. List the applications of sound.

Ans :

Applications of ultrasonic waves :

★ Ultrasounds can be used in cleaning technology.

★ Minute foreign particles can be removed from objects placed in a liquid bath through which ultrasound is passed.

★ Ultrasounds can also be used to detect cracks and flaws in metal blocks

★ Ultrasonic waves are made to reflect from various parts of the heart and form the image of the heart.

★ This technique is called 'echo cardiography'.

★ Ultrasound may be employed to break small 'stones' formed in the kidney into fine grains.

★ These grains later get flushed out with urine.

VI. Numerical problems.

1. The frequency of a source of sound is 600 Hz. Calculate the number of times it vibrates in a minute?

Solution : The frequency of sound 100 hertz means that the source of sound vibrates 100 times in 1 second.

The frequency of sound is 600 Hz means the source of sound vibrates 600 times in a second.

1 min = 60 sec

In one second no of vibrations = 600
In 60 Seconds (1 minute) No. of vibrations = 600 x 60 = 36000
∴ **Hence it vibrates 36000 times in a minute**

---

2. A stone is dropped from the top of a tower 750 m high into a pond of water at the base of the tower. Calculate the number of seconds for the splash to be heard? (Given g = 10 m s^{-2} and speed of sound = 340 m s^{-1})

Solution : Distance travelled by a stone s = 750m

g = 10ms^{-2}

Initial velocity of stone = u = 0

Speed of sound = 340 ms^{-1}

equation of the dynamics of stone

$s = ut + \frac{1}{2} gt^2$ (∴ a=g)

$750 = 0 + \frac{1}{2} \times 10 \times t^2$

$750 = 5t^2$

$t^2 = 150$

$t = 12.25$ sec

Time for sound to reach the top = $\frac{\text{distance to travel}}{\text{speed of sound}} = \frac{750}{340}$

$t = 2.2$ sec

Total time = 12.25+2.2

$T = 14.45$ s

T = 14.45 s

Additional Questions & Answers

I. Choose the correct answer.

1. The speed of Sound is ..... in gaseous medium compared to solid medium

(a) greater (b) more less than

(c) less (d) equal **Ans :(b) more less than**

II. Fill in the blanks.

1. Sounds are produced by ..... of substances. **Ans : vibrations**
2. Sound needs ..... to propagate. **Ans : medium**
3. Sound travels about ..... faster in water than in air. **Ans : 5 times**
4. The speed of sound increases if we ..... the temperature of the medium. **Ans : increase**
5. The speed of sound in sea water is ..... **Ans : 1531 ms^{-1}**
6. The speed of sound in air is ..... **Ans : 340 ms^{-1}**

III. Short questions :

1. What are the characteristics of a sound wave?

Ans :

★ Amplitude
★ Frequency
★ Time period
★ Wave length
★ Velocity or speed

---

2. Define Amplitude.
Ans : Amplitude (A) :
★ The maximum displacement of the particles of the medium from their original undisturbed positions, when a wave passes through the medium is called amplitude of the wave.
★ Its SI unit is meter (m).

---

3. Define speed of sound.
Ans : The speed of sound is defined as the distance travelled by a sound wave per unit time as it propagates through an elastic medium.

$$\text{Speed (v)} = \frac{\text{Distance}}{\text{Time}}$$

---

4. Explain why the flash of lightning reaches us first and the sound of thunder is heard little later.
Ans : Sound travels with a speed which is much less than the speed of light. So the sound of thunder is heard a little later than the flash of light is seen.

---

5. What are 'Infrasonics' and 'Ultrasonics' ?
Ans : Sound waves with frequencies below audible range are termed as 'Infrasonics' and those above audible range are termed as 'Ultrasonics'.

IV. Answer in detail :
1. Explain the applications of ultrasonic waves.
Ans : Applications of ultrasonic waves :
★ Ultrasound can be used in cleaning technology. Minute foreign particles can be removed from objects placed in a liquid bath through which ultrasound is passed.
★ Ultrasounds can also be used to detect cracks and flaws in metal blocks.
★ Ultrasonic waves are made to reflect from various parts of the heart and form the image of the heart. This technique is called 'echo cardiography'.
★ Ultrasound may be employed to break small 'stones' formed in the kidney into fine grains. These grains later get flushed out with urine.

UNIT - 9. Universe

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. Who proposed the heliocentric model of the universe?

(a) Tycho Brahe (b) Nicolaus Copernicus
(c) Ptolemy (d) Archimedes

Ans : (b) Nicolaus Copernicus

II. Fill in the blanks.

4. The third law of Kepler is also known as the Law of _____. **Ans : Harmonies**

III. State whether True or false. If false, correct the statement.

1. ISS is a proof for international cooperation. **Ans : True**

IV. Answer briefly.

7. State Kepler's laws.

Ans :

First Law - The Law of Ellipses:

All planets revolve around the Sun in elliptical orbits with Sun at one of their foci.

Second Law - The Law of Equal Areas :

The line connecting the planet and the Sun covers equal areas in equal intervals of time.

Harmonies :

Third Law - The Law of Harmonies :

The square of time period of revolution of a planet around the Sun is directly proportional to the cube of the distance between sun and the planets.

V. Answer in Detail.

2. Discuss the benefits of ISS.

Ans : Supporting water-purification efforts :

★ Using the technology developed for the ISS, areas having water scarcity can gain access to advanced water filtration and purification systems.

★ The water recovery system (WRS) and the oxygen generation system (OGS) developed for the ISS have already saved a village in Iraq from being deserted due to lack of clean water.

Eye tracking technology :

★ The Eye Tracking Device, built for a microgravity experiment, has proved ideal to be used in many laser surgeries.

★ Also, eye tracking technology is helping disabled people with limited movement and speech.

★ For example, a kid who has severe disability in body movements can use his eye-movements alone and do routine tasks and lead an independent life.

Robotic arms and surgeries :

★ Robotic arms developed for research in the ISS are providing significant help to the surgeons in removing inoperable tumours (e.g., brain tumours) and taking biopsies with great accuracies.

★ Its inventors say that the robot could take biopsies with remarkable precision and consistency.

Additional Questions & Answers

I. Choose the correct answer.

1. Who proposed geocentric model ?

(a) Ptolemy (b) Aryabhatta (c) Nicholaus (d) Ampere **Ans : (a) Ptolemy**

2. ..... proposed three laws of Planetary motion

(a) Ptolemy (b) Aryabhatta (c) Kepler (d) Nicolaus

Ans :(c) Kepler

II. Fill in the blanks.

1. ..... is a large space craft which can house astronauts.

Ans : International Space Station (ISS)

2. The first human crew went to the ISS in the year ..... **Ans : 2000**
3. The name ISS in America is..... **Ans : NASA**
4. The basic for Kepler laws is ..... **Ans : Sun-cetered Solar System**

III. Match the following.

1.

a) Kepler's first law	-	Robotic arms
b) Kepler's second law	-	Law of Harmonies
c) Kepler's third law	-	Law of ellipses
d) Biopsy	-	Law of Equal areas

Ans :

a) Kepler's first law	**-**	**Law of ellipses**
b) Kepler's second law	**-**	Law of Equal areas
c) Kepler's third law	**-**	**Law of Harmonies**
d) Biopsy	**-**	**Robotic arms**

law - Law of Equal areas

IV. Short questions :

1. What is International Space Station?

Ans :

A large, manned satellite in space used as a base for space exploration.

---

2. What is the purpose of ISS ?

Ans :

The purpose of ISS is to provide an international lab for conducting experiments in space.

CHEMISTRY

UNIT - 10. Matter Around Us

TEXT BOOK EXERCISES

I. Choose the correct answer

2. Among the following _____ is a mixture

a)Common Salt b) Juice c) Carbon dioxide d) Pure Silver **Ans :b) Juice**

3. When we mix a drop of ink in water we get a _____

a) Heterogeneous Mixture b) Compound

c) Homogeneous Mixture d) Suspension **Ans : c) Homogeneous Mixture**

5. _____has the same properties throughout the sample

a) Pure substance b) Mixture c) Colloid d) Suspension

Ans : a) Pure substance

II. State whether True or False. If false, correct the statement.

2. A compound cannot be broken into simpler substances chemically.

Ans : False. A compound **can be** broken into simpler substances chemically.

4. Buttermilk is an example of heterogeneous mixture. **Ans : True**

5. Aspirin is composed of 60% Carbon, 4.5% Hydrogen and 35.5% Oxygen by mass. Aspirin is a mixture.

Ans : False. Aspirin is composed of 60% Carbon, 4.5% Hydrogen **and 35.5%** Oxygen by mass. Aspirin is a **compound.**

is composed of 60% Carbon, 4.5% Hydrogen and 35.5% Oxygen by mass. Aspirin is a compound.

III. Match the following

Element	Impure substance
Compound	Made up of molecules
Mixture	Made up of atoms

Ans :

Element	**Made up of atoms**
Compound	**Made up of molecules**
Mixture	**Impure substance**

IV. Fill in the blanks

1. A _____ mixture has no distinguishable boundary between its components

Ans : Homogeneous

V. Answer very briefly.

3. A few drops of 'Dettol' when added to water the mixture turns turbid. Why?

Ans : The oil droplets of dettol get suspended in water and create an emulsion.

---

5. Name the components in each of the following mixtures.

i) Ice cream ii) Lemonade (iii) Air (iv) Soil

Ans :

i)Ice cream : sugar, milk, water

ii) Lemonade : lemon juice, sugar and water

iii) Air : hydrogen, oxygen, carbondioxide, water vapour and other gases.

iv) soil : sand, clay, various types of salts.

VI. Answer briefly .

1. Which of the following are pure substances? Ice, Milk, Iron, Hydrochloric acid, Mercury, Brick and Water.

Ans : Pure substances :

Iron, Hydrochloric acid and Mercury, Water

2. Oxygen is very essential for us to live. It forms 21% of air by volume. Is it an element or compound?

Ans : Oxygen is an element.

3. You have just won a medal made of 22-carat gold. Have you just procured a pure substance or impure substance?

Ans :

- 22 carat gold metal is made up of 91.6% gold and 8.4% other metals.
- So It is impure substance.

5. How are homogenous solutions different from heterogeneous solution? Explain with examples.

Ans :

S.No.	Homogenous Mixtures	Heterogeneous Mixtures
1.	A mixuture in which the components cannot be seen separately is called a homogenous mixture.	A mixture in which the components can be seen separately is called a heterogeneous mixture.
2.	It has a uniform composition and every part of the mixture has the same properties	It does not have a uniform composition and properties.
3.	Eg:Tap water, milk, air, ice cream, sugar syrup, ink, steel, bronze and salt solution	Eg:Soil a mixture of iodine and common salt, a mixture of sugar and sand, a mixture of oil and water, a mixture of sulphur and iron filings, and a mixture of milk and cereals.

VII. Answer in detail.

1. Write the differences between elements and compounds and give an example for each.

Ans :

S.No.	Elements	Compounds
1.	Made up only one kind of atom.	Made up more than one kind of atom.
2.	The smallest particle that retains all its properties is the atom.	The smallest particle that retains all its properties is the molecule.
3.	Cannot be broken down into simpler substances.	Can be broken down into elements by chemical methods.
4.	E.g: Copper, Oxygen, Hydrogen	E.g. : Water, Sugar, Salt.

UNIT - 11. Atomic Structure

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. Among the following the odd pair is

a) $^{18}_{8}O$, $^{19}_{9}F$ b) $^{40}_{18}Ar$, $^{14}_{7}N$, c) $^{30}_{14}Si$, $^{31}_{15}P$, d) $^{40}_{20}Cr$, $^{39}_{19}K$

Ans : c) $^{30}_{14}Si$, $^{31}_{15}P$

2. Change in the number of neutrons in an atom changes it to

a) an ion b)an isotope c) an isobar d) another element

Ans : b) an isotope

3. The term nucleons refer to

a) Protons and electrons b) only Neutrons

c) electrons and neutrons d) Protons and neutrons

Ans : d) Protons and neutrons

4. The number of protons,neutrons and electrons present respectively in $^{80}_{35}Br$ **are**

a) 80,80,35 b)35,55,80 c) 35,35,80 d) 35,45,35 **Ans : d) 35,45,35**

5. The correct electronic configuration of potassium is

a) 2,8,9 b) 2,8,1 c) 2,8,8,1 d) 2,8,8,3 **Ans : c) 2, 8, 8, 1**

II. State whether True or false. If false, correct the statement.

1. In an atom, electrons revolve around the nucleus in fixed orbits. **Ans : True**
2. Isotopes of an element have different atomic numbers

   Ans : False : Isotopes of an element have **same** atomic numbers.
3. Electrons have negligible mass and charge. **Ans : True**
4. Smaller the size of the orbit, lower is the energy of the orbit. **Ans : True**
5. The maximum number of electron in L Shell is 10.

   Ans : False : The maximum number of electron in L shell is **8**.

III. Fill in the Blanks:-

1. Calcium and Argon are examples of a pair of _____ **Ans : Isobars**
2. Total Number of electrons that can be accommodated in an orbit is given by _____ **Ans :** $2n^2$
3. _____ isotope is used in the nuclear reactors. **Ans : Uranium - 235**
4. The number of neutrons present in $^{7}_{3}Li$ is _____ **Ans : 4**
5. The valency of Argon is _____ **Ans : Zero**

V. Complete the following table

Atomic Number	Mass Number	Number of Neutrons	Number of Protons	Number of Electrons	Name of the Element
9	-	10	-	-	-
16	-	16	-	-	-
-	24	-	-	12	Magnesium
-	2	-	1	-	-
-	1	0	1	1	-

Ans :

Atomic Number	Mass Number	Number of Neutrons	Number of Protons	Number of Electrons	Name of the Element
9	19	10	9	9	Fluorine
16	32	16	16	16	Sulphur
12	24	12	12	12	Magnesium
1	2	1	1	1	Hydrogen (Deuterium)
1	1	0	1	1	Hydrogen (Protium)

VI. Answer very briefly.

1. Name an element which has the same number of electrons in its first and second shell.

Ans : K L

Beryllium $_4Be^9$ - 2, 2

---

2. Write the electronic configuration of K and Cl

Ans : K - 2, 8, 8, 1 and Cl - 2, 8, 7

---

4. For an atom 'X', K, L and M shells are completely filled. How many electrons will be present in it?

Ans : 28 electrons (K-2, L-8, M-18, = 2+8+18=28)

---

5. What is the same about the electron structures of

a) Lithium, Sodium and Potassium

b) Beryllium, Magnesium and Calcium

Ans : a) Lithium, Sodium, Potassium atoms are having one electron in their valence shell. So their valency is1

S.No.	Elements	Electron distribution	Valency
1.	Lithium	2, 1	1
2.	Sodium	2, 8, 1	1
3.	Potassium	2, 8, 8, 1	1

b) Beryllium, Magnesium, Calcium are having two electrons in their valence shell. So, their valency is 2.

S.No.	Elements	Electron distribution	Valency
1.	Beryllium	2, 2	2
2.	Magnesium	2, 8, 2	2
3.	Calcium	2, 8, 8, 2	2

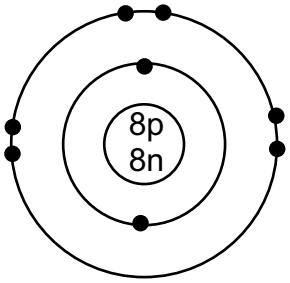
VII. Answer briefly.

