9 SCIENCE Notes

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Unit 1 MEASUREMENT

I. Choose the correct answer.

1. Choose the correct one **(a) mm < cm < m < km**
2. Rulers, measuring tapes and metre scales are used to measure **(d) Length**
3. 1 metric ton is equal to **(b) 10 quintals**
4. Which among the following is not a device to measure mass? **(a) Spring balance**

II. Fill in the blanks.

1. Metre is the unit of **Length**
2. 1 kg of rice is weighed by **Beam balance**
3. The thickness of a cricket ball is measured by **Vernier Caliper**
4. The radius of a thin wire is measured by **Screw Gauge**
5. A physical balance measures small differences in mass up to **1 mg**

III. True or False.

1. The SI unit of electric current is kilogram. **Answer:False**
   Correct Statement: The SI unit of electric current is ampere. Kilogram is the unit of mass.
2. Kilometre is one of the SI units of measurement.**Answer:False**
   Correct Statement: Metre only SI unit. Kilometre is multiple of metre.
3. In everyday life, we use the term weight instead of mass. **Answer:True**
4. A physical balance is more sensitive than a beam balance. **Answer:True**
5. One Celsius degree is an interval of 1K and zero degree Celsius is 273.15 K. **Answer:False**
   Correct Statement: One Celsius degree is an interval 1K is true, but zero degree Celsiusis equal to -273.15K.
6. With the help of vernier caliper we can have an accuracy of 0.1 mm and with screwgauge we can have an accuracy of 0.01 mm. **Answer:True**

IV. Match the following.

1.

Column – I	Column – II
(a) Length	meter
(b) Mass	Kilogram
(c) Time	second
(d)Tempature	Kelvin

2.

Column – I	Column – II
(a) Screw gauge	Coins
(b) Vernier Caliper	Cricket ball
(c) Beam balance	Vegetables
(d) Digital balance	Gold ornaments

V. Assertion and Reason Type.

1. **Both A and R are true but R is not the correct reason.**
2. **(b) Both A and R are true and R is the correct reason.**
3. **(b) Both A and R are true and R is the correct reason.**

VI. Very Short Answer Type.

1. Define measurement.

Measurement is defined as the determination of the size or magnitude of something.

2. Define standard unit.

Unit is the quantity of a constant magnitude which is used to measure the magnitudes of other quantities of the same nature.

3. **What is the full form of SI system?**
International System of Units.

4. Define least count of any device.
Least count is the least distance measured by any given device.

5. **What do you know about pitch of screw gauge?**
Pitch of the screw is the distance between two successive screw threads.

6. **Can you find the diameter of a thin wire of length 2 m using the ruler from yourinstrument box?**
No, a ruler cannot measure diameter it can only measure length.

VII. Short Answer Type.

1. **Write the rules that are followed in writing the symbols of units in SI system.**
   1. The units named after scientists are not written with a capital initial letter.E.g. newton,watt.
   2. The symbols of the units named after scientists should be written by the initial capital letter. E.g. N for newton.
   3. Small letters are used as symbols for units not derived from a proper noun.E.g. m for metre.
   4. No full stop or other punctuation marks should be used within or at the end of symbols. E.g. 50 m and not as 50 m.
   5. The symbols of the units are not expressed in plural form.E.g. 10 kg not as kgs.

2. Write the need of a standard unit.
- Different unit systems were used by people from different countries.
- There was a necessity to use worldwide system of measurement.
- Hence, SI (International System of Units) system of units was developed.

3. Differentiate mass and weight.

S.No.	Mass	Weight
1.	Fundamental quantity	Derived quantity
2.	Has magnitude alone – scalar quantity	Has magnitude and direction – vector quantity
3.	It is the amount of matter contained in a body	It is the normal force exerted by the surface on the object against gravitational pull
4.	Remains the same	Varies from place to place
5.	It is measured using physical balance	It is measured using spring balance
6.	Its unit is kilogram	Its unit is newton

4. How will you measure the least count of Vernier Caliper?
The ratio of value of one smallest main scale division to total number of Vernier scale division. i.e., L.C. = 0.1mm = 0.01cm

VIII. Long Answer Type.

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

(i) Determine the least count (LC) and zero error(ZC) of the screw gauge.
(ii) Place the tea cup between the two studs.
(iii) Rotate the head until the tea cup is held firmly, with the help of ratchat.
(iv) Note the reading of the main scale reading(MSR) and the vernier scale coincidence.
(v) The thickness of the tea cup is given by MSR + (VC x LC)±ZC.

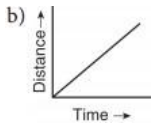
2. How will you find the thickness of a one rupee coin?

(i) Determine the zero error of the screw gauge.
(ii) Place the coin between the two studs
(iii) Rotate the head until the coin is held firmly but not tightly, with the help of the ratchat
(iv) Note the pitch scale reading (PSR) and the head scale coincidence (HSC)
(v) The width of the coin is given by PSR + CHSR (Corrected HSR).
(vi) Repeat the experiment for different positions of the coin.
(vii) Tabulate the readings
(viii) The average of the readings gives the width of the coin

Unit 2 MOTION

I. Choose the correct answer.

1. The area under velocity-time graph represents the **(b) displacement covered by the moving object.**
2. Which one of the following is most likely not a case of uniform circular motion? **c) Motion of a racing car on a circular track.**
3. Which of the following graph represents uniform motion of a moving particle?



4. The centrifugal force is **(b) the force of reaction of centripetal force**

II. Fill in the blanks.

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

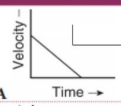
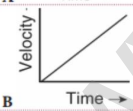
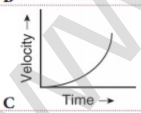
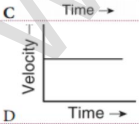
III. True or False.

1. **False Corrected 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. **True**
3. Distance covered by a particle never becomes zero but displacement becomeszero. **True**
4. **False.Corrected Statement:** The velocity-time graph of a particle falling freely under gravity would bestraight line inclined to the x axis
5. If the velocity-time graph of a particle is a straight line inclined to X-axis then itsdisplacement – time graph will be a straight line. **True**

IV Assertion and Reason Type .

1. Answer: (c) If assertion is true but reason is false.
2. Answer: (c) If assertion is false but reason is true.
3. Answer: (a) If both assertion and reason are true and reason is the correct explanation of assertion.

IV. 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 

Answer:
1. (D)
2. (C)
3. (A)
4. (B)

V. Answer briefly.

1. Define velocity.

Velocity is the rate of change of displacement.

2. Distinguish distance and displacement.

S.No	Distance	Displacement
i	The actual length of the path traveled by a moving body.	The change in position of a moving body in a particular direction
ii	Scalar quantity	Vector quantity

3. What do you mean by 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.

S.No	**Speed**	**Velocity**
1	The rate of change of distance	The rate of change of displacement
2	Scalar quantity	Vector quantity
3	Speed = $\frac{distance}{time\ taken}$	Speed = $\frac{displacement}{time\ taken}$

5. What do you understand about negative acceleration?

If the velocity decreases with time and the value of acceleration is negative. It is called negative acceleration.

6. Is the uniform circular motion accelerated? Give reasons for your answer.

When an object is moving with a constant speed along a circular path, the velocity changes due to the change in direction. Hence it is an accelerated motion.

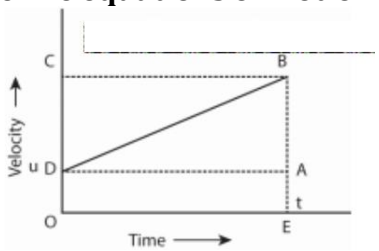
7. **What is meant by uniform circular motion? Give two examples of uniform circular motion.**

When an object moves with constant speed along a circular path, the motion is called uniform circular motion.

Eg. (i) Revolution of Earth around the Sun

VI. **Answer in detail.**

1.**Derive equations of motion by graphical method.**



Graph shows the change in velocity with time for an uniformly accelerated object.

The initial velocity of the object = u = OD = EA

The final velocity of the object = v = OC = EB

Time = t = OE = DA

Also from graph AB = DC

For First equation of motion

By definition, acceleration = $\frac{Change\ in\ velocity}{time}$

$= \frac{(\text{final velocity} - \text{initial velocity})}{time}$

$= \frac{OC-OD}{OE} = \frac{DC}{OE}$

$a = \frac{DC}{t}$

DC = AB = at

From the graph EB = EA + AB

v = u + at ....(1)

For Second equation of motion

From the graph the distance covered by the object during time t is given by the area of quadrangle DOEB

s = area of the quadrangle DOEB

s = area of the rectangle DOEA + area of the triangle DAB

$= (AE \times OE) + (\frac{1}{2} \times AB \times DA)$

$s = ut + \frac{1}{2}at^2$ ....(2)

For Third equation of motion

From the graph the distance covered by the object during time t is given by the area of the quadrangle DOEB. Here DOEB is a trapezium. Then

s = area of trapezium DOEB

$= \frac{1}{2} \times$ sum of length of parallel side × distance between parallel sides

$= \frac{1}{2} \times (OD + BE) \times OE$

$s = \frac{1}{2} \times (u + v) \times t$

Since $a = (v - u) / t$ (or) $t = (v - u)/a$

Therefore $= \frac{1}{2} \times (v + u) \times (v - u)/a$.