2. Why do $^{35}_{17}Cl$ and $^{37}_{17}Cl$ have the same chemical properties? In what respect do these atoms differ?

Ans : $^{35}_{17}Cl$ and $^{37}_{17}Cl$ have the same chemical properties of same atom number.

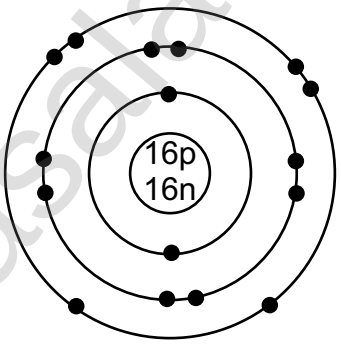
3. Draw the structure of oxygen and sulphur atoms.

Ans : i) oxygen - 8



(2,6)

ii) Sulphur - 16



(2, 8, 6)

4. Calculate the number of neutrons, protons and electrons
(i) atomic number 3 and mass number 7
(ii) atomic number 92 and mass number 238

Ans : (i) Atomic number = 3
Mass number = 7
Atomic number = Number of protons
Number of Protons = 3
Number of electrons = 3
Number of neutrons = 7-3 = 4

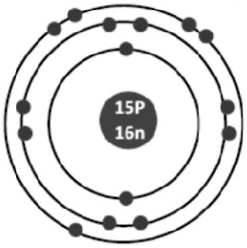
Ans : (ii) Atomic number = 92
Mass number = 238
Atomic number = Number of protons
Number of Protons = 92
Number of electrons = 92
Number of neutrons = 238-92 = 146

∴ Number of protons = number of electrons
Mass number = Number of protons + Number of neutrons
Number of neutrons = Mass number of - Number of protons

5. What are nucleons? How many nucleons are present in Phosphorous? Draw its structure.

Ans : The protons and neutrons collectively found in the nucleus of an atom are called nucleons

Atom of Phosphorus $^{31}_{15}P$



Electronic Config. 2, 8, 5
Valency = 3

(15 p + 16 n) = 31 nucleons are present in phosphorus

VIII. Answer in detail.

3. State the Gay Lussac's law of combining volumes, explain with an illustration.

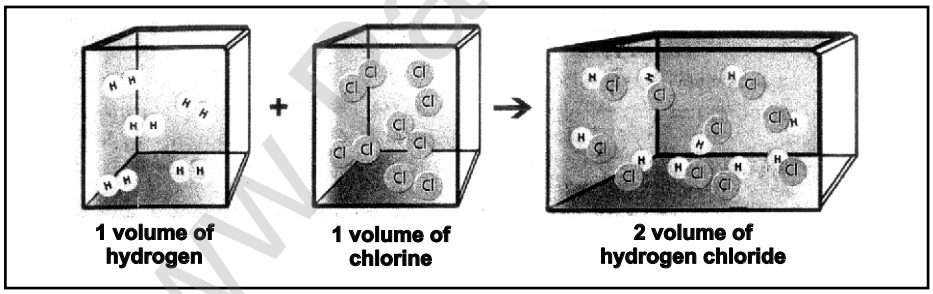
Gay Lussac's law of Combining volumes :

Ans : According to Gay Lussac's Law, Whenever gases react together, the volumes of the reacting gases bear a simple ratio, and the ratio is extended to the product when the product is also in gaseous state, provided all the volumes are measured under similar conditions of temperature and pressure.

This law may be illustrated by the following example.

It has been experimentally observed that one volume of hydrogen reacts with one volume of chlorine to form two volume of hydrogen chloride.

The ratio of volume which gases bears is 1 : 1 : 2 which is a simple whole number ratio.



Additional questions & Answers

I. Fill in the Blanks:

1. Protons and Neutrons are collectively called as _____ **Ans : Nucleons**
2. Number of Neutrons in sodium Atom is _____ **Ans : 12**
3. Symbolic representation of phosphorus is _____ **Ans : $_{15}P^{31}$**
4. Examples for radio active isotopes _____ **Ans : Uranium- 235, Cobalt -60**

III. Short questions :

1. Define - Valency

Ans : Valency of an element is the combining capacity of the element with other elements and is equal to the number of electrons that take part in a chemical reaction.

2. Define - Isotopes

Ans : Isotopes are defined as the atoms of the same element, which have same atomic number but different mass numbers.

3. State reciprocal proportions Law.

Ans : It states that, "If two different elements combine separately with the same weight of a third element, the ratios of the masses in which they do so are either the same or a simple multiple of the mass ratio in which they combine."

4. State multiple proportions Law.

Ans : It states that, "When two elements A and B combine together to form more than one compound, then masses of A which separately combines with a fixed mass of B are in simple ratio".

5. Define - isotones.

Ans : Atoms of different elements with different atomic numbers and different mass numbers, but with same number of neutrons are called isotones

UNIT - 12. Periodic Classification of Elements

TEXT BOOK EXERCISES

I. Choose the correct answer

1. If Dobereiner is related with 'law of triads', then Newlands is related with

a) Modern periodic law b) Hund's rule
c) law of octaves d) Pauli's Exclusion principle

Ans :c) law of octaves

II. Fill in the blanks

1. In Dobereiner's triads, the atomic weight of the middle element is the ..... of the atomic masses of 1st and 3rd elements. **Ans : average**

3. The basis of the classifications proposed by Dobereiner, Newlands and Mendeleev was ..... **Ans : atomic mass**

4. Example for liquid metal is ..... **Ans : Mercury**

III. Match the following

1.	Triads	a)	Newlands
2.	Alkali metal	b)	Calcium
3.	Law of octaves	d)	Sodium
4.	Alkaline earth metal	e)	Dobereiner

Ans :

1.	**Triads**	**e)**	**Dobereiner**
2.	**Alkali metal**	**d)**	**Sodium**
3.	**Law of octaves**	**a)**	**Newlands**
4.	**Alkaline earth metal**	**b**	**Calcium**

IV. State whether true or false . If false, correct the statement.

1.Newlands' periodic table is based on atomic masses of elements and modern periodic table is based on atomic number of elements **Ans : True**

2. Metals can gain electrons **Ans : False**

Correct statement : Metals **lose the** electrons

3. Alloys bear the characteristics of both metals and nonmetals **Ans : False**

Correct statement : Metalloids bear the characteristics of both metals and nonmetals

---

V. Assertion and Reason type Questions.

Statement: Elements in a group generally possess similar properties but elements along a period have different properties.

Reason: The difference in electronic configuration makes the element differ in their chemical properties along a period.

a) Statement is true and reason explains the statement.
b) Statement is false but the reason is correct.

Ans : a) Statement is true and reason explains the statement.

VI. Answer the following :

3. What are the limitations of Mendeleev's periodic table?

Ans : Limitations :

(i) Elements with large difference in properties were included in the same group.

✶ Eg: Hard metals like copper (Cu) and silver (Ag) were included along with soft metals like sodium (Na) and potassium (K).

(ii) No proper position could be given to the element hydrogen.

✶ Eg: Non-metallic hydrogen was placed along with metals like lithium (Li), sodium (Na) and potassium (K).

(iii) The increasing order of atomic mass was not strictly followed throughout.

✶ Eg. Co & Ni, Te & I

(iv) No place for isotopes in the periodic table .

Additional Questions :

I. Choose the best answer.

1. Number of elements have been discovered is .....

(a) 112 (b) 116 (c) 110 (d) 118 **Ans : (d) 118**

2. Who proposed the law of periodicity?

(a) Dobereiner (b) Newland (c) Mendeleev (d) Moseley

Ans : (c) Mendeleev

3. Example for soft metal is .....

(a) Sodium (b) Copper (c) Silver (d) Mercury **Ans : (a) Sodium**

II. Fill in the blanks

1. ..... are good electrical and thermal conductivity **Ans : Metals**

al is..... 2. An example for Non metal is..... **Ans : Oxygen**

3. The only non metal which is a good conductor of electricity is .....

Ans : Graphite

III. Short questions

1. What are called metalloids?

Ans : Elements which have the properties of both metal and non-metals are called as metalloids.

★ E.g : Boron, Arsenic.

IV. Detail :

1. Explain the physical properties of Metals and Non-metals

Ans : Metals :

★ Metals are typically hard, shiny, malleable (can be made as sheet), fusible and ductile (can be drawn into wire) with good electrical and thermal conductivity.

★ Except mercury, most of the metals are solids at room temperature.

★ Metals occupy larger area in the periodic table and are categorized as:

(i) Alkali metals. e.g. Lithium to Francium (top to bottom)

(ii) Alkaline earth metals. e.g: Beryllium to Radium (top to bottom)

(iii) Transition Metals. Group III B to II A

(iv) P-Block metals. e.g: Al, Ga, In, Tl, Sn, Pb and Bi.

Non-metals :

★ A non-metal is an element that does not have the characters like hardness, shiny, malleable, suitable and ductile.

★ In other words, a non-metal is an element that does not have the properties of metal.

★ e.g. All non metals are arranged in P-Block only. P-Block non metals: C, N, O, P, S, Se, Halogen (F, Cl, Br and I) and inert gases (He to Rn).

UNIT - 13 Chemical Bonding

TEXT BOOK EXERCISES

I. Choose the correct answer

1. Number of valence electrons in carbon is

a) 2 b) 4 c) 3 d) 5 **Ans : b) 4**

2. Sodium having atomic number 11, is ready to _____ electron/ electrons to attain the nearest Noble gas electronic configuration.

a) gain one b) gain two c) lose one d) lose two **Ans :c) lose one**

3. The element that would form anion by gaining electrons in a chemical reaction is _____

a) Potassium b) Calcium c) Fluorine d) Iron **Ans :c) Fluorine**

4. Bond formed between a metal and non metal atom is usually _____

a) ionic bond b) covalent bond c) coordinate bond **Ans :a) ionic bond**

5._____ compounds have high melting and boiling points.

a) Covalent b) Coordinate c) Ionic **Ans :c) Ionic**

6. Covalent bond is formed by _____

a) transfer of electrons b) sharing of electrons c) sharing a pair of electrons **Ans : b) sharing of electrons**

II. Answer briefly.

2. Nacl is insoluble in carbon tetrachloride but soluble in water. Give reason.

Ans :

✶ **NaCl is an ionic compound.** Ionic compounds are soluble in **polar solvents like** water and insoluble in non polar solvents.

✶ Hence, Nacl is insoluble in carbon tetrachloride but soluble in water.

---

4. Write a note on different types on bonds?

Ans : (i) Ionic :

An ionic bond is a chemical bond formed by the electrostatic attraction between positive and negative ions

(ii) Covalent bond :

Bond formed between atoms by the mutual sharing of electrons.

(iii) Coordinate covalent bond :

In some compounds the formation of a covalent bond between two atoms takes place by the sharing of two electrons, both of which comes from only one of the combining atoms.

This bond is called coordinate covalent bond or Dative bond.

---

5. Correct the wrong statements.

a. Ionic compounds dissolve in non polar solvents

Ans : Ionic compounds dissolve in **polar solvents**

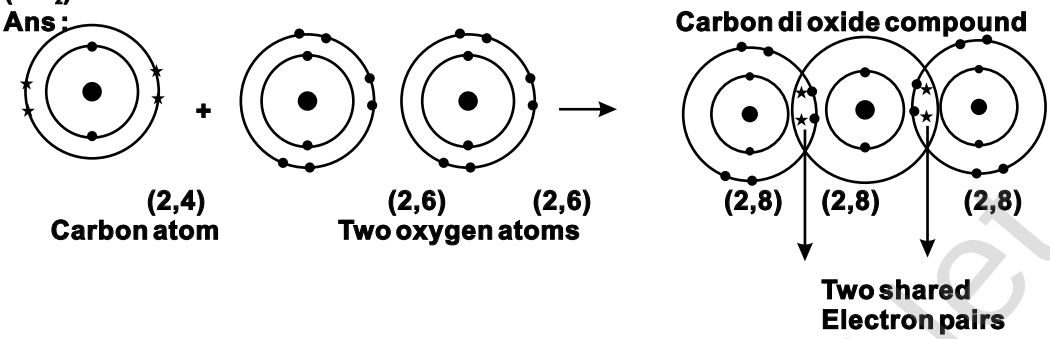
b. Covalent compounds conduct electricity in molten or solution state.

Ans : **Ionic** compounds conduct electricity in molten or solution state.

---

7. Draw the electron distribution diagram for the formation of Carbon di oxide (CO_2) molecule.

Ans :



8. Fill in the following table according to the type of bonds formed in the given molecule.

$CaCl_2$, H_2O, CaO, CO, KBr, HCl, CCl_4, HF, CO_2, Al_2Cl_6

Ionic bond	Covalent bond	Coordinate covalent bond

Ans :

Ionic bond	Covalent bond	Coordinate covalent bond
$CaCl_2$	H_2O	CO
CaO	HCl	Al_2Cl_6
KBr	CCl_4	
	HF	
	CO_2	

9. The property which is characteristics of an Ionic compound is that

a. it often exists as gas at room temperature
b. it is hard and brittle
c. it undergoes molecular reactions
d. it has low melting point

Ans : b). It is hard and brittle

11. Identify the compounds as Ionic/ Covalent/Coordinate based on the given characteristics.

a. Soluble in non polar solvents **Ans:** Covalent (Coordinate)
b. undergoes faster/instantaneous reactions **Ans:** Ionic
c. Non conductors of electricity **Ans:** Covalent (coordinate)
d. Solids at room temperature **Ans:** Ionic

13. Considering $MgCl_2$ as ionic compound and CH_4 as covalent compound give any two differences between these two compounds.

Ans :

S.No.	$MgCl_2$ as Ionic bond	CH_4 as Covalent bond
1.	It has two electron excess to the nearest stable electronic configuration of a noble gas - Neon	Carbon has four valence electrons needs four electrons to stable electronic configuration.
2.	So, magnesium has a tendency to lose two electrons from its outer most shell and acquire a stable electronic configuration forming magnesium cation (Mg^{2+})	So, carbon shares four electrons of hydrogen to achieve stable electronic configuration.

III. Answer in detail

1. List down the differences between Ionic and Covalent compounds

Ans :

S.No.	Ionic Compounds	Covalent Compounds
1.	Formed by the transfer of electrons from a metal to a non-metal atom.	Formed by sharing of electrons between non - metal atoms.
2.	Strong electrostatic force of attraction between cations and anions.	Mutual sharing of electrons and so weak force of attraction between atoms.
3.	Ionic compounds are crystalline solids at room temperature.	Covalent compounds exists in gaseous, liquid and solid form.
4.	In molten state their aqueous solutions conduct electricity	Do not contain charged particles, so they are bad conductors of electricity.
5.	High melting and boiling points	Low melting point
6.	Soluble in polar solvents like water.	They are insoluble in polar solvents like water
7.	They are insoluble in non-polar solvents like benzene, carbon tetra chloride.	soluble in non-polar solvents like benzene, carbon tetra chloride.
8.	High density and quite hard. They are highly brittle	They are soft and waxy
9.	Undergo ionic reactions which are practically rapid and instantaneous	Undergo molecular reactions in solutions and these reactions are slow.