$2as = v^2 = u^2 + 2as$

$v^2 = u^2 + 2as$ .....(3)

2. Explain different types of motion.Answer:

1. Linear motion: Motion along a straight line.
2. Circular motion: Motion along a circular path.
3. Oscillatory motion: Repetitive to and fro motion of an object at regular interval of time.
4. Random motion: Motion of the object which does not fall in any of the above categories.
5. Uniform and Non-uniform motion:
   i. Uniform motion: An object is said to be in uniform motion if it covers equal distances in equal intervals of time
   ii. Non-uniform motion: if an object travels unequal distances in equal intervals of time.

Unit 3 FLUIDS

I. **Choose the correct answer**.

1. The size of an air bubble rising up in water ..... **(b) increases**
2. Clouds float in atmosphere because of their low ..... **(a) density**
3. In a pressure cooker, the food is cooked faster because **.....(a) increased pressure lowers 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 asshown in graph. This is because **(c) pressure increases with depth.**

II. Fill in the blanks.

1. The weight of the body immersed in a liquid appears to be **less** than its actual weight.
2. The instrument used to measure atmospheric pressure is **barometer**.
3. The magnitude of buoyant force acting on an object immersed in a liquiddepends on **density** of the liquid.
4. A drinking straw works on the existence of **Pressure**.

III. True or False.

1. The weight of fluid displaced determines the buoyant force on an object. **True.**
2. The shape of an object helps to determine whether the object will float. **True.**
3. The foundations of high-rise buildings are kept wide so that they may exert morepressure on the ground. **True.**
4.False. Correct statement: Archimedes' principle is not applied to gases
5. Hydraulic press is used in the extraction of oil from oil seeds.**True.**

IV. Match the following.

Density	$\frac{Mass}{volume}$
Pascal's law	Pressure
Pressure exerted bya fluid	hpg
Lactometer	milk

V. Answer in brief.

1. On what factors the pressure exerted by the liquid depends on?
depth (h), density of the liquid (p), acceleration due to gravity (g).

2. Why does a helium balloon float in air?

Helium is much less denser than ordinary air so it floats in air.

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

Due to the presence of dissolved salts in sea water is denser than river water which makes floating easier and hence swimming is easier.

4. What is meant by atmospheric pressure?

The pressure exerted by the atmospheric gases on its surroundings and on the surface of the earth is called atmospheric pressure.

5. **State Pascal's law.**

Pascal's law states that an increase in pressure at any point inside a liquid at rest is transmitted equally and without any change, in all directions to every other point in the liquid.

VI. Answer in detail.

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

Consider standing on loose sand. Your feet go deep into the sand. Now, when you lie down on the sand, you will find that your body will not go that deep into the sand. In both the cases 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 your whole body, which is larger than the area of your feet. Therefore the effect of thrust, that is, pressure depends on the area on which it acts. The effect of thrust on sand is larger while standing than lying.

2. Describe the construction and working of mercury barometer.

The instrument used to measure atmospheric pressure is called barometer.

A mercury barometer, consists of a long glass tube filled with mercury and turned upside down into a container of mercury.

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 the mercury drains from the tube. The level of mercury in the tube provides air pressure which is called atmospheric pressure. This type of instrument can be used in a lab or weather station.

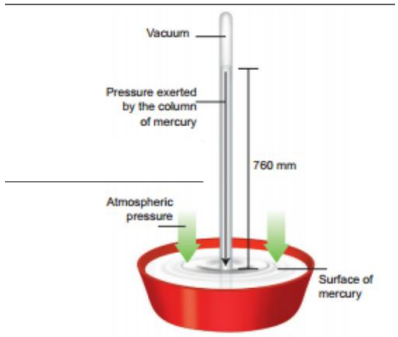


Figure 3.6 Mercury barometer

3. How does an object's density determine whether the object will sink or float in water?

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 water.

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

Hydrometer consists of a cylindrical stem having a spherical bulb at its lower end and a narrow tube at its 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 into the liquid until it floats freely. The reading against the level of liquid touching the tube gives the relative density of the liquid.

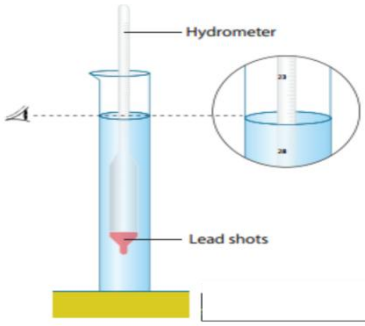


Figure 3.10 Hydrometer

5. State the laws of flotation.

1. The weight of a floating body in a fluid is equal to the weight of the fluid displaced by the body.
2. The centre of gravity of the floating body and the centre of buoyancy are in the same vertical line.

VII. Assertion and Reason.

1. Answer: (a) If both assertion and reason are true and reason is the correct explanation of assertion.
2. Answer: (a)If both assertion and reason are true but reason is not the correct explanation of assertion.

Unit 4 ELECTRIC CHARGE AND ELECTRIC CURRENT

I. Choose the correct answer.

1. In current electricity, a positive charge refers to,……**(c) absence of electron**
2. Rubbing of comb with hair …… **(c) either (a) or (b)**
3. Electric field lines …….. from positive charge and ……..in negative charge. **(b) start; end**
4. Potential near a charge is the measure of its ……..to bring a positive charge at that point. **(d) work**
5. In an electrolyte the current is due to the flow of …….. .**(a) electrons**
6. Heating effect of current is called **(a) Joule heating**
7. Electroplating is an example for **(b) chemical effect**
8. Resistance of a wire depends on **(d) all the above**

II. Match the following.

Electric charge	Coulomb
Potential difference	volt
Electrical field	Newton per coulomb
Resistance	Ohm
Electric current	Ampere

III. True or False.

1. Electrically neutral means it is either zero or equal positive and negative charges. **True**
2. Ammeter is connected in parallel in any electric circuit. **False**
   Correct Statement: An ammeter is connected in series with a device to measure its current.
3. The anode in electrolyte is negative. **False**
   Correct Statement: The anode in electrolyte is positive.
4. Current can produce magnetic field. **True**

IV. Fill in the blanks.

1. Electrons move from **higher**.. potential to **lower** potential.
2. The direction opposite to the movement of electron is called **Conventional** current.
3. The e.m.f of a cell is analogous to **a pump** of a pipe line.
4. The domestic electricity in India is an ac with a frequency of **50** Hz.
5. Trip switch is an **electro mechanical** safety device

V. Conceptual Questions.

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

Birds don't get shocked when they sit on electrical wires because electricity flowing through a single power line will not pass through birds, because there is no potential difference.

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

The electro-chemical process inside a battery provides electrons at the negative terminal and draws electrons from the positive terminal to maintain the current being drawn. By providing energy to the electrons, the cell is capable of maintaining an electric potential difference across the two ends of the external circuit.

3. Can electroplating be possible with alternating current?

As the direction keeps changing electroplating is not possible with alternating current.

VI. Answer the following.

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

i)value of charges on them, ii)distance between them, and iii)nature of medium between them.

2. What are electric lines of force?

The lines representing the electric field are called 'electric lines of force'.

3. Define electric field.

The region in which a charge experiences electric force forms the electric field around the charge.

4. Define electric current and give its unit.

Current is the rate at which charges flow past a point on a circuit. Current (I) is represented as, I=Q/t

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

5. State Ohm's law.

Ohm's law states that electric potential difference across two points in an electrical circuit is directlyproportional to the current passing through it.

That is,V α I (or) V = IR

6. Name any two appliances which work under the principle of heating effect of current.

iron box, water heater, toaster

7. How are the home appliances connected in general, in series or parallel. Give reasons.

The home appliances are connected in parallel because each of them can be switched on and off independently. Also, if the appliances were wired in series, the potential difference across each appliance would vary depending on the resistance of the appliance.

8. List the safety features while handling with electricity.

Ground connection,Trip switch, Fuse.

Unit 5 MAGNETISM AND ELECTROMAGNETISM

I. Choose the correct answer.

1. Which of the following converts electrical energy into mechanical energy? **Answer:(a) motor**
2. Transformer works on **Answer:(a) AC only**
3. The part of the AC generator that passes the current from the armature coil to the external circuit is

   Answer:(d) brushes
4. The unit of magnetic flux density is **Answer: weber/meter^2**

II. Fill in the blanks.

1. The SI Unit of magnetic field induction is ……**Tesla**…
2. Devices which is used to convert high alternating current to low alternatingcurrent is …**Step down transformer**..
3. An electric motor converts …**Electrical energy into mechanical energy**..
4. A device for producing electric current is …**Generator**..

III. Match the following.

Column – I	Answers
Magnetic material	(b) iron
Non-magnetic material	(d) wood
Current and magnetism	(a) Oersted
Electromagnetic induction	(e) Faraday
Electric generator	(c) induction

IV. True or False.

1. A generator converts mechanical energy into electrical energy – **True**
2. Magnetic field lines always repel each other and do not intersect – **True**
3. Fleming's Left hand rule is also known as Dynamo rule – **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 thearea of the coil – **False**
   Correct Statement: The speed of rotation of coil can be increased byincreasing the area of the coil.

5. A transformer can step up direct current – **False**
   Correct Statement: A transformer can step up alternating current.
6. In a step down transformer the number of turns in primary coil is greater than that of the number of turns in the secondary coil – **True**

V. Answer in brief.

1. State Fleming's Left Hand Rule.

It 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 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.