2. Give an example for each of the following statements.

a. A compound in which two Covalent bonds are formed — **Ans :** O_2 (O = O)

b. A compound in which one ionic bond is formed — **Ans :** NaCl(Na^+Cl^-)

c. A compound in which two Covalent and one Coordinate bonds are formed — **Ans :** CO (C = O)

d. A compound in which three covalent bonds are formed — **Ans :** N_2 (N ≡ N)

e. A compound in which Coordinate bond is formed — **Ans :** NH_4^+

3. Identify the incorrect statement and correct them.

a. Like covalent compounds, Coordinate compounds also contain charged particles (ions), so they are good conductors of electricity.

Ans : Like covalent compounds, coordinate compounds **do not** contain charged particles (ions), so they are **bad** conductors of electricity.

b. Ionic bond is a weak bond when compared to Hydrogen bond.

Ans : Ionic bond is a **stronger bond** when compared to hydrogen bond.

c. Ionic or electrovalent bonds are formed by mutual sharing of electrons between atoms.

Ans : **Covalent** bonds are formed by mutual sharing of electrons between atoms.

e. The electrons which are not involved in bonding are called valence electrons.

Ans : The electrons which are **involved** in bonding are called valence electrons

4. Discuss in brief about the properties of Coordinate covalent compounds.
Ans :

Characteristics of coordinate covalent compounds :

Physical state: These compounds exist as gases, liquids or solids.

Electrical conductivity: Like covalent compounds, coordinate compounds also do not contain charged particles (ions), so they are bad conductors of electricity.

Melting point: These compounds have melting and boiling points higher than those of purely covalent compounds but lower than those of purely ionic compounds.

Solubility: Insoluble in polar solvents like water but are soluble in non - polar solvents like benzene, CCl_4 ,and toluence.

Reactions: Coordinate covalent compounds undergo molecular reactions which are slow.

Additional Questions and Answers

I. Choose the best answer.

1. .....is a chemical bond formed by the electrostatic attaraction
(a) Ionic bond (b) Covalent bond
(c) Metallic bond (d) Hydrogen bond **Ans : (a) Ionic bond**

2. The chemical reactions in covalent compounds are .....
(a) Fast (b) Slow (c) Moderate (d) Very fast **Ans : (b) Slow**

3. ..... Compounds are soluble in non-polar solvents.
(a) Ionic (b) Metallic (c) Covalent (d) Electrovalent
Ans : (c) Covalent

4. ..... Compounds are non conductors of electricity
(a) Ionic (b) Metallic (c) Covalent (d) Electrovalent
Ans : c) Covalent

5. ..... are hard and brittle
(a) Covalent compounds (b) Electrovalent compounds
(c) Metallic compounds (d) Ionic compounds
Ans :(d) Ionic compounds

II. Fill in the blanks

1. Two atoms that binds them together as a unit called. ..... **Ans : Molecule**
2. ..... is called as atomic bond **Ans : Covalent bond**
3. Carbon tetra chloride (CCl_4) is a .....compound. **Ans : Covalent**
4. Gold has ..... resistance to corrosion **Ans : High**

UNIT - 14. Acids, Bases and Salts

TEXT BOOK EXERCISES

I. Choose the correct answer

1. $Zn + 2\,HCl \rightarrow ZnCl_2 + \ldots \uparrow (H_2, O_2, CO_2)$ **Ans : H_2**

2. Apple contains malic acid. Orange contains .....
(citric acid, ascorbic acid) **Ans : ascorbic acid**

3. Acids in plants and animals are organic acids. Whereas Acids in rocks and minerals are ..... (Inorganic acids, Weak acids) **Ans : Inorganic acids**

4. Acids turn blue litmus paper to.....
(Green, Red, Orange) **Ans : Red**

5. Since metal carbonate and metal bicarbonate are basic, they react with acids to give salt and water with the liberation of ..... (NO_2, SO_2, CO_2) **Ans : CO_2**

II. Answer in briefly.

1. Classify the various types of Acids based on their sources.

Ans :

Organic Acids: Acids present in plants and animals (living things) are organic acids. Example: HCOOH, CH_3COOH

Inorganic Acids: Acids prepared from rocks and minerals are inorganic acids or mineral acids. Example: HCl, HNO_3, H_2SO_4

---

2. Write any four uses of acids.

Ans :

(i) Sulphuric acid is used in car batteries
(ii) Hydrochloric acid is used as a cleaning agent in toilets
(iii) Carbonic acid is used in aerated drinks
(iv) Tartaric acid is a constituent of baking powder

---

6. Two acids 'A' and 'B' are given. Acid A gives one hydrogen ion per molecule of the acid in solution. Acid B gives two hydrogen ions per molecule of the acid in solution.

(i) Find out the acid A and acid B.

Ans : A is HCl (Hydro Chloric Acid)
B is H_2SO_4 (Sulphuric Acid)

(ii) Which acid is called the King of Chemicals?

Ans : H_2SO_4 (Sulphuric acid) is called the king of chemicals

---

9. What is neutralization reaction? Give an example.

Ans :

The reaction between a base and an acid is known as neutralization reaction.

Eg : Bases react with acids to form salt and water

$KOH + HCl \rightarrow KCl + H_2O$

III. Answer in detail

2. Give the tests to identify Acids and Bases.

Ans :

a) Test with a litmus paper:

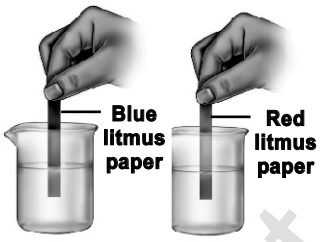
- An acid turns blue litmus paper into red.
- A base turns red litmus paper into blue.

b) Test with an indicator Phenolphthalein:

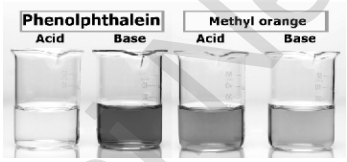
- In acid medium, phenolphthalein is colourless.
- In basic medium, phenolphthalein is pink in colour.

c) Test with an indicator Methyl orange:

- In acid medium, methyl orange is pink in colour.
- In basic medium, methyl orange is yellow in colour.



Test for acid and base using litmus paper



Test for acid and base using indicator

Acid base indicator

Indicator	Colour in acid	Colour in base
Litmus	Blue to Red	Red to Blue
Phenolphthalein	Colourless	Pink
Methyl orange	Pink	Yellow

3. Write any four uses of bases.

Ans : (i) Sodium hydroxide is used in the manufacture of soap.
(ii) Calcium hydroxide is used in white washing of building.
(iii) Magnesium hydroxide is used as a medicine for stomach disorder.
(iv) Ammonium hydroxide is used to remove grease stains from cloths.

hydroxide is used to remove grease stains from

5. Sulphuric acid is called King of Chemicals. Why is it called so?

Ans :

Sulphuric acid is called King of Chemicals because it is used in the preparation of many other compounds. It is used in car batteries also.

Additional Questions & Answers

I. Choose the best answer.

1. **Acids are ..... in taste**
   (a) Bitter (b) Sour (c) Sweet (d) Salty **Ans : (b) Sour**
2. **Curd contains .....**
   (a) Tartaric acid (b) Malic acid (c) Lactic acid (d) citric acid
   Ans : (c) Lactic acid
3. **..... is a weak acid**
   (a) HCl (b) HNO_3 (c) CH_3COOH (d) H_2SO_4 **Ans : (c) CH_3COOH**
4. **HCL is a ..... acid**
   (a) Strong (b) Weak (c) Dibasic (d) Tribasic **Ans : (a) Strong**
5. **..... acid is used as a food preservative**
   (a) Nitric (b) Sulphuric (c) Citric (d) Carbonic **Ans : (c) Citric**
6. **..... is used in the manufacture of soap**
   (a) NaOH (b) KoH (c) NH_4OH (d) $CaCOH_2$ **Ans : (a) NaOH**
7. **In basic medium, phenolphthalein is ..... in colour**
   (a) Red (b) Pink (c) White (d) Yellow **Ans : (b) Pink**
8. **In acidic medium, phenolphthalein is ..... in colour**
   (a) Red (b) Pink (c) Colourless (d) yellow **Ans : (c) Colourless**

II. Fill in the blanks

1. A base is the compound that forms ..... ions in solution **Ans : Hydroxide**
2. The acid present in ant and Bee is ..... **Ans : Formic acid**
3. When HCl is dissolved in water, it gives.....and ..... ions in water **Ans : H^+ Cl^-**
4. ..... are acids that ionise completely in water. **Ans : Strong Acids**
5. Bases that are soluble in water are called ..... **Ans : Alkalis**
6. ..... is used in white washing of building **Ans : Calcium Hydroxide**
7. ..... is used as a medicine for stomach disorder **Ans : Magnesium Hydroxide**
8. .....is used to remove grease stains from cloths **Ans : Ammonium Hydroxide**
9. .....is the hardest substance in our body **Ans : White enamel coating of teeth**

III. Match the following

1.

Source		Acid present	
(i)	Apple	a)	Tartaric acid
(ii)	Vinegar	b)	Citric acid
(iii)	Lemon	c)	Acetic acid
(iv)	Grapes	d)	Malic acid

Ans :

Source		Acid present	
(i)	Apple	d)	Malic acid
(ii)	Vinegar	c)	Acetic acid
(iii)	Lemon	b)	Citric acid
(iv)	Grapes	a)	Tartaric acid

IV Short questions :

1. What are Acids?

Ans :

Acid is a substance which furnishes H^+ ions or H_3O^+ ions in aqueous solution.

2. What are Bases?

Ans : Bases are substances that ionise in water to form hydroxyl ions (OH^-)

3. Define Acidity.

Ans : The term acidity is used for base, which means the number of replaceable hydroxyl groups present in one molecule of a base

UNIT - 15. Carbon and its Compounds

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. A phenomenon in which an element exists in different modification in same physical state is called

(a) Isomerism (b) Allotropy
(c) Catenation (d) Crystallinity **Ans : (a) Isomerism**

2 . Carbon forms large number of organic compounds due to

(a) Allotropy (b) Isomerism
(c) Tetravalency (d) Catenation **Ans : (d) Catenation**

5. Graphene is one atom thick layer of carbon obtained from

(a) Diamond (b) Fullerene
(c) Graphite (d) Gas Carbon **Ans : (c) Graphite**

6. The legal measures to prevent plastic pollution come under the _____ Protection Act 1988.

(a) Forest (b) Wildlife
(c) Environment (d) Human Rights **Ans : (c) Environment**

II. Fill in the blanks.

1. _____ named carbon. **Ans : Antoine Lavoisier**

3. Compounds with same molecular formula and different structural formula are known as _____. **Ans : Isomerism**

4. _____ is a suitable solvent for sulphur. Ans : Carbon **disulphide**

III. Match the following

1.	Alkyne	-	c)	Graphene	**1.**	**Alkyne**	**- d)**	**Triple bond**
2.	Andre Geim	-	d)	Triple bond	**2.**	**Andre Geim**	**- c)**	**Graphene**

Ans :

IV. Answer briefly.

2. Write all possible isomers of C_4H_{10}

Ans :

The given formula C_4H_{10} is having two kinds of arrangement of atoms as shown below

a) $CH_3 - CH_2 - CH_2 - CH_3$ b) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$

---

3. Carbon forms only covalent compounds. Why?

Ans :

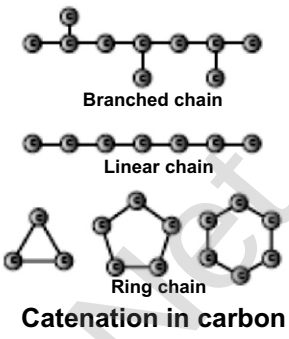
★ The shell electronic configuration of carbon is 2, 4
★ It has four electrons in its outermost orbit.
★ Catenation is binding of an element to itself or with other elements through covalent bonds to form open chain or closed chain compounds.
★ Hence carbon force only covalent compounds due to catenation.

V. Answer in detail.

1. What is catenation? How does carbon form catenated compounds?

Ans :

Catenation : Catenation is binding of an element to itself or with other elements through covalent bonds to form open chain or closed chain compounds.



Catenation in carbon

Catenated compounds:

★ Carbon is the most common element which undergoes catenation and forms long chain compounds.

★ Carbon atom links repeatedly to itself through covalent bond to form linear chain, branched chain or ring structure.

★ This property of carbon itself is the reason for the presence of large number of organic carbon compounds.

★ So organic chemistry essentially deals with catenated carbon compounds.

★ For example, Starch and Cellulose contain chains of hundreds of carbon atoms.

VI. Higher Order Thinking Skills.

1. Why do carbon exist mostly in combined state?

Ans : Carbon exists mostly in combined state due to the property of catenation.

---

2. When a carbon fuel burns in less aerated room, it is dangerous to stay there. Why?

Ans :

★ When the carbon fuels are burned they releases unburnt carbon particles in the air.

★ It leads to formation of carbon monoxide (CO) which is very poisonous.

toxic gas ★ CO is a colourless, odourless toxic gas.

★ When poeple exposed to CO, it enters into human body through breathing and affects the function of haemoglobin.

★ CO displaces oxygen from haemoglobin thereby stops its function leading to death.

---

3. Explain how dioxins are formed? Which plastic type they are linked to and why they are harmful to humans?

Ans :

★ Burning polyvinyl chloride releases dioxins.

★ PVC is a resin code #3 type of plastics.

★ PVC is one of the most dangerous chemicals known to human.

★ It affects hormones and most toxic chemicals known to humans.

Additional Questions & Answers

I. Choose the correct answer.

1. Carbon is one of the most important ..... element

(a) metallic (b) non-metallic (c) metalloid (d) valuable

Ans : (b) non-metallic

2. The earth's crust contains only ..... of carbon

(a) 0.013% (b) 0.023% (c) 0.032% (d) 0.432% **Ans : (c) 0.032%**

3. ..... is an organic carbon compound

(a) Carbon monoxide (b) Carbon-di-oxide

(c) Calcium carbonate (d) Ethanol **Ans : (d) Ethonal**

4. ..... is used as a fire extinguisher

(a) CO (b) CO_2 (c) CaC_2 (d) CS_2 **Ans : (b) CO_2**

5. ..... is used as dry ice in refrigerator
(a) CO_2 (b) CO (c) CS_2 (d) CaC_2 **Ans :(a)CO_2**

6. ..... is used in baking powder
(a) H_2CO_3 (b) $NaHCO_3$ (c) $CaCO_3$ (d) Na_2CO_3
Ans :(b) $NaHCO_3$

7. ..... is toxic oxide gas of carbon
(a) Carbon-di-oxide (b) Carbon sulphide
(c) Carbon monoxide (d) Calcium carbide
Ans :(c) Carbon monoxide

III. Fill in the blanks.

1. ..... . is a main constituent of coal. **Ans : Carbon**
2. ..... % of the weight of human body is carbon. **Ans : 18 %**
3. ..... is highly toxic sparingly solube in water. **Ans : Carbon monoxide**
4. ..... . is used as preservative for fruits. **Ans : Carbon dioxide**
5. ..... is used to prepare acetylene gas for welding . **Ans : Calcium Carbide**
6. ..... is crystalline solid used as an Antacid. **Ans : Calcium Carbonate**
7. ..... is in making electrode in dry cell. **Ans : Gas carbon**
8. ..... is a colourless, odourless toxic gas. **Ans : Carbon monoxide**

III. Short questions :

1. Which is called as Living chemistry ? why?
Ans : Organic chemistry is called as Living chemistry. Because, without carbon, there is no possibility for the existence of plants and animals including human.

---

features of carbon?
2. What are the special features of carbon?
Ans :
★ Catenation ★ Tetra valency ★ Multiple bonds ★ Isomerism ★ Allotropy

---

3. Define tetra valency.
Ans : Carbon has the tendency to share its four electrons with other atoms to complete its octet. This is called its tetravalency.

IV. Answer in detail.

1. How to avoid use of plastic in our daily life?
Ans :
★ Do not litter the environment by throwing plastic items.
★ Do not use Thermocol (resin code #6 PS) for your school projects.
★ Do not use one-time use or throwaway plastics like plastics bags, tea cups, Thermocol plates and cups, and plastic straws.
★ Do not burn plastics since they release toxic gases that are harmful to our health and contribute to climate change.
★ Burning PVC plastic releases dioxins which are one of the most dangerous chemicals known to humans.
★ Do not eat hot or spicy food items in plastic containers.

UNIT - 16. Applied Chemistry

TEXT BOOK EXERCISES

I. Choose the correct answer.

4. The cathode of an electrochemical reaction involves _____

(a) oxidation (b) reduction
(c) neutralisation (d) catenation **Ans : (b) reduction**

5. The age of a dead animal can be determined by using an isotope of _____

(a) carbon (b) iodine
(c) phosphorous (d) oxygen **Ans : (a) carbon**

8. Radiochemistry deals with

(a) oxidants (b) batteries
(c) isotopes (d) nanoparticles **Ans : (c) isotopes**

II. Fill in the blanks.

1._____ is an electrochemical cell which converts electrical energy into chemical change(Reaction). **Ans : Electrolytic cell**

III. Match the following

2.	Corrosion prevention	-	b)	Iodine-131
3.	Hyperthyroidism	-	e)	Electroplating

Ans :

2.	**Corrosion prevention**	**-**	**e)**	**Electroplating**
3.	**Hyperthyroidism**	**-**	**b)**	**Iodine-131**

IV. Answer very briefly.

1. What is Radio Carbon Dating?

Ans :

Radio Carbon Dating : It is a method by which the age of fossil wood or animals is determined using C-14 isotope.

VI. HOTS

1. Batteries that are used in mobile phone can be recharged. Likewise, can you recharge the batteries used in watches? Justify your answer.

Ans :

★ No, we cannot recharge the batteries used in watches.
★ Because, watch batteries are primary cells which takes irreversible reaction and cannot be recharged.

Additional Questions & Answers

I. Choose the correct answer.

1. ..... is the chemistry of drugs.

(a) Nano chemistry (b) Pharmaceutical chemistry
(c) Electro chemistry (d) Radio chemistry
Ans :(b) Pharmaceutical chemistry

2. ..... isotope is used in Radio carbon dating.
(a) P-32 (b) C-14 (c) I-131 (d) O-18 **Ans : (b) C-14**

III. Fill in the blanks.

1. ..... is an electrochemical cell which converts chemical energy into electrical energy. **Ans : Galvanic Cell**
2. ..... in the ground can decay into radon gas which can be very dangerous to humans. **Ans : Uranium**
3. ..... radio isotope is used for blood disorder. **Ans : Phosphorous-32**

III. Match the following

1.

Radioisotope	Diagnosis used for
(i) Iron - 59	(a) Thyroid gland disorder
(ii) Cobalt-60	(b) Blood clot
(iii) Hydrogen-3	(c) Cancer
(iv) Sodium-24	(d) Anaemia
(v) Iodine - 131	(e) Water content of the human body

Ans :

Radioisotope	Diagnosis used for
(i) Iron - 59	**(d) Anaemia**
(ii) Cobalt-60	**(c) Cancer**
(iii) Hydrogen-3	**(e) Water content of the human body**
(iv) Sodium-24	**(b) Blood clot**
(v) Iodine - 131	**(a) Thyroid gland disorder**

2.

Radioisotope	Treatment used for
(i) Phosphorous-32	(a) Cancer
(ii) Cobalt - 60	(b) Hyperthyroidism
(iii) Iodine - 131	(c) Skin disease

Ans :

Radioisotope	Treatment used for
(i) Phosphorous-32	**(c) Skin disease**
(ii) Cobalt - 60	**(a) Cancer**
(iii) Iodine - 131	**(b) Hyperthyroidism**

IV. Short questions :

1. Define drugs :

Ans :

Drugs : 'It is a substance or product that is used or intended to be used to modify or explore physiological systems or pathological states for the benefits of the recipient'.

2. What is Electrochemical cell ?

Ans : The device that make use of a chemical change to produce electricity or electricity to produce chemical change is called Electrochemical Cell.

BIOLOGY

UNIT - 17. Animal Kingdom

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. Find the group having only marine members

a) Mollusca c) Coelenterata c) Echinodermata d) Porifera

Ans : c) Echinodermata

2. Mesoglea is present in

a) Porifera b) Coelenterata c) Annelida d) Arthropoda

Ans : b) Coelenterata

5. The animal without skull is

a) Acrania b) Acephalia c) Apteria d) Acoelomate

Ans : a) Acrania

6. Hermaphrodite organisms are

a) Hydra, Tape worm, Earth worm, Amphioxus
b) Hydra, Tape worm, Earth worm, Ascidian
c) Hydra, Tape worm, Earth worm, Balanoglossus
d) Hydra, Tape worm, Ascaris, Earth worm

Ans : b) Hydra, Tape worm, Earth Ans : b) Hydra, Tape worm, Earth **worm, Ascidian**

9. Excretory organ of tape worm is

a) flame cells b) nephridia c) body surface d) solenocytes

Ans : a) Flame cells

10. Water vascular system is found in.

a) Hydra b) Earthworm c) Star fish d) Ascaris

Ans : c) Star fish

II. Fill in the blanks.

1. The skeletal framework of Porifera is _____. **Ans : Spicules**
2. Ctenidia are respiratory organs in _____. **Ans : Phylum Mollusca**

III. State whether true or false. If false correct the statement.

1. Canal system is seen in coelenterates.
   Ans : False. Correct statement: Canal system is seen in **Porifera**
2. Hermaphrodite animals have both male and female sex organs. **Ans : True**
3. Trachea are the respiratory organ of Annelida.
   Ans : False. Correct statement: Trachea is the respiratory organ of **Arthropoda**.
4. Bipinnaria is the larva of Mollusca.
   Ans : False. Correct statement: Bipinnaria is the larva of **Echinodermata**.
5. Balanoglossus is a ciliary feeder **Ans : True**

IV. Match the following :

	PHYLUM		EXAMPLES
(A)	Coelenterata	(i)	Snail
(B)	Platyhelminthes	(ii)	Star Fish
(C)	Echinodermata	(iii)	Tapeworm
(D)	Mollusca	(iv)	Hydra

Ans :

	PHYLUM		**EXAMPLES**
(A)	**Coelenterata**	**(iv)**	**Hydra**
(B)	**Platyhelminthes**	**(iii)**	**Tapeworm**
(C)	**Echinodermata**	**(ii)**	**Star Fish**
(D)	**Mollusca**	**(i)**	**Snail**

V. Answer very briefly.

1. Define taxonomy ?

Ans : Taxonomy is the science of classification which makes the study of wide variety of organisms easier.

2. What is nematocyst ?

Ans : The tentacles bear stinging cells called cnidoblast or nematocyst.

3. Why coelenterates are called diploblastic animals?

Ans : Coelenterates are called as diploblastic animals because, the body wall is made up of two layers of cells namely the outer ectoderm and inner mesoderm.

5. How does locomotion take place in starfish?

Ans : In starfish the locomotion is affected by tube feet.

6. Are jelly fish and star fish similar to fishes? If no justify the answer.

Ans : Jelly fish - Coelenterata - Invertebrates
Star fish - Echinodermata - Invertebrates
Fish - Vertebrates - chordata

VI. Answer briefly.

1. Give an account on phylum Annelida.

Ans : Phylum Annelida (Segmented worms):

★ These are bilaterally symmetrical, triploblastic, first true coelomate animals with organ-system grade of organization.
★ Body is externally divided into segments called metameres joined by ring like structures called annuli.
★ It is covered by moist thin cuticle.
★ Setae and parapodia are locomotor organs.
★ Sexes may be separate or united (hermaphrodites).
★ e.g- Nereis, Earthworm, Leech.

2. Differentiate between flat worms and round worms?
Ans :

S.No.	Flat worms	Roundworms
1.	It belongs to the phylum platyhelminthes	It belongs to the phylum Nematoda.
2.	Alimentary canal is absent or simple	The alimentary canal is a straight tube.
3.	Acoelomate	Pseudocoelomate
4.	Having both male and female reproduction organism a single individual.	They reproduce sexually and the sexes are separate.
5.	Most of them are parasitic in nature.	They exist as free - living soil forms.
6.	E.g : Liver fluke	E.g : Ascaris

VII. Answer in detail.
2. Give an account on phylum Arthropoda.
Ans : Phylum Arthropoda (Animals with jointed legs) :
★ Arthropoda is the largest phylum of the animal kingdom.
★ They are bilaterally symmetrical, triploblastic and coelomate animals.
★ The body is divisible into head, thorax and abdomen.
★ Each segment bears paired jointed legs.
★ Exoskeleton is made of chitin and is shed periodically as the animal grows.
★ The casting off and regrowing of exoskeleton is called moulting.
★ Body cavity is filled with haemolymph (blood).
★ The blood does not flow in blood vessels and circulates throughout the body (open circulatory system).
★ Respiration (air through body surface, gills or tracheae (air tubes).
body surface, gills or tracheae (air tubes)
★ Excretion occurs by malphigian tubules or green glands.
★ Sexes are separate.
★ E.g., Prawn, Crab, Cockroach, Millipedes, Centipedes, Spider, Scorpions.

Additional questions & answers

I. Choose the best answer :
1. Tapeworm is and example of an.....
a) Pseudocoelomate b) Acoelomate c) Coelomate **Ans : b) Acoelomate**
2. In Protozoa, locomotion occur through.....
a) Cilia b) Flagella c) Pseudopodia **Ans :c) Pseudopodia**
3. Amoebic dysentry is caused by .....
a) Entomoeba histolytica b) Plasmodium sp c) Ascaris lumbricoides
Ans : a) Entomoeba histolytica

II. Fill in the blanks:
1. ..... introduced the method of naming the animals.
Ans : Carolus Linnacees
2. Cutturing of aquatic organisms is referred to as..... **Ans : Aqua culture**

III. Answer in briefly.
1. Define - Coelom.
Ans : Coelom is a fluid-filled body cavity. It separates the digestive tract from the body wall.

2. Define Pseudocoleomates.
Ans :
★ Pseudocoleomates- False body cavity which is not bounded by true epithelial lining
★ E.g. Roundworm

UNIT - 18. Organisation of Tissues

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. The tissue composed of living thin walled polyhedral cell is
a. Parenchyma b. Pollenchyma c. Pclerenchyma d. None of above
Ans : a. Parenchyma

2. The fibres consists of
a. Parenchyma b. Sclerenchyma c. Collenchyma d. None of above
Ans : b. Sclerenchyma

3. Companion cells are closely associated with
a. sieve elements. b. vessel elements c. Trichomes d. guard cells.
Ans : a. sieve elements.

4. Which of the following is a complex tissue?
a. parenchyma b. collenchyma c. xylem d. sclerenchyma
Ans : c. xylem

5. Aerenchyma is found in
a. Epiphytes b. hydrophytes c. halophytes d. xerophytes
Ans : b. hydrophytes

6. Smooth muscles occur in
a. Uterus b Artery c. vein d. All of the above
Ans : d. All of
Ans : d. All of **the above**

7. Nerve cell does not contains
a. axon b. nerve endings c. tendons d. dendrites
Ans : c. tendons

II. Match the following **Ans :**

1.	Sclereids	a)	Chlorenchyma	**1.**	**Sclereids**	**b)**	**Sclerenchyma**
2.	Chloroplast	b)	Sclerenchyma	**2.**	**Chloroplast**	**a)**	**Chlorenchyma**
3.	Simple tissue	c)	Collenchyma	**3.**	**Simple tissue**	**c)**	**Collenchyma**
4.	Companion cell	d)	Xylem	**4.**	**Companion cell**	**e)**	**Phloem**
5.	Trachieds	e)	Phloem	**5.**	**Trachieds**	**d)**	**Xylem**

III. Fill in the blanks

1. ..... tissues provide mechanical support to organs. **Ans : collenchyma**
2. Parenchyma, collenchyma, Sclerenchyma are ..... type of tissue. **Ans : Simple**
3. ..... and ..... are complex tissues. **Ans : Xylem, Phloem**
4. Epithelial cells with cilia are found in ..... of our body . **Ans : Trachea**
5. Lining of small intestine is made up of ..... **Ans : Columnar epithelium**

IV. State whether True or false. If false, correct the statement

1. Epithelial tissue is protective tissue in animal body. **Ans : True**
2. Bone and cartilage are two types of areolar connective tissues. **Ans : False**
Correct statement : Bone and cartilage are two types of **supportive** connective tissue.
3. Parenchyma is a simple tissue. **Ans : True**

4.Phloem is made up of tracheids **Ans : False**
Correct statement : **xylem** is made up of Tracheids
5. Vessels are found in collenchyma **Ans : False**
Correct statement : Vessels are found in **Xylem**

V. Answer briefly.

1. What are intercalary meristems? How do they differ from other meristems?

Ans : Intercalary meristem:

★ It lies between the region of permanent tissues and is part of primary meristem which is detached due to formation of intermittent permanent tissues.

★ It is found either at the base of leaf e.g. Pinus or at the base of internodes e.g. grasses.

2. What is complex tissue? Name the various kinds of complex tissues.

Ans :

★ Complex tissues are made of more than one type of cells that work together as a unit

★ There are of two types namely (i) xylem (ii) phloem.

3. Mention the most abundant muscular tissue found in our body. State its function.

Ans : a) Skeletal muscle :

★ These muscles are attached to the bones and are responsible for the body movements and are called skeletal muscles.

★ They work under our control and are also known as voluntary muscles.

b) Smooth muscle :

★ The walls of the internal organs such as the blood vessels, gastric glands, intestinal villi and urinary bladder contain this type of smooth muscle.

c) Cardiac muscle :

★ It is a special contractile tissue present in the heart.

★ The contraction of cardiac muscle is involuntary and rhythmic.

4. What is skeletal connective tissue? How is it helpful in the functioning of our body?

Ans :

★ The supporting or skeletal connective tissues forms the endoskeleton of the vertebrate body.

★ Which protect various organs and help in locomotion.

VI. Answer in Detail.

1. What are permanent tissues? Describe the different types of simple permanent tissues.

Ans : Permanent Tissues:

★ Permanent tissues are those in which, growth has stopped either completely or for the time being.

★ At times, they become meristematic partially or wholly.

★ Permanent tissues are of two types, namely : (a) simple tissue (b) complex tissue.

Simple Tissues :

★ Simple tissue are homogeneous tissues composed of structurally and functionally similar cells. (eg). (i) Parenchyma, (ii)Collenchyma, (iii)Sclerenchyma.