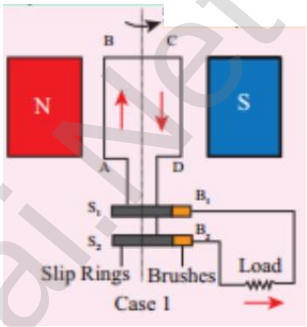
2. Define magnetic flux density.

The number of magnetic field lines crossing unit area kept normal to the direction of field lines is called magnetic flux density. Its unit is Wb/m^2

3. List the main parts of an electric motor.

Permenant magnet, Coil, Commutator, Brushes,

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



5. State the advantages of AC over DC.

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.

Direct current 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.

6. Differentiate step up and step downtransformer.

Step up transformer	Step down transformer
used to change a low voltage to a high voltage	used to change a high voltage to a low current
the number of turns in the secondary coil is more than the number of turns in the primary coil	the numberof turns in the secondary coils are les than the number of turns in the primarycoil

7. A portable radio has a built in transformer so that it can work from the mains instead of batteries. Is this a step up or step down transformer?

A step-down transformer is used in a portable radio in order to reduce the voltage.

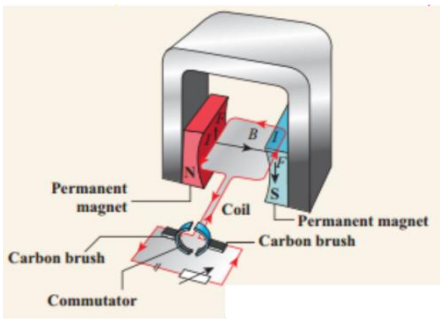
8. State Faraday's laws of electromagnetic induction.

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.

VI. Answer in detail.

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

A motor is an electrical machine which converts electrical energy into mechanical energy. The principle of working of a DC motor according to Faraday's laws of electromagnetic induction is that "whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force". The various parts of a DC motor are; Permanent magnets on both sides of a coil which consists of carbon brush and commutator as shown in



Principle of electric motor

Working of electric motor is primarily dependent upon the

interaction between magnetic field and current. The direction of this force is given by Fleming's left hand rule and it's magnitude is given by F = BIL. Where, B = magnetic flux density,I = current and L = length of the conductor within the magnetic field.

2. Explain two types of transformer.

The two types of transformers are; step-up or step-down transformers.

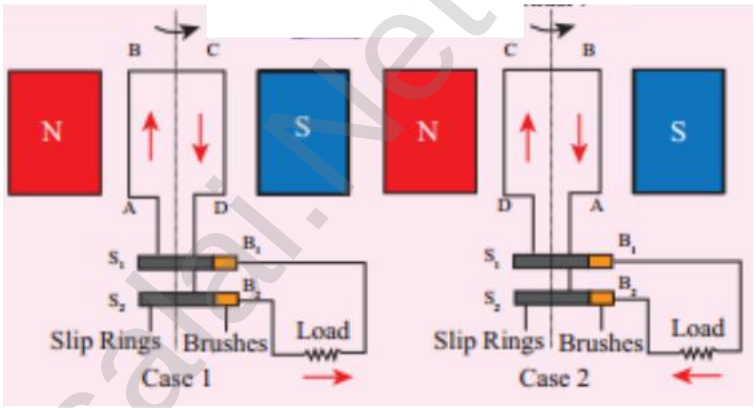
Step up transformer:

The transformer used to change a low alternative voltage to a high alternating voltage is called a step up transformer, ie (Vs > Vp) . In a step up transformer, the number of turns in the secondary coil is more than the number of turns in the primary coil (Ns > Np).

Step down transformer:

The transformer used to change a high alternating voltage to a low alternating voltage is called a step down transformer (Vs < Vp). In a step down transformer, the number of turns in the secondary coils are less than the number of turns in the primary coil (Ns < Np).

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



An alternating current (AC) generator, 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 the 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. Outer ends of the two brushes are connected to the external circuit.

When the coil is 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 Fland 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 theexternal circuit is changing its direction for every half a rotation of the coil.

Unit 6 LIGHT

I. Choose the correct answer.

1. A ray of light passes from one medium to another medium. Refraction takes placewhen angle of incidence is ……**Answer:(b) 45°**
2. ……is used as reflectors in torchlight. **Answer:(a) Concave mirror**
3. We can create enlarged, virtual images with ……**Answer:(a) Concave mirror**
4. When the reflecting surface is curved outwards the mirror formed will be **Answer:(b) convex mirror**
5. When a beam of white light passes through a prism it gets **Answer:(c) deviated and dispersed**
6. The speed of light is maximum in **Answer:(a) vacuum**

II. True or False – If false give the correct answer.

1. The angle of deviation depends on the refractive index of the glass – **True**.
2. **False.Correct Statement**: When light travels from one medium to another, it suffersdeviation.
3. The convex mirror always produces a virtual, diminished and erect image ofthe object – **True**.
4. **False.Correct Statement:** The image formed is real, inverted and same size of theobject.
5. The reason for brilliance of diamonds is total internal reflection of light –**True**.

III. Fill in the blanks.

1. In going from a rarer to denser medium, the ray of light bends **towards normal**
2. The mirror used in search light is **concave mirror**
3. The angle of deviation of light ray in a prism depends on the angle of **prism and angle of incident**
4. The radius of curvature of a concave mirror whose focal length is 5 cm is **10 cm**
5. Large mirrors are used to concentrate sunlight to produce heat in **concave** solar furnaces.

IV. Match the following.

List I	Answers
Ratio of height ofimage to height of object	Magnification
Used in hairpin bends in mountains	Convex Mirror
Coin inside waterappearing slightly raised	Refraction
Mirage	Total Internal Reflection
Used as Dentist'smirror	Concave Mirror

V. Assertion & Reason.

1. Answer:(d) If assertion is false but reason is true.
2. Answer: (b) If both assertion and reason are true and reason is not the correct explanation.

VI. Answer very briefly.

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

Concave mirror and concave lens.

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

Concave mirror

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

Image will be formed at infinity.

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

Light bends due to the change in velocity of light in the different medium.

5. What is speed of light in vacuum?

3×10^8 m/s.

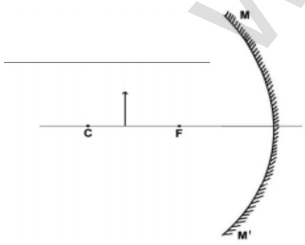
6. Concave mirrors are used by dentists to examine teeth. Why?

It magnifies the imge of teeth.

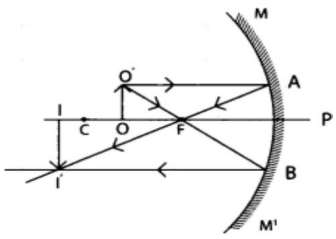
VII. Answer briefly.

1. a. Complete the diagram to show how a concave mirror forms the image of theobject.
b. What is the nature of the image?

a.



Solution:



(b) magnified, real and inverted.

2. Pick out the concave and convex mirrors from the following and tabulate them

Concave mirror	Torch light mirror, Make-up mirror, Dentist's mirror
Convex mirror	Rear view mirror, Mirrors in shopping malls

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

When incident ray is directed towards the centre of curvature, at all the points of spherical mirror, the ray is always normal. Therefore, angle of incidence i = Angle of reflection r = 0°.

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

Magnification is defined as the ratio of the height of the image ,to the height of the object .

Sign for real image it is negative, Sign for virtual image it is positive.

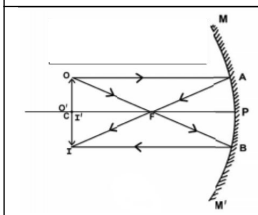
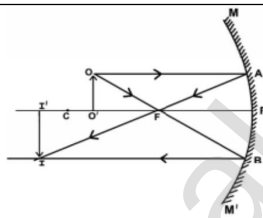
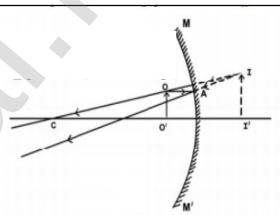
5. Write the spherical mirror formula and explain the meaning of each symbol used in it.

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

Here, f – focal length of spherical mirror; u – distance of the objective; 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.

(1) At the centre of curvature C	(2) Between C and F	(3) Between the focus F and the Pole P of the mirror.
		

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

Position of object	Position of Image	Nature of Image
Between C and F	Beyond C	Real and inverted
Between F and P	Behind the mirror	Virtual and Erect

2. Explain with diagrams how refraction of incident light takes place from

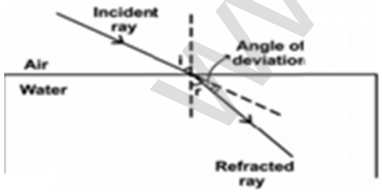
(a) rarer to denser medium

(b) denser to rarer medium

(c) normal to the surface separating the two media.

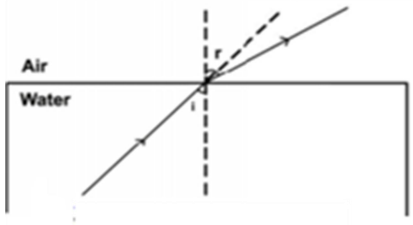
(a) rarer to denser medium:

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



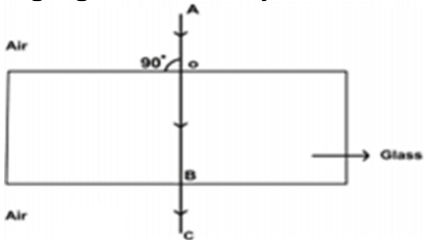
(b) denser to rarer medium:

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



(c) normal to the surface separating the two media

Light goes without any deviation



Unit 7 HEAT

I. Choose the correct answer:

1. Calorie is the unit of **Ans: (a) heat**
2. SI unit of temperature is **Ans:(d) kelvin**
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 samematerial, which of them conduct heat faster? **Ans :(b) Rod-2**
4. In which mode of transfer of heat, molecules pass on heat energy to neighbouring molecules without actually movingfrom their positions? **Ans:(b) Conduction**
5. A device in which the loss of heat due to conduction, convection and radiation is minimized is **Ans: (d) Thermos flask**

II. Fill in the blanks.

1. The fastest mode of heat transfer is **radiation**.
2. During day time, air blows from **sea** to **land**.
3. Liquids and gases are generally **bad** conductors of heat.
4. The fixed temperature at which matter changes state from solid to liquid is called **melting point**

III. Assertion and Reason type Questions.Mark the correct choice as:

1. Answer: both assertion and reason are true and reason is the correct explanation of assertion.
2. Answer: both assertion and reason are true but reason is not the correct explanation of assertion.
3. Answer:assertion is true but reason is false.

IV. Answer briefly.

1. Define conduction.

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?

The vacuum present in between the two walls prevents the transfer of heat from the first to the second wall and hence the ice remains in the solid form for a longer time period.

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

An earthen pot consists of small pores from which the water inside the pot constantly seeps out and gets evaporated due to the presence of high temperature around it. The evaporation process requires heat which is acquired from the surface of the pot, hence making the water and the pot cooler.

4. Differentiate convection and radiation.

Convection	Radiation
Heat transfers from particle to particle	Heat tranfers by electromagnetic radiations
It happens only in matter	It travells even in vacuum

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

White clothes are good reflectors of heat and hence, they keep us cool.

6. What is specific heat capacity?

The specific heat capacity of a substance is defined as the amount of heat required to raise the temperature of 1kg of the substance by 1°C or 1 K.

The SI unit is $Jkg^{-1} K^{-1}$.

7. Define thermal capacity.

Heat capacity or thermal capacity is defined as the amount of heat energy required to raise the temperature of a body by 1°C. It is denoted by 'C'.

SI unit of is J/K.

8. Define specific latent heat capacity.

Specific latent heat is the amount of heat energy absorbed or liberated by unit mass of a substance during changeof state without causing any change in temperature.

The SI unit of is J/kg.

V. Answer in detail.

1. Explain convection in daily life.Convection in daily life:

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

ii. **Breeze:** During day time, the air in contact with the land becomes hot and rises. Now the cool air over the surface ofthe 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.

iii. **Winds**: Air flows from area of high pressure to area of low pressure. The warm air molecules over hot surface riseand create low pressure. So, cooler air with high pressure flows towards low pressure area. This causes wind flow.

iv. **Chimneys**: Tall chimneys are kept in kitchen and industrial furnaces. As the hot gases and smoke are lighter, theyrise up in the atmosphere.

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

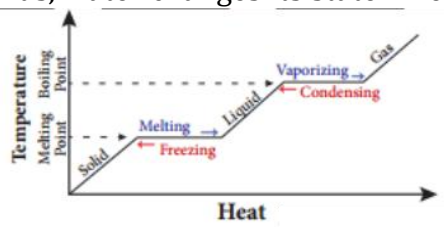
Water molecules are in liquid state at normal temperature. When water is heated to 100°C, it becomes steam or vapour which is a gaseous state of matter. This process called boiling or vaporization.The temperature at which a liquid changes its state to gas is called boiling point.

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

On reducing the temperature of water further to 0°C, it becomes ice which is a solid state of water. This process is called freezing. The temperature by which a liquid changes its state to solid is called freezing point.

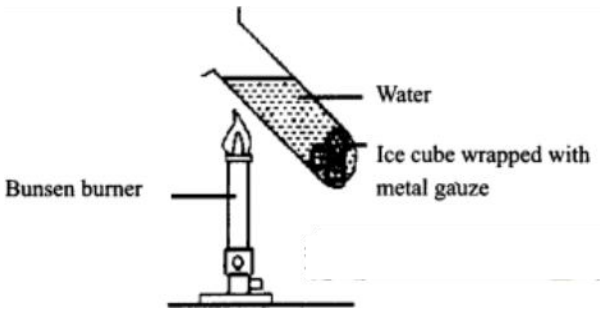
Ice on heating, becomes water again by absorbing heat, a process known as melting.

Thus, water changes its state when there is a change in temperature.



Various stages of conversion of state of matter

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



- Take a glass tube and drop an ice cube wrapped in wire gauze in it.
- Now fill 3/4th of this tube with water and place it above the burner as shown in the figure.
- You can observe that the water boils at the edge and the ice present in the bottom of the tube has not melted indicating that heat has not reached the bottom where the ice cube is present. This proves that water is a bad conductor of heat.
- It is easy to heat water easily or quickly while cooking. This is because, while cooking the vessel or pan is usually covered with a lid.

Unit 8 SOUND

I. Choose the correct answer:

1. Which of the following vibrates when a musical note is produced by the cymbals in a orchestra? **Answer:(d) metal plates**
2. Sound travels in air: **Answer:(d) if disturbance moves**
3. A musical instrument is producing continuous note. This note cannot be heard by a person having a normal hearingrange. This note must then be passing through **Answer:(b) vacuum**
4. The maximum speed of vibrations which produces audible sound will be in **Answer (b) ground glass**
5. The sound waves travel faster **Answer:(c) in solids**

II.Fill in the blanks.

1... Sound is a **longitudinal** wave and needs a material medium to travel.
2... Number of vibrations produced in one second is **frequency of wave**
3... The velocity of sound in solid is **faster** than the velocity of sound in air.
4. Vibration of object produces **Sound**.
5. Loudness is proportional to the square of the **amplitude**
6... **Stethoscope** is a medical instrument used for listening to sounds produced in the body.
7. The repeated reflection that results in persistence of sound is called **reverberation**

III. Match the following.

Column – I	Ans
(a) Tuning fork	Production of sound
(b) Sound	Longitudinal wave
(c) Compressions	The point where density of air is maximum
(d) Amplitude	Maximum displacement from the equilibrium position
(e) Ultrasonics	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.

Sound travels faster through iron as sound travels faster in solids.

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

The SI unit of frequency is hertz (Hz). The number of vibrations produced in one second is called frequency of the wave.

3. What is meant by supersonic speed?

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.

4. How does the sound produced by a vibrating object in a medium reach your ears?

When an object vibrates, it forces the particles of the medium to vibrate. These vibrating particles then force the particles adjacent to them to vibrate. In this way vibrations produced by an object are transferred till it reaches the ear.

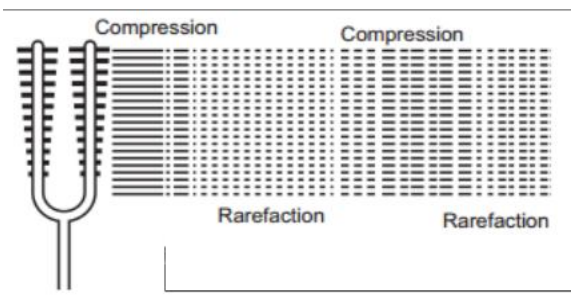
5. You and your friend are on the moon. Will you be able to hear any sound produced by your friend?

No, as there is no medium on moon for the sound to travel.

V. Answer in detail.

1. Describe with diagram, how compressions and rarefactions are produced.

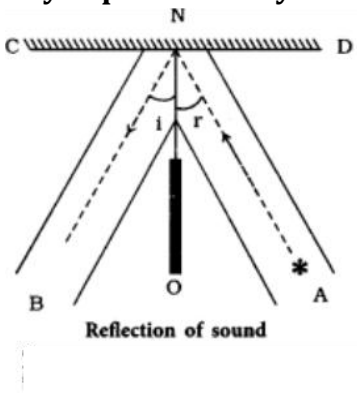
Sound is also a longitudinal wave. Sound can travel only when there are particles which can be compressed and rarefied. Compressions are the regions where particles are crowded together. Rarefactions are the regions of low pressure where particles are spread apart. A sound wave is an example of a longitudinal mechanical



Sound is a wave

wave. Below figurerepresents the longitudinal nature of sound wave in the medium.

2. Verify experimentally the laws of reflection of sound.



Reflection of sound

Take two metal tubes A and B. Keep one end of each tube on a metal plate as shown in figure. Place a wrist watch c at the open end of the tube A and interpose a cardboard between A and B. Now at a particular inclination of the tube B with the cardboard, ticking of the watch is clearly heard. The angle of reflection made by the tube B with the cardboardis equal to the angle of incidence made by the tube A with the cardboard.

For example, if the angle of incidence is 20° on the left side of a protractor, the angle ofreflection at which we are able to hear the sound clearly will also be at 20° on the right side of the protractor.

$\therefore \angle i = \angle r \rightarrow$ verifying Law I

We will also further observe that pipe 1, pipe 2 i.e, the incident ray, reflected ray and the normal lie on the same plane,verifying law II.

3. List the applications of sound.

- Ultra sound 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 getflushed out with urine.