(i).Parenchyma :

★ Parenchyma are simple permanent tissues composed of living cells.

★ Parenchyma cells are thin walled, oval, rounded or polygonal in shape with well developed spaces among them.

★ In aquatic plants, Parenchyma possesses intercellular air spaces, and is named as Aerenchyma.

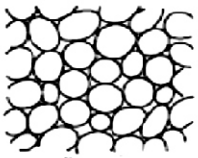
★ When exposed to light, parenchyma cells may develop chloroplasts and are known as Chlorenchyma.

Functions:

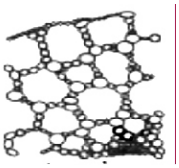
★ Parenchyma may store water in many succulent and xerophytic plants.

★ It also serves the functions of storage of food reserves, absorption, buoyancy, secretion etc.,

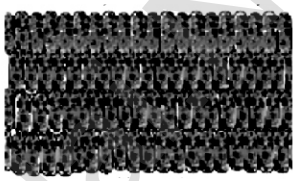
Types of Parenchyma :



Parenchyma



Aerenchyma



Chlorenchyma

(ii). Collenchyma :

★ Collenchyma is a living tissue found beneath the epidermis.

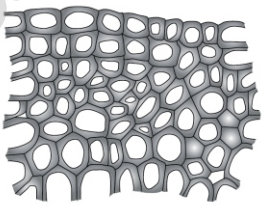
★ Cells are elongated with unevenly thickened non-lignified walls.

★ Cells have rectangular oblique or tapering ends and persistent protoplast.

★ They possess thick primary non-lignified walls.

Functions:

★ They provide mechanical support for growing organs.



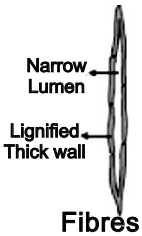
Collenchyma

(iii). Sclerenchyma :

★ Sclerenchyma consists of thick walled cells which are often lignified.

★ Sclerenchyma cells are dead and do not possess living protoplasts at maturity.

★ Sclerenchyma cells are grouped into (1) fibres (2) sclereids.



Fibres

(1) Fibres :

★ Fibres are elongated sclerenchymatous cells, usually with pointed ends.

★ Their walls are lignified. Fibres are abundantly found in many plants.

★ The average length of fibres is 1 to 3 mm, however in plants like Linum usitatissimum (flax), Cannabis sativa (hemp) and Corchorus capsularis (jute), fibres are extensively longer, ranging from 20 mm to 550 mm.

(2) Sclereids :

Sclereids

★ Sclereids are widely distributed in plant body.

★ They are usually broad, may occur in single or in groups.

★ Sclereids are isodiametric, with liginified walls.

★ Pits are prominent and seen along the walls.

★ Lumen is filled with wall materials.

★ Sclereids are also common in fruits and seeds.

2. Write about the elements of Xylem

Ans : Xylem :

★ Xylem is composed of :

★ (i) xylem tracheids (ii) xylem fibres (iii) xylem vessels (iv) xylem parenchyma.

i. Xylem tracheids:

★ These are elongated or tube-like dead cells with hard, thick and lignified walls.

★ Their ends are tapering, blunt or chisel-like and devoid of protoplast.

★ They have large lumen without any content.

★ Their function is conduction of water and providing mechanical support to the plant.

ii. Xylem fibres :

★ These cells are elongated, lignified and pointed at both the ends.

★ Xylem fibres provide mechanical support to the plant.

iii. Xylem vessels :

★ These are long cylindrical, tube like structures with lignified walls and wide central lumen.

★ These cells are dead as these do not have protoplast.

★ They are arranged in longitudinal series in which the partitioned walls (transverse walls) are perforated, and so the entire structure looks-like a water pipe.

★ Their main function is to transport of water and also to provide mechanical strength.

iv. Xylem parenchyma :

★ These are living and thin walled cells.

★ The main function of xylem parenchyma is to store starch and fatty substances.

VII. Higher Order Thinking Skills.

1. What is the consequence that occur if all blood platelets are removed from the blood?

Ans :

★ Blood platelets play an important role in blood clotting mechanism.

★ So, if all blood platelets are removed from the blood, there is no blood clotting mechanism.

★ A bleeding person continues to bleed and he eventually dies.

---

2. Which are not true cells in the blood? why?

Ans :

★ In the blood Red blood cells and blood platelets are anucleated (Nucleus absent)

★ So, those blood cells are not true cells.

Additional Questions & Answers

I. Choose the best answer.

1. When exposed to light, parenchyma cells may develop chloroplasts and are known as .....

(a) Collenchyma (b) Aerenchyma
(c) Chlorenchyma (d) Sclerenchyma **Ans : (c) Chlorenchyma**

2. ..... tissue in the skin functions as a waterproof membrane.

(a) Epithelial (b) Cardiac (c) Adipose (d) Connective
Ans : (a) Epithelial

3. Large cartilage cells are called as .....

(a) Osteocytes (b) Lacunae (c) Canaliculi (d) Chondrocytes
Ans :(d) Chondrocytes

4. RBC Contain a ..... pigment called haemoglobin.
(a) Respiratory (b) excretory (c) circulatory (d) Digestive
Ans :(a) Respiratory

II Match the following

	Cells		Duration of cell replacement
1.	Skin cells	a)	300 - 500 days
2.	Liver cells	b)	120 days
3.	Bone cells	c)	2 weeks
4.	RBC	d)	10 years

Ans :

	Cells		Duration of cell replacement
1.	**Skin cells**	**c)**	**2 weeks**
2.	**Liver cells**	**a)**	**300 - 500 days**
3.	**Bone cells**	**d)**	**10 years**
4.	**RBC**	**b)**	**120 days**

III. Fill in the blanks
1. .....causes genetic variations among the species from one generation to the next **Ans :Crossing over**
2. The muscle cells are composed of numerous..... **Ans : Myofibrils**
3. Sprain is caused by excessive pulling of ..... **Ans : Ligaments**

IV. Give Reasons:
1. Nerve cells do not undergo cell division.
Reason : Nerve cells do not undergo cell division due to the absence of centrioles.

V. Analogy :
1. (i) Yellow fibres : Elastin
(ii) White fibres : Collagen
: Collagen
2. (i) **Erythrocytes** : RBC
(ii) Leucocytes : WBC

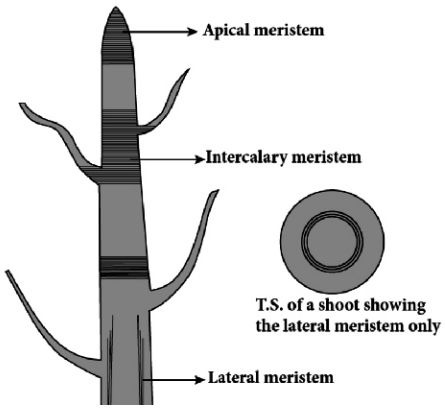
VI. Answer the following :
1. What are fibers ? Mention its average length?
Ans :
★ Fibres are elongated, sclerenchymatous cells, usually with pointed ends.
★ Average length of fibres is 1 to 3 mm.

2. Define - Bone marrow.
Ans :
In bones, the hollow cavities of spaces are called marrow cavities filled with bone marrow.

3. Name the minute fibres of tendon which enter into peristomium of bone
Ans :
Nano fibres - Sharpey's fibres.

4. What are the types of WBC?
Ans :
★ Granulocytes (with granules in the cytoplasm)
They are neutrophils, basophils, eosinophils.
★ Agranulocytes (without granules in the cytoplasm)
They are lymphocytes, Monocytes.

5. Draw neat sketch of Longitudinal section of shoot apex and its parts.



Longitudinal section of shoot apex

UNIT - 19. Plant physiology

TEXT BOOK EXERCISES

I. Choose the correct answer.

1.The tropic movement that helps the climbing vines to find a suitable support is .....

a) phototropism b) geotropism c) thigmotropism d) chemotropism

Ans : c) thigmotropism

3. The bending of root of a plant in response to water is called.....

a) Thigmonasty b) Phototropism c) Hydrotropism d) Photonasty

Ans : c) Hydrotropism

4. A growing seedling is kept in the dark room. A burning candle is placed near it for a few days. The tip part of the seedling bends towards the burning candle. This is an example of.....

a) Chemotropism b) Geotropism c) Phototropism d) Thigmotropism

Ans : c) Phototropism

5. The root of the plant is.....

(i) positively phototropic but negatively geotropic
(ii) positively geotropic but negatively phototropic
(iii) negatively phototropic but positively hydrotropic
(iv) negatively hydrotropic but positively phototropic

a) (i) and (ii) b) (ii) and (iii) c) (iii) and (iv) d) (i) and (iv)

An

Ans : b) (ii) and (iii)

6. The non-directional movement of a plant part in response to temperature is called.....

a) thermotropism b) Thermonasty c) chemotropism d) thigmonasty

Ans : b) Thermonasty

II. Fill in the blanks.

1. The shoot system grows upward in response to _____

Ans : sunlight

2. _____ is positively hydrotropic as well as positively geotropic.

Ans : Root

4. The solar tracking of sunflower in accordance with the path of sun is due to _____.

Ans : photonasty

5. The response of a plant part towards gravity is _____. **Ans : Geotropism**

III. Match column A with column B

S.No.	Column A		Column B
1.	Roots growing downwards into soil	a)	Positive phototropism
2.	Shoots growing towards the light	b)	Negative geotropism
3.	Shoots growing upward	c)	Negative phototropism
4.	Roots growing downwards away from light	d)	Positive geotropism

Ans :

S.No.	Column A		Column B
1.	Roots growing downwards into soil	d)	Positive geotropism
2.	Shoots growing towards the light	a)	Positive phototropism
3.	Shoots growing upward	b)	Negative geotropism
4.	Roots growing downwards away from light	c)	Negative phototropism

IV. State whether true or false. If false, correct statement.

1. The response of part of plant to the chemical stimulus is called phototropism.

Ans : False. Correct statement: The response of a part of plant to the chemical stimulus is called chemotropism.

2. Shoot is positively phototropic and negatively geotropic.

Ans : True

V. Answer very briefly.

1. What is nastic movement?

Ans : Nastic movements are non-directional response of a plant or part of a plant to stimulus.

2. Name the plant part

a) Which bends towards the direction of gravity but away from the light.

Ans : Root

b) Which bends towards light but away from the force of gravity.

Ans : Shoot

3. Differentiate phototropism from photonasty.

Ans :

S.No.	Phototropism	Photonasty
1.	Movement of a plant part towards light.	Movement of a part of a plant in response to light.
2.	Growth dependent movements	Growth independent movements
3.	Growth of stem towards light	E.g. : Taraxacum officinale, blooms in morning and closes in the evening.

VI. Answer in briefly.

1. Give the technical terms for the following :

(a) Growth dependent movement in plants.

Ans : Tropic movements.

(b) Growth independent movement in plants.

Ans : Nastic movements.

2. Explain the movement seen in Pneumatophores of Avicennia.

Ans :

- Nagatively geotropic roots.
- These roots turn 180° upright for respiration

5. Name the part of plant which shows positive geotropism. Why?
Ans :
✶ The part of plant which shows positive geotropism is **Root,**
✶ Because the roots grow downwards towards gravity to provide stability for the plant.

6. What is the difference between movement of flower in sunflower plant and closing of the leaves in the *Mimosa pudica.*?
Ans :

S.No.	Movement in Sunflower	Movement in Mimosa pudica
1.	Photonasty	Thigmonasty
2.	Movement of a part of plant in response to light	Movement of a part of plant in response to touch.

9.To which directional stimuli do
(a) roots respond
Ans : Roots respond - Gravity
(b) Shoots respond
Ans : Shoots respond - Light

VII. Answer in Detail.
1. Differentiate between tropic and nastic movements.
Ans :

S.No.	Tropic movements	Nastic movements
1.	Unidirectional response to the stimulus.	Non-directional response to the stimulus.
2.	Growth dependent movements.	Growth independent movements.
3.	More or less permanent and irreversible.	Temporary and reversible.
4.	Found in all plants.	Found only in a few specialized plants.
5.	Slow action.	Immediate action.

VIII. Higher Order Thinking Skills.
1. There are 3 plants A, B and C. The flowers of A open their petals in bright light during the day but closes them when it gets dark at night. On the other hand, the flowers of plant B open their petals at night but closes during the day when there is bright light. The leaves of plant C fold up and droop when touched with fingers or any other solid object.
a) Name the Phenomenon shown by the flowers of plant A and B.
Ans : Photonasty
b) Name one plant each which behaves like the flowers of plant A and B
Ans : Plant A - Taraxacum officinale (Common Dandelion)
Plant B - Ipomoca albe (Moon flower)
c) Name the phenomenon exhibited by the leaves of plant C
Ans : Thigmonasty
d) Name the plant which behaves like the leaves plant C.
Ans : Mimosa pudica

UNIT - 21. Nutrition and Health

TEXT BOOK EXERCISES

I. Choose the correct answer

1. The nutrient required in trace amounts to accomplish various body functions is .....

a) carbohydrate b) protein c) vitamin d) fat **Ans : c) vitamin**

2. The Physician who discovered that scurvy can be cured by ingestion of citrus fruits is .....

a) James Lind b) Louis Pasteur c) Charles Darwin d) Isaac Newton

Ans :a) James Lind

II. Fill in the blanks

1. Deficiency diseases can be prevented by taking..... diet.

Ans :balanced

3. Vitamin D is called as..... vitamin as it can be synthesised by the body from the rays of sun light. **Ans : sunshine**

III. State whether true or false. If false, correct the statement

1. Iron is required for the proper functioning of thyroid gland. **Ans :False**

Correct Statement : Iodine is required for the proper functioning of thyroid gland.

2. Vitamins are required in large quantities for normal functioning of the body.

Ans :False

Correct Statement : Vitamins are required in **Minute** quantities for normal functioning of the body.

3. Vitamin C is a water soluble Vitamin **Ans :True**

4. Lack of adequate fats in diet may result in low body weight **Ans : True**

IV) Match the following

Column A	Column B
1. Calcium	a. Muscular fatigue
2. Sodium	b. Anaemia
3. Potassium	c. Osteoporosis
4. Iron	d. Goitre
5. Iodine	e. Muscular cramps

Ans :

Column A	Column B
1.Calcium	c. Osteoporosis
2.Sodium	e. Muscular cramps
3. Potassium	a. Muscular fatigue
4.Iron	b. Anaemia
5.Iodine	d. Goitre

V) Fill in the blanks with suitable answers

Vitamins	Dietary Source	Deficiency disease
Calciferol		Rickets
	Papaya	Night blindness
Ascorbic acid		
	Whole grains	Beriberi

Ans :

Vitamins	Dietary Source	Deficiency disease
Calciferol	Dairy Products	Rickets
Retinol	Papaya	Night blindness
Ascorbic acid	Citrus fruits	Scurvy
Thiamine	Whole grains	Beriberi

VII. Assertion and Reason

Direction : In the following question, a statement of a Assertion is given and a corresponding Reason is given just below it. Of the statements given below, mark the correct answer as:

1. **Assertion :** Haemoglobin contains iron.
   Reason : Iron deficiency leads to anaemia.

(a) If both Assertion and Reason are true and the Reason is the correct explanation of Assertion

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

(c) If Assertion is true but Reason is false

(d) If both Assertion and Reason is false

Ans : (d) If both Assertion and Reason is false

VIII. Give reasons for the following statements.

c) Deficiency of calcium in diet leads to poor skeletal growth.....