4. Explain how does SONAR work?

SONAR stands for Sound Navigation And Ranging. Sonar is a device that uses ultrasonic waves to measure the distance, direction and speed of underwater objects. Sonar consists of a transmitter and a detector and is installed at the bottom of boats and ships. The transmitter produces and transmits ultrasonic waves. These waves travel through water and after striking the object on the seabed, get reflected back andare sensed by the detector.

The distance of the object that reflected the sound wave can be calculated by knowing the speed of sound in water and the time interval between transmission and reception of the ultrasound. Sonar technique is used to determine the depth of the sea and to locate underwater hills, valleys, submarine, icebergs etc.

Unit 9 UNIVERSE

I. Choose the correct answer.

1. Who proposed the heliocentric model of the universe? **Answer:(b) Nicolaus Copernicus**
2. Which of the following is not a part of outer solar system? **Answer:(a) Mercury**
3. Ceres is a ……..**Answer:(d)Asteroid**
4. The period of revolution of planet A around the Sun is 8 times that of planet B. How many times is the distance of planet A as great as that of planet B? **Answer:(a) 4**
5. The Big Bang occurred years ago. **Answer:(a) 13.7 billion**

II. Fill in the blanks.

1. The speed of Sun in km/s is **250**
2. The rotational period of the Sun near its poles is **36 days**.
3. India's first satellite is **Aryabhatta**
4. The third law of Kepler is also known as the Law of **Harmonies**
5. The number of planets in our Solar System is **8**

III. True or False.

1. ISS is a proof for international cooperation – **True**.
2. Halley's comet appears after nearly 67 hours -**False**.
3. **Correct statement**: Halley's comet appears after nearly every 76 years.

4. **Correct statement**: Satellites nearer to the Earth should have lesser orbital velocity – **False.**
5. **Correct statement**: Nearer the object to the Earth, the faster is the required orbital velocity.
6. Mars is called the red planet – **True**

IV. **Answer very briefly.**

1. What is solar system?

The Sun and celestial bodies which revolve around it form the solar system. It consists of large number of bodies such as planets, comets, asteroids and meteors.

2. Define orbital velocity.

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called orbital velocity.

3. Define time period of a satellite.

Time taken by the satellite to complete one revolution round the Earth is called time period.
Time period, T = Distance covered/Orbital velocity

4. What is a satellite? What are the two types of satellites?

A body moving in an orbit around a planet is called satellite. The two types of satellites are natural and artificial.

5. Write a note on the inner planets.

The planets are spaced unevenly. The first four planets are relatively close togetherand close to the Sun. They form the inner solar system. The four planets grouped together in the inner solar system are Mercury, Venus, Earth and Mars. They are called inner planets.

They have a surface of solid rock crust and so are called terrestrial or rocky planets.

Their insides, surfaces and atmospheres are formed in a similar way and form similar pattern. Our planet, Earth can be taken as a model of the other three planets.

6.Write about comets in brief.

Comets are lumps of dust and ice that revolve around the Sun in highly elliptical orbits. Their period of revolution is very long. When approaching the Sun, a comet vaporizes and forms a head and tail. Some of the biggest comets even seen had tails160 million (16 crores) km long. Many comets are known to appear periodically.

7. State Kepler's laws.

First Law – The Law of Ellipses

The path of the planets about the Sun is elliptical in shape, with the center of theSun being located at one of the foci.

Second Law – The Law of Equal Areas

An imaginary line drawn from the center of the Sun to the center of the planet willsweep out equal areas in equal intervals of time.

Third Law – The Law of Harmonies

The ratio of the squares of the periods of any two planets is equal to the ratio of thecubes of their semi major axis from the Sun.

8. What factors have made life on Earth possible?

Due to its right distance from the Sun it has the right temperature, the presence of water and suitable atmosphere and a blanket of ozone. All these have made continuation of life possible on the Earth.

V. Answer in detail.

1. Give an account of all the planets in the solar system.

The four planets grouped together in the inner solar system are Mercury, Venus, Earth and Mars. They are called inner planets. They have a surface of solid rock crust and so are called terrestrial or rocky planets. Their insides, surfaces and atmospheres are formed in a similar way and form similar pattern. Our planet, Earthcan be taken as a model of the other three planets.

The four large planets Jupiter, Saturn, Uranus and Neptune spread out in the outer solar system that slowly orbit the Sun are called outer planets. They are made of hydrogen, helium and other gases in huge amounts and have very dense atmosphere.They are known as gas giants and are called gaseous planets. The four outer planets Jupiter, Saturn, Uranus and Neptune have rings whereas the four inner planets do not have any rings. The rings are actually tiny pieces of rock covered with ice.

2. Discuss the benefits of ISS.

Its main purpose is to provide an international lab for conducting experiments in space, as the space environment is nearly impossible to reproduce here on Earth. The microgravity environment present in the ISS provides ideal conditions for doing many scientific researches especially in biology, human biology, physics, astronomyand meteorology.

3. Write a note on orbital velocity.

The horizontal velocity that has to be imparted to a satellite at the determined height so that it makes a circular orbit around the planet is called orbital velocity.

The orbital velocity of the satellite depends on its altitude above Earth. Nearer the object to the Earth, the faster is the required orbital velocity.

Orbital velocity can be calculated using the following formula. $v = \sqrt{\frac{GM}{(R+h)}}$

where; G = Gravitational constant ($6.673 \times 10^{-11} Nm^2kg^{-2}$) M = Mass of the Earth (5.972×10^{24}kg)

R = Radius of the Earth (6371 km)

h = Height of the satellite from the surface of the Earth.

VI. Conceptual Questions.

1. Why do some stars appear blue and some red?

Stars also appear to be in different colours depending on their temperature.

2. How is a satellite maintained in nearly circular orbit?

Satellite is maintained nearly in cicular body due to gravitational force of earth.

3. Why are some satellites called geostationary?

If a satellite stays in a fixed position relative to a point on Eqrth's surface, this kind of orbit is called 'geostationary'.

4. A man weighing 60 kg in the Earth will weigh 1680 kg in the Sun. Why?

The sun's gravtiational acceleration is 28 times more than that of the earth. So the person would weigh 16,80kg on the surface of sun.

Unit 10 MATTER AROUND US

I. Choose the correct answer.

1. The separation of denser particles from lighter particles done by rotation at high speed is called
2. ……..**Answer:(d) centrifugation**
3. Among the following is a mixture. **Answer: (b) Juice**
4. When we mix a drop of ink in water we get a …….. **Answer:(b) Homogeneous Mixture**
5. ___ is essential to perform separation by solvent extraction method. **Answer:(a) Separating funnel**
6. ___has the same properties throughout the sample. Ans**wer:(a) Pure substance**

II. State whether the following statements are true or false. If false give the correct statement.

1. Oil and water immiscible in each other – **True**
2. **False**. **Correct Statement:** A compound can be broken into simpler substances chemically.
3. **False. Correct Statement**: Liquid – solid colloids are called gels.
4. Buttermilk is an example of heterogeneous mixture – **True**
5. **False. Correct Statement**: The constituents of Aspirin are present in a fixed ratio by mass. So it is aCompound.

III. Match the following.

S.No.	A	Ans
1.	Element	(e) Made up of atoms
2.	Compound	(c) Made up of molecules
3.	Colloid	(d) Pure substances
4.	Suspension	(a) Settles down on standing
5.	Mixture	(b) Impure substance

IV. Fill in the blanks.

1. A **homogeneous** mixture has no distinguishable boundary between its components.
2. An example of a substance that sublimes is **Camphor**
3. Alcohol can be separated from water by **fractional distillation**
4. In petroleum refining, the method of separation used is **fractional distillation**
5. Chromatography is based on the principle of **different solubilities in the same sovent.**

V. Very short answers.

1. Differentiate between absorption and adsorption.

Absorption :It is the process by which atoms, molecules, or ions enter a bulk phase(liquid, gas, solid)

Adsorption :It is the adhesion of atoms, ions or molecules from a gas, liquid or dissolvedsolid to a surface

2. Define sublimation.

Certain solids change directly to a gas without passing through the liquid is called sublimation.

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

The mixture turns turbid, because of emulsion.

4. Name the apparatus that you will use of separate the components of mixtures containing two,

1. Miscible liquids,
2. Immiscible liquids

1. Miscible liquids – Fractional distillation.
2. Immiscible liquids – Separating funnel

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

1. Ice cream
2. Lemonade
3. Air
4. **Soil**

1. The main constituents of ice cream are fat, milk solids, sugar, gelatin, egg and flavouring.
2. Lemonade is a mixture of lemon juice, sugar and water.
3. Air is a mixture of nitrogen, oxygen, carbon dioxide, water vapour and other gases.
4. Soil is a mixture of clay, sand and various salts.

VI. Short answers.

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

Ice, Iron, Hydrochloric acid, Mercury and water are pure substances.

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

Oxygen is an element. It contains the atoms of oxygen of the same kind.

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

I have procured an impure substance. It is made of 22 parts of pure gold and 2 parts of copper or silver.

4. How will you separate a mixture containing saw dust, naphthalene and iron filings?

By Magnetic separation iron fillings can be removd from saw dust and naphthalene
By using Sublimation process we can separte naphthalene from saw dust.

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

S.No	Homogeneous solution	Heterogeneous solutions
1	Components are uniformly mixed.	Components arc not uniformly mixed
2	It has single phase	It has two or more distinct phases.
3	No boundaries of separation betweenthe components	There are visible boundaries betweenthe componer
4	Components are invisible to nakedeye	Components are visible to naked eye
5	Eg: salt solution, lemonade, petrol etc	Eg: chalk in water, petrol in water, and sand in wate

VII. Long Answer.

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

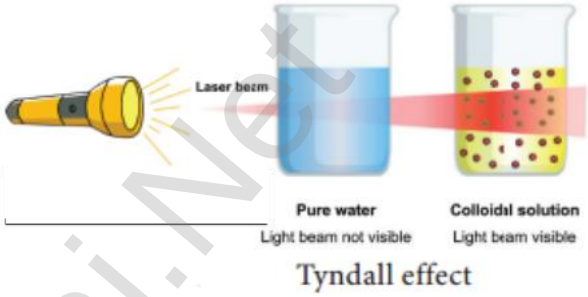
Elements	Compounds
Contains only one kind of atoms.	Contains more than one kind of atoms.
Elements cannot be broken down further into simpler substances by chemical methods	Compounds can be broken down further into simpler substances by chemical methods.
Elements have definite physical and chemical properties.	Compounds have definite physical and chemical properties.
Examples for elements: oxygen , hydrogen, sodium Na.	Examples for compounds, water,cane sugar

2. Explain Tyndall effect and Brownian movement with suitable diagram.

A. Tyndall Effect:

When a strong beam of light is focused on a colloidal solution the path of the beam becomes visible.

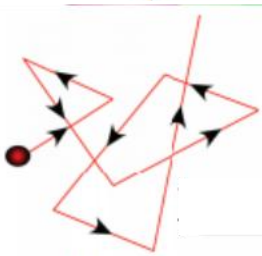
This phenomenon is called as Tyndall effect. The illuminated path is called Tyndall cone. This phenomenon is due to scattering of light by colloidal particles.



Tyndall effect

B. Brownian movement:

It is a kinetic property. When colloidal solution are viewed under powerful microscope, it can be seen that colloidal particles are moving constantly and rapidly in zig-zag directions. The Brownian movement of particles is due to the unbalanced bombardment of the particles by the molecules of dispersion medium.


Brownian movement

3. How is a mixture of common salt, oil and water separated?You can use a combination of different methods.

The mixture of common salt, oil and water are taken in a beaker. The salt dissolves in water. Allow it to stand for a few minutes. The mixture of two immiscible liquids is separated by a separating funnel. The oil floats on top. The water can carefully be separated by opening the stopcock in the separating funnel. The oil is left behind in the separating funnel.

The salt water is heated slowly, in a distillation flask with a water condenser. The pure water vapour passes through the inner tube of the condenser.

The vapours on cooling condense into pure water and are collected in a receiver. The salt is left behind in theflask as a residue.

Unit 11 ATOMIC STRUCTURE

I. Choice the correct answer.

1. Among the following the odd pair is ...**Answer:(c)** $_{14}Si^{30}$, $_{15}P^{31}$
2. Change in the number of neutrons in an atom changes it to **Answer:(b) an isotope.**
3. The term nucleons refer to **Answer:(d) Protons and neutrons**
4. The number of protons, neutrons and electrons present respectively in 35Br **Answer:(d) 35, 45, 35**
5. The correct electronic configuration of potassium **Answer:(c) 2,8,8,1**

II.True or false / if false give the correct answer.

1. In an atom, electrons revolve around the nucleus in fixed orbits – **True**
2. **False**. **Correct Statement:** Isotopes are atoms of the same element, which have same atomic number but different massnumbers.
3. **False**. **Correct Statement:** Electrons have negligible mass and have negative charge.

4. Smaller the size of the orbit, lower is the energy of the orbit – **True**
5. **False**. **Correct Statement:** 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 **Isobars**
2. Total Number of electrons that can be accommodated in an orbit is given by **$2n^2$**
3. ....**Uranium - 235** isotope is used in the nuclear reactors.
4. The number of neutrons present in $_3Li^7$ is **4**
5. The valency of Argon is **0**

IV. Match the following.

1. Dalton	First atomic theory
2. Thomson	Plum pudding model
3. Rutherford	Discovery of Nucleus
4. Neils Bohr	Hydrogen atom model

V. Complete the following table.

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

VI. Answer very briefly.

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

Beryllium

2. Write the electronic configuration of K and Cl

Electronic configuration of K^+ – 2, 8, 8, 1

Cl^- – 2, 8, 7

3. Write down the names of the particles represented by the following symbols and explain the meaning of superscript and subscript numbers attached. $_1H^1$, $_0n^1$, $_{-1}e^0$.

$_1H^1$ → atomic mass=1, atomic number=1

$_0n^1$ → charge = 0, mass = 1amu

$_{-1}e^0$ → charge = -1, mass = 0

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

K – 2, L – 8, M – 18,

Total=28 electrons

6. What is the same about the electron structure of:

a) Lithium, Sodium, and Potassium.

b) Beryllium, Magnesium and Calcium.

a) Lithium, Sodium, and Potassium have 1 electron in their outermost shell.

b) Beryllium, Magnesium and Calcium have 2 electrons in their outermost shell.

VII. Answer briefly.

1. How was it shown that atom has empty space.

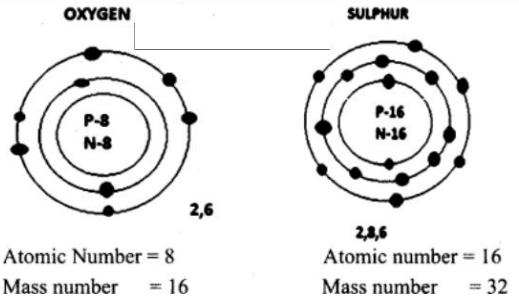
In Rutherford experiment when alpha particles are bombarded with gold foil most of the particles passed straight through the foil. This experiment shows that atom has empty space.

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

The chemical properties of elements are based on the number of electrons.

Eventhough the two chlorine atoms have different mass number, they have an identical electronic configuration. So they have same chemical properties.

3. Draw the structure of oxygen and sulphur atoms.



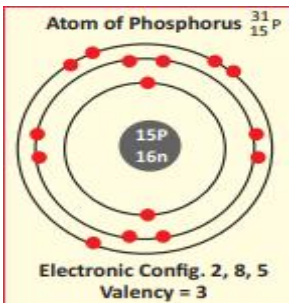
Atomic Number = 8 Atomic number = 16
Mass number = 16 Mass number = 32

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

i. Number of neutrons – 4Number of protons – 3 Number of electrons – 3
ii. Number of neutrons – 146Number of protons – 92 Number of electrons – 92

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



Protons and neutrons reside in the nucleus of an atom and are thus called nucleons.

Nucleons present in phosphorus atom= No of protons+No of Netrons=15+16=31

VIII. Long answer.

1. What conclusions were made from the observations of Gold foil experiment?

- There is a large empty space around the nucleus.
- The entire mass of an atom is concentrated in a very small positively charged region, which is called Nucleus. The electrons are distributed in the vacant space around the nucleus.
- The electrons move in circular paths around the nucleus.

2. Explain the postulates of Bohr's atomic model.

1. In atoms, electrons revolve around the nucleus in shells or orbits.
2. While the electrons revolve, they do not radiate energy.
3. The circular orbits are numbered as 1,2,3,4 or designated as K, L, M, N shells.
4. K shell (n = 1) is closer to the nucleus and is associated with lowest energy.
5. The maximum number of electrons that can be accommodated in an energy level is $2n^2$.
6. When an electron absorbs energy, it jumps from lower energy level to higher energy level.
7. When an electron returns from higher energy level to lower energy level, it gives off energy.

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

Whenever gases react together, the volumes of the reacting gases and the products bear a simple whole number ratio, provided all the volumes are measured under similar conditions of temperature and pressure.Steps:

a. Hydrogen combines with oxygen to form water

b. $H_2 + \frac{1}{2} O_2 \rightarrow H_2O$ (Skeletal equation)

c. $2H_{2(g)} + O_{2(g)} \rightarrow 2H_2O_{(g)}$ (balanced equation)

(2 volumes) + (1 volume) (2 volumes)

2: 1: 2

Two volumes of hydrogen react with one volume of oxygen to form two volumes of water vapour that is the ratio by volume, which gases bears is 2:1:2, which is a simple whole number ratio.

Unit 12 PERIODIC CLASSIFICATION OF ELEMENTS

I. Choose the correct answer.

1. If Dobereiner is related with 'law of triads', then Newlands is related with ...**Answer:(c) Law of octaves**
2. Modem periodic law states that the physical and chemical properties of elements arethe periodic functions of their ...**Answer:(a) atomic numbers**
3. Elements in the modem periodic table are arranged in groups and..... periods. **Answer:(b) 18,7**

II. Fill in the blanks.

1. In Dobereiner's triads, the atomic weight of the middle element is the **average**.. of the atomic masses of 1st and 3rd elements.
2. Noble gases belong to **18th** group of the periodic table.
3. The basis of the classifications proposed by Dobereiner, Newlands and Mendeleev was **atomic masses**..
4. Example for liquid metal is ... **Mercury**.