Ans : Deficiency of calcium in diet leads to poor skeletal growth **because calcium is the major consituent of bone.**

IX. Answer briefly.

1. Differentiate

a) Kwashiorkar from Marasmus.

Ans :

S.No.	Kwashiorkar	Marasmus
1.	It is a condition of severe protein deficiency .	It is due to the diet is poor in Carbohydrates fats and protiens.
2.	It affects children between 1-5 years of age.	It usually affects infants below the age of one year.

b) Macronutrients from micronutrients.

Ans :

S.No.	Macronutrients	Micronutrients
1.	Nutrients required for the growth and development of the body in large quantities are called Macronutrients.	Nutrients required for the growth and development of the body in small quantities are called Micronutrients.
2.	Eg. Calcium, Phosphorus, Potassium, Sodium and Magnesium.	Eg. Sulfur, Iron, Chlorine, Cobalt, Copper, Zinc, Manganese, Molybdenum, Iodine and Selenium.

5.What factors are required for the absorption of Vitamin D from the food by the body?
Ans : 1) Sunlight 2) Dehydro Cholestrol.

6. Write any one function of the following minerals.
a) Calcium b) Sodium c) Iron d) Iodine
Ans :

Sl.no	Minerals	Functions
a)	Calcium	Constituent of bones
b)	Sodium	Maintains fluid balance
c)	Iron	Important component of haeomoglobin
d)	Iodine	Formation of thyroid hormones

X. Answer in detail.
1. How are vitamins useful to us? Tabulate the sources, deficiency diseases and symptoms of fat soluble vitamins.
Ans : a) Vitamin : Vitamins are vital nutrients required in minute quantities of perform specific physiological and biochemical functions.

b) Fat soluble vitamins :

Vitamins	Sources	Deficiency disorders	Symptoms
Vitamin A (Retinol) (Night blindness)	Carrot, papaya, leafy vegetables, fish liver oil egg yolk, liver, diary products	Xerophthalmia Nyctalopia (Night blindness)	Dryness of Cornea Unable to see in the night (dim light) Scaly skin
Vitamin D (Calciferol)	Egg, liver, diary products, Fish, synthesized by the skin in sunlight	Rickets (in children)	Bow legs, defective ribs, development of pigeon chest
Vitamin E (Tocopherol)	Whole wheat, meat , Vegetable oil, milk	Sterility in rats, Reproductive abnormalities	Sterility
Vitamin K (Derivative of Quinone)	Leafy vegetables, Soyabeans, milk	Blood clotting is prevented	Excessive bleeding due to delayed blood clotting

liver, diary

XI. Higher Order Thinking Skills.
2. The doctor advices an adolescent girl who is suffering from anaemia to include more of leafy vegetables and dates in her diet. Why so?
Ans :
★ Anaemia is a condition resulting from deficiency of haemoglobin in the blood
★ Iron is necessary for the formation of a haemoglobin.
★ Therefore the doctor advices the girl to include leafy vegetables and dates in her diet since they are rich in iron content.

Additional questions & answers

I. Short answers.

1. Write the classes of nutrients.

Ans :

★ Carbohydrates, ★ Proteins, ★ Fats, ★Vitamins, ★Minerals

---

2. Define Carbohydrate.

Ans : Carbohydrates are organic compounds composed of carbon, hydrogen and oxygen.

---

3. Define Proteins.

Ans : Proteins are the essential nutrients and also the building blocks of the body.

---

4. Define Vitamins.

Ans : Vitamins are the vital nutrients, required in minute quantities to perform specific physiological and biochemical functions.

---

5. What is a minerals.

Ans : Minerals are inorganic substances required as an essential nutrient by organisms to perform various biological functions necessary for life. They are the constituents of teeth, bones, tissues, blood, muscle and nerve cells.

UNIT - 22. World of Microbes

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. Which of the following is transmitted through air?
a) Tuberculosis b) Meningitis
c) Typhoid d) Cholera **Ans : a)Tuberculosis**

2. One of the means of indirect transmission of a disease is
a) sneezing b) coughing
c) vectors d) droplet infection **Ans : c) vectors**

3. Diptheria affects the
a) Lungs b) Throat
c) Blood d) Liver **Ans : b) Throat**

4. The primary organ infected during tuberculosis is
a) bone marrow b) intestine
c) spleen d) lungs **Ans : d) lungs**

5. Microbes that generally enter the body through nose are likely to affect
a) gut b) lungs
c) liver d) lymph nodes **Ans : b) lungs**

6. The organ affected by jaundice is
a) liver b) lungs
c) kidney d) brain **Ans : a) liver**

7. Poliomyelitis virus enters the body through
a) skin b) mouth and nose
d) eye c) ears Ans : b) d) eye **Ans : b) mouth and nose**

II. Fill in the blanks.

1. _____ break down organic matter and animal waste into ammonia.
Ans : Putrefying bacteria
2. Typhoid fever is caused by _____. **Ans : Salmonella typhi**
3. H_1N_1 virus causes _____. **Ans : Swine Flu**
4. _____ is a vector of viral disease dengue. **Ans : Aedes aegypti mosquito**
5. _____ vaccine gives considerable protection against tuberculosis. **Ans : BCG**
6. Cholera is caused by _____ and malaria is caused by _____.
Ans : Vibrio cholerae, Plasmodium

III. Expand the following.

1)	ORS	-	Oral Rehydration Solution
2)	HIV	-	Human Immuno Deficiency Virus
3)	DPT	-	Diptheria, Pertussis, Tetanus
4)	WHO	-	World Health Organisation
5)	BCG	-	Bacillus Calmette Guerin

IV. Pick out the odd one.

i) AIDS, Retrovirus, Lymphocytes, BCG,

Ans :

Odd one : BCG

---

ii) Bacterial disease, Rabies, Cholera, Common cold and Influenza
Ans :
Odd one : Rabies

V. State whether True or False. If false correct the statement.
2. Non- infectious diseases remain confined to the person who develops the disease and do not spread to others. **Ans : True**
3. The process of vaccination was developed by Jenner . **Ans : True**
4. Hepatitis B is more dangerous than Hepatitis A. **Ans : True**

VI. Match the following.

1.	Swine flu	a)	Human Papilloma virus
2.	Genital warts	b)	Human Immunodeficiency Virus
3.	AIDS	c)	Mycobacterium
4.	Tuberculosis	d)	Influeuza virus H1N1

Ans :

1.	**Swine flu**	**d)**	**Influeuza virus H1N1**
2.	**Genital warts**	**a)**	**Human Papilloma virus**
3.	**AIDS**	**b)**	**Human Immunodeficiency Virus**
4.	**Tuberculosis**	**c)**	**Mycobacterium**

VII. Define the following.
1. Pathogen
Ans :
★ A pathogen is a biological agent that causes disease to its host.
★ Eg: Bacteria, Virus, Fungi.

---

3. Vaccines
Ans :
★ Vaccines are preparation of living or killed micro organisms or their products used for prevention or treatment of diseases.

VIII. Answer very briefly.
2. Name the vector of the malarial parasite. Mention the species of malarial parasite which cause malignant and fatal malaria.
Ans :
a) Vector of the malarial parasite : The female Anopheles mosquito.
b)Malignant and fatal malaria : Plasmodium falciparum

---

3. What is triple antigen? Mention the disease which can be prevented by using the antigen.
Ans :
a) DPT (Triple vaccine) triple antigen.
b) **Diseases prevented by DPT antigen :**
★ Diphtheria,
★ Pertussis (Whooping cough)
★ Tetanus

---

4. Name the chronic diseases associated with respiratory system.
Ans : 1. Tuberculosis 2. Diphtheria 3. Whooping cough

5. Name the organism causing diarrhoeal disease and give one precaution against it.
Ans :
a) Rotavirus
b) Proper sanitation and hygiene.

6. Name two common mosquitoes and the diseases they transmit.
Ans :
1. Female Anopheles Mosquito - Malaria
2. Aedes aegypti - Dengue, Chikungunya

IX. Answer briefly.
4. Suggest the immunization schedule for a new born baby till 12 months of age. Why it is necessary to follow the schedule?
Ans : a) Immunization Schedule for Children

Age	Vaccine	Dosage
New born	BCG	1st dose
15 days	Oral Polio	1st dose
6th week	DPT and Polio	1st dose
10th week	DPT and Polio	1st dose
14th week	DPT and Polio	1st dose
9-12 months	Measles	1st dose

DPT and Polio 1st dose

b) It is necessary to follow the schedule to protect the children from infectious diseases.

X. Assertion and Reason type Questions.
Mark the correct statement as.
1. Assertion: Chicken pox is a disease indicated by scars and marks in the body.
Reason: Chicken pox causes rashes on face and further spreads throughout the body.
a) If both A and R are true and R is correct explanation of A
b) If both A and R are true but R is not the correct explanation of A
c) If A is true but R is false
d) If both A and R are false
Ans : a) If both A and R are true and R is correct explanation of A

2. Assertion: Dengue can be treated by intake of antibiotics.
Reason: Antibiotics blocks the multiplication of viruses.
a) If both A and R are true and R is correct explanation of A
b) If both A and R are true but R is not the correct explanation of A
c) If A is true but R is false
d) If both A and R are false
Ans : d) If both A and R are false

XI. Higher order Thinking Skills.

1. Suggest precautionary measures you can take in your school to reduce the incidence of infectious disease.

Ans :

1) Using a hand kerchief while sneezing or coughing
2) Staying away from an infected student
3) Drinking clean and hygienic water
4) Keeping the toilet neat and clean

---

2. Tejas suffered from typhoid while, Sachin suffered from tuberculosis. Which disease could have caused more damage and why?

Ans :

★ Tuberculosis causes more damage to the patient than Typhoid.
★ It is mostly affect the lungs.
★ Infected person has to be treated with anti-tuberculosis drugs for a long period of 6 months to one year.

Additional Questions & Answers

I. Choose the correct answer.

1. Occurence of goitre in sub-Himalayan regions is ..... disease

(a) Sporadic (b) Epidemic
(c) Pandemic (d) Endemic **Ans :(d) Endemic**

II. Fill in the blanks.

1. Filaria is transmitted by the bite of infected ..... mosquito. **Ans : Culex**

III) Match the following :

1.	World Health Day	-	25th April
2.	World Malaria Day	-	24th March
3.	World AIDS Day	-	7th April
4.	World Anti-Tuberculosis Day	-	1st December

Answer :

1.	**World Health Day**	**-**	**7th April**
2.	**World Malaria Day**	**-**	**25th April**
3.	**World AIDS Day**	**-**	**1st December**
4.	**World Anti -Tuberculosis Day**	**-**	**24th March**

UNIT - 23. Economic Biology

TEXT BOOK EXERCISES

I. Choose the correct answer.

2. Which one of the following is not an exotic breed of cow?
a) Jersey b) Holstein-Friesan
c) Sahiwal d) Brown Swiss **Ans : c) Sahiwal**

3. Which one of the following is an Italian species of honey bee?
a) Apis mellifera b) Apis dorsata
c) Apis florae d) Apis cerana
Ans : a) Apis mellifera

5. Drones in the honey bee colony are formed from
a) unfertilized egg b) fertilized egg
c) parthenogenesis d) both b and c **Ans : a) unfertilized egg**

6. Which of the following is an high milk yielding variety of cow?
a) Holstein- Friesan b) Dorset
c) Sahiwal d) Red Sindhi **Ans : a) Holstein-Friesan**

7.Which Indian variety of honey bee is commonly used for apiculture?
a) Apis dorsata b) Apis florea
c) Apis mellifera d) Apis indica **Ans : d) Apis indica**

II. Fill in the blanks.

1. Quinine drug is obtained from _____. **Ans : Cinchona Officinalis**
2. Carica papaya leaf can cure _____ disease. **Ans : Dengue**
3. Vermicompost is a type of soil made by _____ and microorganisms. **Ans : earthworm**
5. The largest member in a honey bee hive is the _____ **Ans : Queen Bee**
6. _____ is a preservative in honey. **Ans : Formic Acid**

III. Say true or false, If false, correct the statement.

2. Milch animals are used in agriculture and transport. **Ans : False**
Correct statement : Milch animals are used in **Milkproduction**
3. Apis florea is a rock bee. **Ans : False**
Correct statement : Apis florea is a **little** bee.
4. Ongole is an exotic breed of cattle. **Ans : False**
Correct statement : Ongole is an **Indian** breed of cattle
5. Sheep manure contains high nutrients than farm yard manure. **Ans : True**

IV. Differentiate the following.

a. Exotic breed and Indigenous breed

Ans :

S.No.	Exotic breed	Indigenous breed
1.	The exotic breeds are imported from foreign countries	Indigenous breeds are native of India
2.	These are selected for long lactation periods	Milk production depends on the duration of the lactation period have excellent resistant to diseases.

3. Eg : Jersey Brown Swiss and Holstein Friesian.	Eg : Sahiwal, Red sindhi, Deoni and Gir.

b. Pollen and Nectar
Ans :

Pollen	Nectar
Pollen is the male fertilizing agent of flowering plants, trees, grasses and weeds	It is a sweet, viscous secretion secreted by the flower of plants.

d. Farmyard manure and Sheep manure
Ans :

S.No.	Farmyard manure	Sheep manure
1.	It is a mixture of cattle dung, urine, litter material and other dairy wastes.	It contains higher nutrients than farmyard manure
2.	It contains 0.5% Nitrogen, 0.2% Phosphate and 0.5 % potash.	It contains 3% of Nitrogen, 1% Phosphorus pentoxide and 2% potassium oxide.

V. Match the following.

S.No.	Column A		Column B
7.	Sarpagandha	f)	Psoriosis
8.	Olericulture	h)	Reserpine
9.	Wrighta tinctoria	i)	Vegetable farming

i) Vegetable farming

Ans :

S.No.	Column A		Column B
7.	**Sarpagandha**	**h)**	**Reserpine**
8.	**Olericulture**	**i)**	**Vegetable farming**
9.	**Wrighta tinctoria**	**f)**	**Psoriosis**

VI. Answer in brief.

1.What are secondary metabolites?
Ans : Secondary metabolites :
★ Most medicines are obtained either directly or indirectly from plants.
★ These drugs from medicinal plants are called secondary metabolites
★ Secondary metabolites for protection, competition and species interaction.
★ e.g. : Alkaloids, Terpenoids, Flavonoids.

2. What are the types of vegetable garden?
Ans : Types of vegetable garden are,
(i) Kitchen or Nutrition gardening
(ii) Commercial gardening
(iii) Vegetable forcing.

4. Enumerate the advantages of vermicompost over chemical fertiliser.
Ans : Advantages of Vermicompost :
★ It is a rich source of nutrients essential for plant growth it makes the soil fertile.
★ It improves the water holding capacity and helps to prevent soil erosion.

★ It contains valuable vitamins, enzymes and growth regulator substances for increasing growth, vigour and yield of plants.
★ It enhances decomposition of organic matter in soil.
★ It is free from pathogens and toxic elements.
★ It is rich in beneficial microflora.