III. Match the following.

Column – I	
Traids	Dobereiner
Alkali metal	Sodium
Law of octaves	Henry Moseley
Alkali earth metal	Calcium
Modem Periodic Law	Newlands

IV. State whether True or False.

1. Newlands' periodic table is based on atomic masses of elements and modem periodic table is based on atomic number of elements – **True**
2. **False**. **Correct Statement:** Metals tend to lose electrons to attain Noble Gas electron configuration.
3. **False. Correct Statement**: An alloy is a mixture of metals or a mixture of a metal and another element.
4. Lanthanides and actinides are kept at the bottom of the periodic table because they resemble each other but they do not resemble with any other group elements – **True**
5. Group 17 elements are named as Halogens – **True**

V. Assertion and Reason

Answer:(a) Statement is tme and reason explains the statement.

VI. Answer the following.

1. State modern periodic law.

"The Chemical and Physical properties of elements are periodic functions of their atomic numbers".

2. What are groups and periods in the modern periodic table?

The horizontal rows are called periods. There are seven periods in the periodic table.
Vertical columns in the periodic table starting from top to bottom are calledgroups. There are 18 groups in the periodic table.

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

- Elements with large difference in properties were included in the same group.
- No proper position could be given to the element hydrogen.
- The increasing order of atomic mass was not strictly followed throughout.
- No place for isotopes in the periodic table.

4.State any five features of modern periodic table.

- All the elements are arranged in the increasing order of their atomic number
- The horizontal rows are called periods. There are seven periods in the periodic table.
- The elements are placed in periods based on the number of shells in their atoms.
- Vertical columns in the periodic table starting from top to bottom are calledgroups. There are

18 groups in the periodic table

- Based on the physical and chemical properties of elements, they are grouped into various families.

Unit 13 CHEMICAL BONDING

I. Choose the correct answer.

1. Number of valence electrons in carbon is ……**Answer:(b) 4**
2. Sodium having atomic number 11, ready to_____electron/ electrons to attain the nearest Noble gas electronic configuration. **Answer:(c) lose one**
3. The element that would form anion by gaining electrons in a chemical reaction is_ **Answer: (c)Fluorine**
4. Bond formed between a metal and non metal atom is usually ..**Answer:(a) ionic bond**
5. …….. compounds have high melting and boiling points **Answer: (c) Ionic**
6. Covalent bond is formed by ……**Answer:(b) sharing of electrons**
7. Oxidising agents are also called as because they remove electrons from other substances. **Answer:(b) electron acceptors**
8. Elements with stable electronic configurations have eight electrons in their valence shell. They are ……**Answer: (c) noble gases**

II. Answer in brief.

1. How do atoms attain Noble gas electronic configuration?

Atoms can combine either by transfer of valence electrons from one atom to another or by sharing of valenceelectrons in order to achieve the stable outer shell of eight electrons.

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

NaCl is an ionic compound that is soluble in polar solvents like water and insoluble in non-polar solvents

3. Explain Octet rule with an example.

The tendency of atoms to have eight electrons in the valence shell is known as the 'Octet rule' or the'Rule of eight'.

Example: Sodium with atomic number 11 will readily loose one electron to attain Neon's stable electronic configuration.

4. Write a note on different types of bonds.

All the elements differ with each other in their valence shell electronic configuration. So the way in which they combine to form compounds also differs. Hence, there are different types of chemical bonding possible between atoms which make the molecules. Depending on the type of bond they show different characteristics or properties. Such types of bonding that are considered to exist in molecules arecategorized as the Ionic bond, Covalent bond and Coordinate bond.

5. Correct the wrong statements.

a. Ionic compounds dissolve in non-polar solvents

b. Covalent compounds conduct electricity in molten or solution state

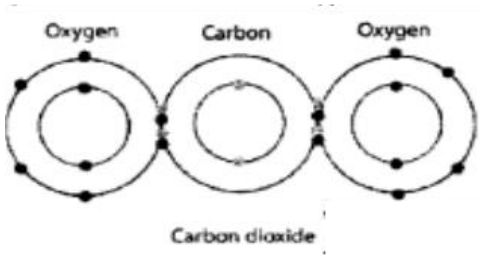
a. Ionic compounds dissolve in polar solvents.

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

6. Complete the table given below.

Element	Atomic number	Electron distribution	Valence electrons	Lewis dot structure
Lithium	3	$1s^2\ 2s^1$	1	Li •
Boron	5	$1s^2\ 2s^2\ 2p^1$	3	:$\dot{B}$
Oxygen	8	$1s^2\ 2s^2\ 2p^4$	6	:$\ddot{O}$·

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



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, $C0_2$, Al_2Cl_6

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

9. Choose the correct answer from the choices given below.

The property which is characteristics of an Ionic compound is that

1. it often exists as gas at room temperature
2. it is hard and brittle
3. it undergoes molecular reactions
4. it has low melting point
5. it is hard and brittle

Answer:

2. it is hard and brittle

10. Identify the following reactions as oxidation or reduction

a. $Na \rightarrow Na+ + e^-$

b. $Fe^{3+} + 2\ e^- \rightarrow Fe^+$

a. It is an Oxidation reaction.

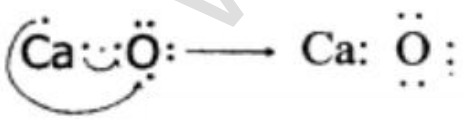
b. It is a Reduction reaction.

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

a. Soluble in non-polar solvents	Covalent compounds
b. undergoes faster/instantaneous reactions	Ionic compounds
c. Non-conductors of electricity	Covalent compounds
d. Solids at room temperature	Ionic compounds

12. An atom X with atomic number 20 combines with atom Y with atomic number 8. Draw the dot structurefor the formation of the molecule XY.

Atom X is Calcium with atomic number 20 and atom Y is Oxygen with atomic number 8.



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

$MgCl_2$	**CH_4**
Strong electrostatic force of attraction exist between Mg and Cl	Week force of attraction exists between carbon and for hydrogen
$MgCl_2$ is soluble in water	CH_4 is insolube in water

14. Why are Noble gases inert in nature?

Noble gases are inert in nature due to the completely filled subshells and thus have stable electronic
structures which is very difficult to change.

III. Answer in detail.

1. List down the differences between Ionic and Covalent compounds.

1.	Ionic compounds	Covalent compounds
2.	Formed by the transfer of electrons from a metal to a non-metal atom	Formed by sharing fo electrons between non-metal atoms
3.	Strong electrostatic force of attraction between cations and anions	Mutual sharing of electrons and so weak force of attraction between atoms.
4.	Solids at room temperature	Gases, liquds and soft solids
5.	Have high melting and boiling points	Have low melting and boiling points
6.	Soluble in polar solvents	Soluble in non-polar solvents

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

a)a compound in which two Covalent bonds are formed
b)a compound in which one ionic bond is formed
c)a compound in which two Covalent and one Coordinate bonds are formed
d)a compound in which three covalent bonds are formed
e)a compound in which Coordinate bond is formed

a. oxygen molecule (O_2)
b. Magnesium Chloride ($MgCl_2$)
c. between $NH_3 \rightarrow BF_3$ molecules
d. nitrogen molecule (N_2)
e. in ammonium ion (NH_{4+})

3. Identify the incorrect statement and correct them.

1. **Like covalent compounds, Coordinate compounds also contain charged particles (ions), so theyare good conductors of electricity**
2. **Ionic bond is a weak bond when compared to Hydrogen bond.**
3. **Ionic or electrovalent bonds are formed by mutual sharing of electrons between atoms.**
4. **Loss of electrons is called Oxidation and Gain of electron is called Reduction.**
5. **The electrons which are not involved in bonding are called valence electrons.**

1) Like covalent compounds, coordinate compounds also do not contain charged particles (ions), so they are bad conductors of electricity
2) Ionic bond is a strong bond when compared to Hydrogen bond.
3) covalent bonds are formed by mutual sharing of electrons between atoms.
4) Loss of electrons is called Oxidation and Gain of electron is called Reduction.
5) The electrons which are involved in bonding are called valence electrons.

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

The compounds containing coordinate covalent bonds are called coordinate covalent compounds.

1. Physical state – These compounds exist as gases, liquids or solids.
2. Electrical conductivity –coordinate compounds do not contain ions, so they are bad conductors of electricity.
3. Melting point – These compounds have melting and boiling points higher than those of purelycovalent compounds but lower than those of purely Ionic compounds.
4. Solubility – Insoluble in polar solvents like water but are soluble in non-polar solvents like benzene.
5. Reactions –Reactions are slow.

5. Find the oxidation number of the elements in the following compounds,

1)C in CO_2

2)Mn in $MnSO_4$

3)N in HNO_3

1. Oxidation number of C in CO_2 is +4
2. Oxidation number of Mn in $MnSO_4$ is +2
3. Oxidation number of N in HNO_3 is +5

Unit 14 ACIDS, BASES AND SALTS

I. Choose the correct answer.

1. $Zn + 2HCl \rightarrow ZnCl_2 +$_____$\uparrow$ **Answer:(a) H_2**
2. Apple contains malic acid. Orange contains ...**Answer:(b) ascorbic acid**
3. Acids in plants and animals are organic acids. Whereas Acids in rocks and minerals are .....**Answer:(a) Inorganic acids**
4. Acids turn blue litmus paper to .....**Answer:(b) Red**
5. Since metal carbonate and metal bicarbonate are basic they react with acids to give salt and water with the liberation of .....**Answer:(c) CO_2**
6. The hydrated salt of copper sulphate has colour **Answer: (c) Blue**

II. Answer in brief.

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

Organic Acids: Acids present in plants and animals are organic acids.

Inorganic Acids: Acids prepared from rocks and minerals are inorganic acids or minerals.