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5. What are the species of earthworm used for vermiculture?
Ans : The Species of earthworm used for vermiculture are,
★ Perionyx excavatus - Indian blueworm
★ Eisenia fetida - Redworms
★ Eudrilus eugeniae - African night crawler

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6. List the medicinal importance of honey.
Ans : The medicinal importance of Honey :
★ Honey has an antiseptic and antibacterial property. It is a blood purifier.
★ It helps in building up of haemoglobin content in the blood.
★ It is used in Ayurvedic and Unani system of medicines.
★ It prevents cough, cold, fever and relieves sore throat.
★ It is a remedy for ulcers of tongue, stomach and intestine.
★ It enhances digestion and appetite.

VII. Answer in detail.
3. What are the sources of organic resources for vermicomposting?
Ans : (i) Agricultural wastes (crop residue, vegetables waste, sugarcane trash)
(ii) Crop residues (rice straw, tea wastes, cereal and pulse residues, rice husk, tobacco wastes, coir wastes)
(iii) Leaf litter
(iv) Fruit and vegetable wastes
(v) Animal wastes (cattle dung, poultry droppings, pig slurry, goat and sheep droppings)
(vi) Biogas slurry

---

5. Classify the different breeds of the cattle with suitable examples.
Ans :
Different breeds of the cattle :
They are classified into three types :
(i) Dairy breeds
(ii) Drought or Draft breeds
(iii) Dual purpose breeds
(i) Dairy breeds :
★ Dairy animals are domesticated for obtaining milk.
★ The cows are high milk yielders
★ The dairy breeds are ,
a) Indigenous breeds
b) Exotic breeds
a) Indigenous breeds :
★ Indigenous breeds are native of India.
★ **Example :** Sahiwal, Red Sindhi, Deoni and Gir.
★ These cattle are well built with strong limbs, prominent hump and loose skin.
★ Milk production depends on the duration of the lactation period (the period of milk production after the birth of a calf).

★ These local breed animals show excellent resistant to diseases.

b) Exotic breeds :

★ The **exotic breeds** (Bos taurus) are imported from foreign countries.
★ **Example : Jersey, Brown Swiss** and **Holstein - Friesian** etc.
★ These foreign breeds are selected for long lactation periods.

(ii) Draught (or) Draft breeds : They are used for agricultural work, such as tilling, irrigation and carting.

★ **Example :** These include **Amritmahal, Kangayam, Umblachery, Malvi, Siri** and **Hallikar** breeds.
★ Bullocks are good draft animals while the cows are poor milk yielders.

(iii) Dual purpose breeds : The cows of these breeds provide milk and the bulls are useful for farm work.

★ In India these breeds are favoured by farmers.
★ **Examples : Haryana, Ongole, Kankrej** and **Tharparkar.**

VIII. Higher Order Thinking Skills .

1. Biomanuring plays an important role in agriculture. Justify

Ans : Biomanuring :

★ Organic manures are predominantly derived from plant debris, animal faeces and microbes.
★ They make the soil fertile by adding nutrients like nitrogen.
★ Few of them are listed below.
★ i) Animal manure :
  a) Farm yard manure.
  b) Sheep and goat manure.
★ ii) Compost
★ iii) Green manure

---

2. Each bee hive consists of hexagonal cells. Name the material in which the cell is formed and mention the significance of the hexagonal cells.

a) Comb : The comb of the bees is formed mainly by the secretion of the wax glands present in the abdomen of the worker bee.

b) Significance of hexagonal cells :

★ A comb is a vertical sheet of wax with double layer of hexagonal cells.
★ The cells of the comb are of various types.
★ **Storage cells :**
★ It contain honey and pollen.
★ They are built in the margin and at the top of the comb.
★ **Brood cells:**
★ It contain the young stages of the honey bees and they are built in the centre and the lower part of the comb.
★ The **brood chamber** is divided into three types.
★ They are **Worker chamber, Drone chamber** and **Queen chamber** where the larvae developing into worker, drone and queen are reared.

Additional Questions & Answers

I. Choose the correct answer.

1. Kangayam is native to .....
(a) Tamilnadu (b) Kerala (c) Karnataka (d) Andhrapradesh
Ans :(a) Tamilnadu

2. Dr. Verghese kurien was the father of ..... revolution
(a)Blue (b) Green (c) White d) Yellow **Ans :(c) White**

3. One kilogram of honey contains ..... calories and is an energy rich food.
(a)1200 (b) 2100 (c) 2300 (d) 3200 **Ans :(d) 3200**

II. Fill in the blanks.

1. ..... is the method of growing vegetables in buildings, green houses, cold farms. **Ans : Vegetable forcing**
2. India's first anti diabetic ayurvedic drug ..... **Ans : BGR-34**

III. Complete the Analog:

a) Fertile female : Queen bee
Fertile male : **Drones**
b) Deoni : Indigenous breed
Brown swiss : **Exotic breed**

IV. Answer the following :

1. Name the Indigenous and exotic varieties of Honey bee?
Ans : Indigenous and Exotic varieties of Honey Bee :
a) Indigenous varieties
(i) Apis dorsata (Rock bee or Wild bee) (ii) Apis florea (Little bee)
(iii) Apis indica (Indian bee)
b) Exotic varieties
(i) Apis mellifera (Italian bee) (ii) Apis adamsoni (African bee)

UNIT - 24. Environmental Science

TEXT BOOK EXERCISES

TEXT BOOK EXERCISES

I. Choose the correct answer.

1. All the factors of biosphere which affect the ability of organisms to survive and reproduce are called as _____.

a) biological factors b) abiotic factors
c) biotic factors d) physical factors **Ans : b) abiotic factors**

2. The ice sheets from the north and south poles and the icecaps on the mountains, get converted into water vapour through the process of_____.

a) evaporation b) condensation
c) sublimation d) infiltration **Ans :c) sublimation**

3. The atmospheric carbon dioxide enters into the plants through the process of_____.

a) photosynthesis b) assimilation
c) respiration d) decomposition **Ans : a) photosynthesis**

4. Increased amount of _____ in the atmosphere, results in greenhouse effect and global warming

a) carbon monoxide b) sulphur dioxide
c) nitrogen dioxide d) carbon dioxide **Ans : d) carbon dioxide**

d) carbon dioxide Ans : d) carbon

II. Match the following.

S.No	Microorganism		Role Played
1.	Nitrosomonas	a)	Nitrogen fixation
2.	Azotobacter	b)	Ammonification
3.	Pseudomonas species	c)	Nitrification
4.	Putrefying bacteria	d)	Denitrification

Ans :

S.No	Microorganism		Role Played
1.	Nitrosomonas	c)	Nitrification
2.	Azotobacter	a)	Nitrogen fixation
3.	Pseudomonas species	d)	Denitrification
4.	Putrefying bacteria	b)	Ammonification

III. State whether true or false. If false correct the statement.

1. Nitrogen is a greenhouse gas. **Ans : False**
   Correct Statement : Carbon - di - oxide is a greenhouse gas.
3. Bats are the only mammals that can fly. **Ans : True**
4. Earthworms use the remarkable high frequency system called echoes. **Ans : False**
   Correct Statement : Bats use the remarkable high frequency system called echoes.
5. Aestivation is an adaptation to overcome cold condition. **Ans : False**
   Correct Statement : Hibernation is an adaptation to overcome cold condition.

IV. Give reason for the following.

2. Why streamlined bodies and presence of setae is considered as adaptations of earthworm?

Ans : (i) Streamlined bodies of earthworm, helps them to live in narrow burrows underground and for easy penetration into the soil.

(ii) Setae in earthworm help to move through the soil and provide anchor in the burrows.

3. Why is it impossible for all farmers to construct farm ponds in their fields?
Ans : It is impossible for all farmers to construct it in their fields because,
(i) Farm ponds reduce water flow to other tanks and ponds situated in lower-lying areas.
(ii) They occupy a large portion of farmer's lands.

V. Answer in brief.
1. What are the two factors of biosphere?
Ans : Biosphere can be grouped into two major categories namely :
(i) **Biotic or living factors :** - Which include plants, animals and all other living organisms.
(ii) **Abiotic or Non-living factors** : - Which include all factors like temperature, pressure, water, soil, air and sunlight.

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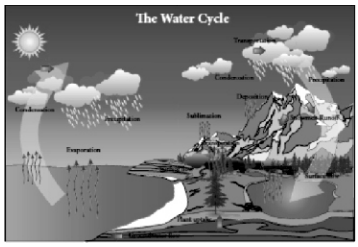
2. How do human activities affect nitrogen cycle?
Ans :
★ Burning fossil fuels, application of nitrogen-based fertilizers and other activities can increase the amount of biologically available nitrogen in an ecosystem.
★ Nitrogen applied to agricultural fields enters rivers and marine systems.
★ It alters the biodiversity, changes the food web structure and destroys the general habitat.

---

3. What is adaptation?
Ans : Any feature of an organism or its part that enables it to exist under conditions of its habitat is called adaptation.

VI. Answer in detail.
1. Describe the processes involved in the water cycle.
Ans : a) Evaporation
Water evaporates from the surface of the earth and water bodies such as the oceans, seas, lakes, ponds and rivers.



Water Cycle

b)Sublimation
Ice sheets and ice caps from north and south poles, and icecaps on mountains, get converted into water vapour directly, without converting into liquid.
c)Transpiration
Transpiration is the process by which plants release water vapour in to the atmosphere through stomata in leaves and stems.
d) Condensation
At higher altitudes, the temperature is low. The water vapour present there condenses to form very tiny particles of water droplets. These particles come close together to form clouds and fog.
e) Precipitation
Due to change in wind or temperature, clouds combine to make bigger droplets, and pour down as precipitation(rain). Precipitation includes drizzle, rain, snow and hail.
f) Run off
As the water pours down, it runs over the surface of earth. Runoff water combines to form channels, rivers, lakes and ends up into seas and oceans.

---

2. Explain carbon cycle with the help of a flow chart?

Ans : Carbon cycle :

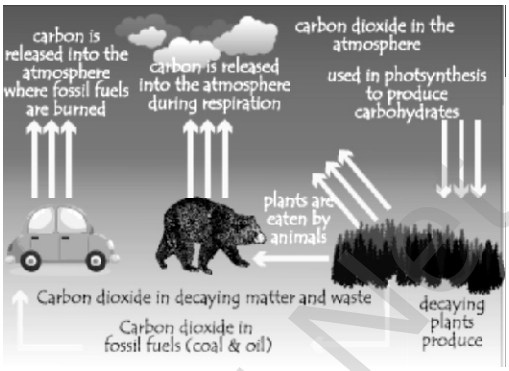
★ All living organisms are made up of carbon containing molecules like proteins and nucleic acids.

★ The atmospheric carbon dioxide enters into the plants through the process of photosynthesis to form carbohydrates.

★ From plants, it is passed on to herbivores and carnivores.

★ During respiration, plants and animals release carbon into atmosphere in the form of carbon dioxide.

★ Carbon dioxide is also returned to the atmosphere through decomposition of dead organic matter, burning fossil fuels and volcanic activities.



Carbon Cycle

4. How does a bat adapt itself to its habitat ?

Ans : Adaptations of Bat :

★ Bats are the only mammals that can fly.

★ Mostly, bats live in caves.

★ Apart from caves, bats also live in trees, hollowed logs and rock crevices.

★ They are extremely important to humans as they reduce insect population and help to pollinate plants.

★ Adaptations of bat in relation to their habitat are explained below.

Nocturnality :

★ Bats are active at night.

★ This is a useful adaptation for them, as flight requires a lot of energy during day.

★ Their thin, black wing membrane (Patagium) may cause excessive heat absorption during the day.

★ This may lead to dehydration.

Flight adaptation :

★ Forelimbs are modified serve wings.

★ Tail supports and controls movements during flight.

★ Muscles are well developed and highly powerful and achieve in beating of wings.

★ Tendons of hind limbs provide a tight grasp when the animals are suspended upside down at rest.

Hibernation :

★ Hibernation is a state of inactivity in which the body temperature drops with a lowered metabolic rate during winter.

★ Bats are warm blooded animals but unlike other mammals, they let their internal temperature reduce when they are resting.

★ They go to a state of decreased activity to conserve energy.

Echolocation :

★ Bats use a remarkable high-frequency system called echolocation.

★ Bats give out high-frequency sounds (**ultrasonic sounds**).

★ These sounds are reflected back from its prey and perceived by the ear.

★ Bats use these echoes to locate and identify the prey.

Additional Questions & Answers

I. Choose the correct answer.

1. **..... is an essential component of proteins , DNA and Chlorophyll.**
   (a) Hydrogen (b) Nitrogen (c) Carbon (d) Oxygen **Ans :(b) Nitrogen**
2. **Charcoal, Diamond and Graphite are elemental forms of .....**
   (a)Carbon (b) Potassium (c) Iron d) Zinc **Ans :(a) Carbon**
3. **An earthworm is a segmented worm which belongs to phylum .....**
   (a) Porifera (b) Mollusca (c)Arthropoda (d)Annelida **Ans :(d) Annelida**

II. Fill in the blanks.

1. Thin, black wing membrane in bats are ..... . **Ans : Patagium**
2. Earthworms can sense light through light sensitive cells called ..... .
   Ans : Photo - receptors

III. Answer the following :

1. List out the environmental issues.

Ans :

- ★ Pollution
- ★ Global warming
- ★ Ozone layer depletion
- ★ Acid rain
- ★ Deforestation
- ★ Land slide
- ★ Drought
- ★ Desertification

---

2. Give the kinds of Precipitation.

Ans : Drizzle, rain, snow, hail.

PRACTICAL - TABLE OF CONTENTS

SI.NO	NAME OF THE EXPERIMENT	TIME
1.	To find the diameter of a spherical body	40 minutes
2.	To find the thickness of given iron nail	40 minutes
4.	Measurement of volume of liquids	40 minutes
5.	Identification of adaptations in animals	40 minutes
6.	Identification of plant and animal tissues	40 minutes

PRACTICALS

PHYSICS

1. TO FIND THE DIAMETER OF A SPHERICAL BODY

Marks : 10
Time : 40 Minutes

Aim :

★ To determine the diameter of a spherical body using Vernier Caliper

Apparatus required :

★ Vernier Caliper, given spherical body (cricket ball)

Formula :

i) Least count (LC) = 1 Main scale division - 1 Vernier scale division
LC = 1mm - 0.9mm
LC = 0.1mm (or) 0.01cm

ii) Diameter of the spherical object (d) = M.S.R. + (VC x LC) ± ZC cm

where, MSR = Main Scale Reading
VC = Vernier Coincide
LC = Least Count (0.01cm)
ZC = Zero Correction.

Procedure :

★ Find the least count of the Vernier caliper.
★ Find the zero correction of the Vernier caliper.
★ Fix the object firmly in between the two lower jaws of the Vernier.
★ Measure the main scale reading and the Vernier scale Coincidence.
★ Repeat the experiment by placing the jaws of the Vernier at different position of the object.
★ Using the formula find the diameter of the object.

Least Count : (LC) 0.01cm Zero correction : (ZC) **0**

Sl.No	Main Scale Reading MSR(cm)	Vernier Coincidence (VC)	Diameter of object d = MSR + (VC x LC) ± ZC (cm)
1	7.2	9.5	7.2+ 0.095 = 7.295
2	7.2	9.4	7.2+ 0.094 = 7.294
3	7.2	9.6	7.2+ 0.096 = 7.296

Average $\frac{21.885}{3}$ = **7.295cm**

Result : The diameter of the given spherical object (Cricket ball) is **7.29** cm

Marks Allotment :

Aim	-	**1 Mark**
Apparatus required	-	**2 Marks**
Formula	-	**2 Marks**
Procedure	-	**2 Marks**
Tabulation	-	**2 Marks**
Result	-	**1 Mark**
Total	-	**10 Marks**

2. TO FIND THE THICKNESS OF GIVEN IRON NAIL

Marks : 10
Time : 40 Minutes

Aim : ★To find the thickness of the given iron nail
Appartus required : Screw gauge and iron nail
Formula :

i) Least Count (LC) = $\frac{\text{Pitch scale Reading}}{\text{No of divisions in the Head Scale}}$

ii) Thickness (t) = Pitch scale Reading (PSR) + [Head scale coincidence (HSC) x Least Count (LC)] ± zero correction

t = PSR + (HSC x LC) ± ZC

Error :
i) If positive error is 5 points, for zero correction, subtract 5 points.

t = PSR + (HSC x LC) - ZC
t = PSR + (HSC x LC) - 5

ii) If negative error is 95 points, for zero correction add 5 points(100 - 95 =5).

t = PSR + (HSC x LC) + ZC
t = PSR + (HSC x LC) + 5

iii) If no correction is needed,

t = PSR + (HSC x 0.01) ± 0

Procedure :
★ The Least count of screw gauge is 0.01mm
★ The zero error is to be found when the two faces of the screw gauge touch each other.
★ Then place the iron nail between the two faces of the screw gauge. The pitch scale reading (PSR) and head scale coincidence (HSC) are to be noted.
★ Repeat the process by placing other parts of the iron nail in the screw gauge
★ Tabulate the readings.

Zero correction : 0 Least count : 0.01mm

Sl.No	Pitch Scale Reading PSR (mm)	Head Scale Coincidence (HSC)	Thickness of the iron nail t = PSR + (HSC x LC) ± ZC (mm)
1	2	55	2 + (55 x 0.01) = 2 + 0.55 = 2.55
2	2	56	2 + (56 x 0.01) = 2 + 0.56 = 2.56
3	2	57	2 + (57 x 0.01) = 2 + 0.57 = 2.57
			Average = 7.68 / 3 = 2.56 mm

Result : The diameter (Thickness) of the iron nail is 2.55 mm

Marks Allotment :

Aim	-	**1 Mark**
Apparatus Required	-	**2 Marks**
Formula	-	**2 Marks**
Procedure	-	**2 Marks**
Tabulation	-	**2 Marks**
Result	-	**1 Mark**
Total	-	**10 Marks**

CHEMISTRY

4. MEASUREMENT OF VOLUME OF LIQUIDS

Marks : 10
Time : 40 Minutes

Aim :

★ To measure the volume of given colourless and coloured liquids.

Materials Required :

Pipette (20ml), sample liquids and beakers

Procedure :

Take a 20 ml pipette. Wash it thoroughly with water and then rinse it with the given liquid. Insert the lower end of the pipette into the given liquid and suck the solution slowly till the solution rises well above the circular mark on the stem. Take the pipette out of the mouth and quickly close it with the fore finger. Take the pipette out the liquid and keep it such a way that the circular mark on the stem is at the level of the eyes. Now slowly release the fore finger to let the liquid drop out until the lower meniscus touches the circular mark on the stem. If the liquid in the pipette is exactly 20ml. This can be transferred to an empty beaker by removing the fore finger.

Tabulation :

Sl.No	Name of the liquid	Colour of the liquid	Nature of the meniscus	Volume of the liquid
1	Potassium permanganate	pink	Upper meniscus	20ml
2	Copper sulphate	Blue	Upper meniscus	20ml
3	Hydrochloric acid(HCl)	Colourless	Lower meniscus	20ml
4	NaOH solution	Colourless	Lower meniscus	20ml

pink

Result : Exactly 20ml of various liquids are measured using a standard 20ml pipette.

Note :

1) Keeping the circular mark on the stem of the pipette above or below the level of the eyes will lead to error.

2) When coloured liquids are measured, the upper meniscus should be taken into account.

3) Never suck strong acids or strong alkalis using a pipette.

Marks Allotment :

Aim	-	**2 Marks**
Materials Required	-	**2 Marks**
Procedure	-	**2 Marks**
Tabulation	-	**2 Marks**
Result	-	**2 Marks**
Total	-	**10 Marks**

BIOLOGY

5. IDENTIFICATION OF ADAPTATIONS IN ANIMALS

Marks : 10
Time : 40 Minutes

Aim :

★ To identify the given vertebrate animal and list out the following adaptations seen in them.

Required Specimens :

1. Pisces (Fish) 2. Amphibian (Frog), 3. Reptile (Calotes), 4. Aves (Dove), 5. Mammal (Rat)

The following adaptations are noted.

Sl.No	Name of the Animal	Habitat	Body Structure	Body Covering	Locomotory Organs
1	Pisces(Fish)	Aquatic	Streamlined body. Body has three parts- Head, trunk, tail	Scales	Fins, tail
2	Amphibian (Frog)	Land and water	Head stout body. No neck	Moist skin	Fore and hind limbs. Hind limbs have webbed feet.
3	Reptile (Calotes)	Land	Slender. Body has head, trunk and tail	Dry scales	Fore and hind limbs
4	Aves(Dove)	Arboreal	Spindle, head, neck Light weight body with air sacs and Preumatic bones, tail	Feathers	Wings
5	Mammal (Rat)	Burrows	Small head, neck four legged with long tail	Epidermal Hairs	Fore and hind limbs

water No neck

Result : Comparitive study about the adaptation of the given specimen was done.

Marks Allotment :

Aim	-	**2 Marks**
Required Specimens	-	**2 Marks**
Observation	-	**2 Marks**
Result	-	**2 Marks**
Record Work	-	**2 Marks**
Total	-	**10 Marks**

6. IDENTIFICATION OF PLANT AND ANIMAL TISSUES

Aim:

★ To identify the structural features of plant and animal tissues from permanent prepared slides.

Observation:

Identify the given plant and animal tissues.

a) Simple tissues- parenchyma, collenchyma, sclerenchyma
b) Complex tissues-xylem and phloem
c) Epithelial tissue- columnar epithelium, ciliated epithelium
d) Connective tissue- section of bone
e) Muscle tissue- skeletal muscle, smooth and cardiac muscle
f) Nerve tissue

Draw a labelled sketch and write the location and function of the tissues observed.

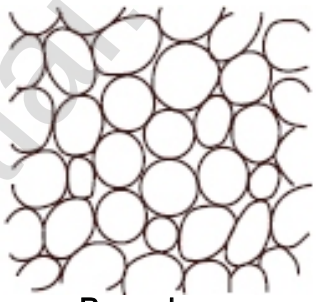
A) Simple tissues- parenchyma, collenchyma, sclerenchyma

1. Parenchyma :

★ Parenchyma are simple permanent tissues composed of living cells.
★ Parenchyma cells are thin walled, oval, rounded or polygonal in shape with well developed spaces among them.

Function :

★ When exposed to light, parenchyma cells may develop chloroplasts and are known as Chlorenchyma.



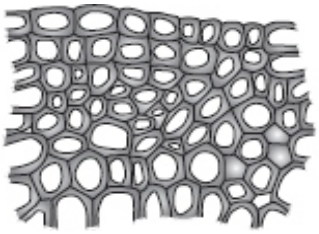
Parenchyma

2. Collenchyma :

★ Collenchyma is a living tissue found beneath the epidermis.
★ Cells are elongated with unevenly thickened non-lignified walls.
★ Cells have rectangular oblique or tapering ends and persistent protoplast.
★ They posses thick primary non-lignified walls.

Function :

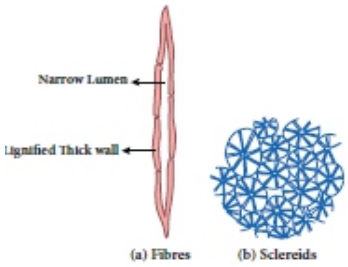
★ They provide mechanical support for growing organs.



Collenchyma

3.Sclerenchyma :

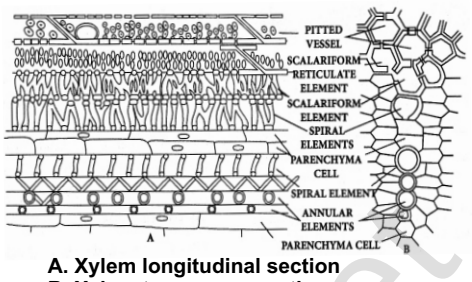
★ Sclerenchyma consists of thick walled cells which are often lignified.
★ Sclerenchyma cells are dead and do not possess living protoplasts at maturity.
★ Sclerenchyma cells are grouped into fibres and sclereids.
★ Fibres are elongated sclerenchymatous cells, usually with pointed ends.
★ Their walls are lignified.
★ Fibres are abundatly found in many plants.
★ The average length of fibres is 1 to 3 mm.



Sclerenchyma

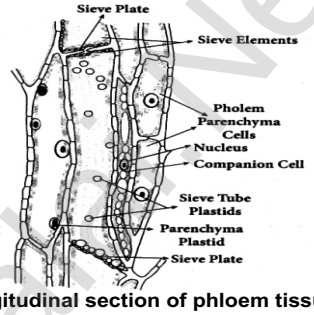
B) Complex tissues-xylem and phloem .The given micro slide observed as xylem, phloem tissue

Xylem
★ Conducts water and minerals
★ Conduction is mostly unidirectional i.e., from roots to apical parts of the plant.
★ Conducting channels are tracheids and vessels.
★ Component of xylem include tracheid vessels, xylem parenchyma and xylem fibres. companion cells, phloem parenchyma and phloem fibres.



A. Xylem longitudinal section
B. Xylem transverse section

Phloem
★ Conducts organic solutes or food materials.
★ Conduction may be bidirectional from leaves to storage organs and growing parts or from storage organs to growing parts of plants.
★ Conducting channels are sieve tubes.
★ Components are sieve elements, companion cells, phloem parenchyma and phloem fibres.

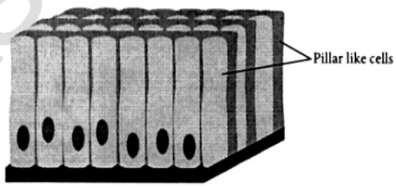


Longitudinal section of phloem tissue

C) Epithelial tissue- columnar epithelium, ciliated epithelium

Columnar Epithelium :

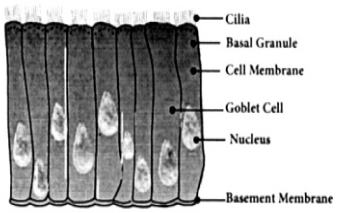
★ Columnar Epithelium is composed of a single layer of slender, elongated and pillar like cells.
★ Their nuclei are located at the base.
at the base.
★ It is found lining the stomach, gall bladder, bile duct, small intestine, colon, oviducts and also fo :
★ They are mainly involved in secretion and absorption



Columnar Epithelium

Ciliated Epithelium :

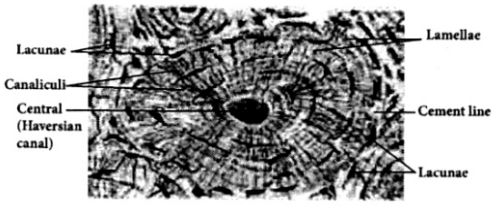
★ Certain columnar cells bear numerous delicate hair like out growths called cilia and are called ciliated epithelium.
★ Their function is to move particles or mucus in a specific direction over the epithelium.
★ It is seen in the trachea of wind-pipe, bronchioles of respiratory tract, kidney tubules and fallopian tubes of oviducts.



Ciliated Epithelium

D) Connective tissue :

★ It is solid, rigid and strong, non-flexible skeletal connective tissue.
★ The matrix of the bone is rich in calcium salts and collagen fibres which gives the bone its strength.
★ The matrix of the bone is in the form of concentric rings called lamellae.
★ The bone cells present in Lacunae are called osteocytes. They communicate with each other by a network of fine canals called canaliculi.



T.S of Bone

★ The hollow cavities of spaces are called marrow cavities filled with bone marrow.
★ They provide shape and structural framework to the body. Bones support and protect soft tissues and organs.

E) Muscle tissue- skeletal muscle, smooth muscle and cardiac muscle

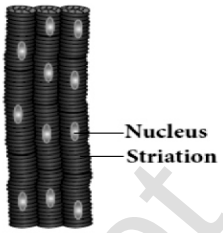
a. Skeletal muscle:

★ These muscles are attached to the bones and are responsible for the body movements and are called skeletal muscles.

★ They work under our control and are also known as voluntary muscles.

★ The muscle fibres are elongated, cylindrical, unbranched and with alternating dark and light bands, giving them the striped or striated appearance.

★ They possess many nuclei (multinucleate). They occur in the biceps and triceps of arms and undergo rapid contraction.



Skeletal muscle

b. Smooth muscle:

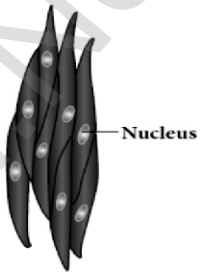
★ These muscles are spindle shaped with broad middle part and tapering ends.

★ There is a single centrally located nucleus (uninucleate).

★ These fibrils do not bear any stripes or striations and hence are called non-striated.

★ They are not under the control of our will and so are called involuntary muscles.

★ The walls of the internal organs such as the blood vessels, gastric glands, intestinal villi and urinary bladder contain this type of smooth muscle.



Smooth muscle

Function:

★ Movement of food in the alimentary canal or the contraction and relaxation of blood vessels are involuntary movements.

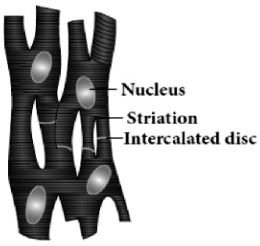
C. Cardiac muscle:

★ It is a special contractile tissue present in the heart.

★ The muscle fibres are cylindrical, branched and uninucleate.

★ The branches join to form a network called as intercalated disc which are unique distinguishing features of the cardiac muscles.

★ The contraction of cardiac muscle is involuntary and rhythmic.



Cardiac muscle

F) Nerve tissue

Nervous Tissue :

★ Nervous tissue comprises of the nerve cells or neurons.

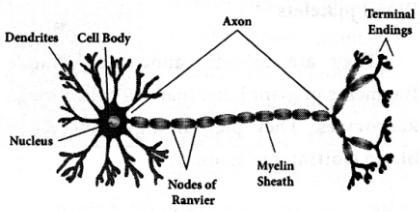
★ They are the longest cells of the body.

★ Neurons are the structural and functional units of the nervous tissue.

★ The elongated and slender processes of the neurons are the nerve fibres.

★ Each neuron consists of a cell body or cyton with nucleus and cytoplasm.

★ The dendrons are short and highly branched protoplasmic processes of cyton.



Neuron

Function :

★ The axon is a single, long fibre like process that develops from the cyton and ends up with fine terminal branches.

★ They have the ability to receive stimuli from within or outside the body and send signals to different parts of the body.

Marks Allotment :

Aim	-	2 Marks
Observation	-	2 Marks
Diagram with parts	-	6 Marks
Total Marks	-	**10 Marks**