2. Write any four uses of acids.

- Sulphuric acid is used in car batteries also.
- Hydrochloric acid is used as a cleansing agent in toilets.
- Citric acid is used in the preparation of effervescent salts and as a food preservative.
- Nitric acid is used in the manufacture of fertilizers, dyes, paints and drugs.

3. Give the significance of pH of soil in agriculture.

In agriculture, the pH of soil is very important. Citrus fruits require slightly alkaline soil, while rice requires acidic soil and sugarcane requires neutral soil.

4. What are various uses of Aquaregia?

It is used to dissolve metals such as gold and platinum. It is used for cleaning and refining gold.

5. What are the uses of Plaster of Paris?

1. It is used for plastering bones
2. It is used for making casts for statues.

6. Two adds '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.

1. **Find out acid A and acid B.**
2. **Which acid is called the King of Chemicals?**
   1. Acid A is HCl and Acid B is H_2SO_4
   2. Sulphuric acid is called the King of Chemicals.

7. Define aquaregia.

Mixture of hydrochloric acid and nitric acid in a molar ratio of 3:1is called aquaregia.

8. Correct the mistakes:

1. **Washing soda is used for making cakes and bread soft, spongy.**
2. **Calcium sulphate hemihydrate is used in textile industry.**

1. Baking soda is used for making cakes and bread soft, spongy.
2. Calcium Oxychloride hemihydrate is used in textile industry.

9. What is neutralization reaction? Give an example.

Acids and bases neutralize each other to form corresponding salts and water.

Example: $KOH + HCl \rightarrow KCl + H_2O$

III. Answer in detail.

1. Differentiate hydrate and anhydrous salts with examples?

S.No	Hydrated	Anhydrous
1.	Salts that contain water of crystallisation	Salts that do not contain water of crystallisation
2.	These are crystals	These are generaly powders

2. Give the test to identify Acids and Bases?

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

3. Write any four uses of bases.

1. Sodium hydroxide is used in the manufacture of soap.
2. Calcium hydroxide is used in white washing of building.
3. Magnesium hydroxide is used as a medicine for stomach disorder.
4. Ammonium hydroxide is used to remove grease stains from cloths

4. Write any five uses of salts.

1. Common Salt (NaCl): It is used in our daily food and used as a preservative.
2. Washing Soda (Sodium Carbonate):
   - It is used in softening hard water.
   - It is used in glass, soap and paper industries.
3. Baking Soda (Sodium bicarbonate -$NaHC0_3$):
   - It is used in making of baking powder which is a mixture of bakingsoda and tartaric acid.
   - It is used in soda-acid fire extinguishers.
4. Baking powder is used to make cakes and bread, soft and spongy.It neutralizes excess acid in the stomach and provides relief.
5. Bleaching powder (Calcium Oxychloride – $CaOCl_2$)
   - It is used as disinfectant.
   - It is used in textile industry for bleaching cotton and linen.
6. Plaster of Paris (Calcium Sulphate Hemihydrate – $CaS0_4$. ½ H2O
   - It is used for plastering bones
   - It is used for making casts for statues

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

Sulphuric acid is called King of Chemicals because it is used in the preparation of many compounds.

It is used in

- car batteries.
- Making drugs and fertilizers
- Petroleum refineries

Unit 15 CARBON AND ITS COMPOUNDS

I. Choose the correct answer.

1. A phenomenon in which an element exists in different modification in same physical state is called ……**Answer:(a) isomerism**

2. Carbon forms large number of organic compounds due to ……**Answer:(d) Catenation**

3. Nandhini brings his lunch every day to school in a plastic container which has resin code number 5. The container is made of ……**Answer:(c) Polypropylene**

4. Plastics made of Polycarbonate (PC) and Acrylonitrile Butadiene Styrene (ABS) are made of resin code ……**Answer:(d) 7**

5. Graphene is one atom thick layer of carbon obtained from ……**Answer:(c) graphite**

6. The legal measures to prevent plastic pollution come under the ……Protection Act 1988.
Answer:(c) Environment

II. Fill in the blanks.

1)….. **Antoine Lavoisier** named carbon.
2) Buckminster Fullerene contains **60** carbon atoms.
3) Compounds with same molecular formula and different structural formula are known as **isomers**
4) **Carbon disulphide** is a suitable solvent for sulphur.
5) There are **7** plastic resin codes.

III. Match the following.

Alkyne	Triple bond
Andre Geim	Graphene
C_{60}	Bucky Ball
Thermocol	Polystyrene
Burning	Oxidation

IV. Answer in brief.

1. Differentiate graphite and diamond.

Graphite	Diamond
Each carbon has three covalent bonds	Each carbon has four covalent bonds
Soft, slippery to touch and opaque.	Hard, heavy and transparent.
It has planar layers of hexagon units.	It has tetrahedral units linked in threedimensions
It is conductor of heat and electricity.	It is a non-conductor of heat andelectricity

2. Write all possible isomers of C_4H_{10}.

1) $CH_3\text{-}CH_2\text{-}CH_3$ → Isobutane
CH_3

2) $CH_3\text{-}CH_2\text{-}CH_2\text{-}CH_3$ → n-butate

3. Carbon forms only covalent compounds. Why?
Carbon forms only covalent compounds due to catenation.

4. Define Allotrophy?
Allotrophy is a property by which an element can exist in more than one form that are physically different and chemically similar.

5. Why are one-time use and throwaway plastics harmful?

- They cause short and long-term environmental damage.
- These block drains and pollute water bodies.
- causes health problems for humans, plants and animals.

V. Answer in detail.

1. What is catenation? How does carbon form catenated compounds?
Catenation is the binding of an element to itself or with other elements throughcovalent bonds to form open chain or closed chain compounds.
Carbon atom links repeatedly to itself through covalent bond to form linear chain, branched chain or ring structure.

2. What are the chemical reactions of carbon?
Oxidation – (Reaction with oxygen)
Carbon combines with oxygen to form its oxides like carbon monoxide (CO) andcarbon dioxide (CO_2) with evolution of heat.

Reaction with steam
Carbon reacts with steam to form carbon monoxide and hydrogen. This mixture is called water gas.

$$C_{(s)} + H_{(s)}O_{(g)} \rightarrow CO_{(g)} + H_{2(g)}$$

Reaction with sulphur

With sulphur, carbon forms its disulphide at high temperature.

$$C_{(s)} + S_{(s)} \rightarrow CS_{2(g)}$$

Reaction with metals

At elevated temperatures, carbon reacts with some metals like iron, tungsten, Titanium, etc. to form their carbides.

$$W_{(s)} + C_{(g)} \rightarrow WC_{(s)}$$

3. Name the three safer resin codes of plastics and describe their features.

RESIN CODE	Other Names	Features
2-HDPE	PEHD	It is light very strong and widely recycled
4-LDPE	PELD, LLDPE	It is very flexible and soft but strong
5-PP		It is light and hard bt scratches easily

VI. HOTS

1. Why do carbon exist mostly in combined state?

Carbon exists mostly in combined state due to the prooerty of catenation

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

When carbon fuel bums in less aerated room, carbon monoxide is formed. When people are exposed to CO, it enters into human body through breathing and affects the function of haemoglobin. CO displaces oxygen from haemoglobin thereby stopsits function leading to death.

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

Burning PVC plastic releases dioxins which are one of the most dangerous chemicals known to humans.

4. Yugaa wants to buy a plastic water bottle. She goes to the shop and sees four different kinds of plastic bottles with resin codes 1,3,5 and 7. Which one should she buy? Why?

Yuga should by plastic bottle with resin code 5, as it is considered to be more safer.

Unit 16 APPLIED CHEMISTRY

I. Choose the correct answer.

1. One Nanometre is ……**Answer:(d) 10^{-9} metre**
2. The antibiotic Penicillin is obtained from ……**Answer:(b) microorganism**
3. 1 % solution of Iodoform is used as ……**Answer:(c) antiseptic**
4. The cathode of an electrochemical reaction involves ……**Answer:(b) reduction**
5. The age of a dead animal can be determined by using an isotope of ……**Answer:(a) carbon**
6. Which of the following does not contain natural dyes?**Answer:(a) Potato**
7. This type of food protect us from deficiency diseases.**Answer:(b) Vitamins**
8. Radiochemistry deals with ……**Answer:(c) isotopes**
9. The groups responsible for the colour of an organic compound is called……**Answer:(d) chromophore**
10. Chlorinated hydrocarbons are used as ……**Answer:(b) pesticides**

II. Fill in the blanks.

1. **Electrolytic cell** is an electrochemical cell which converts electrical energy into chemical change (Reaction).
2. Painkiller drugs are called **Analgesic**..
3. Indigo is a **Vat** dye.
4. **Nitrogen**, **Phosphorous** and **Potassium** are macronutrients required for plant growth.
5. **Ninhydrin** is a chemical used in fingerprint analysis.

III. Match the following.

Antipyretics	Fever
Corrosion prevention	Electroplating
Hyperthyroidism	Iodine-131
Nanoparticle	Large surface area
Proteins	Body building

IV. Answer in brief.

1. What is Radio carbon dating?

It is method by which the age of fossil wood or animal is determined using C-14 isotope.

2. What are called Anaesthetics? How are they classified?

The drugs which cause loss of sensation are called Anaesthetics.Types of Anaesthetics

- General anaesthetics
- Local anaesthetics

3. What is the need for chemical fertilizers in crop fields?

Chemical fertilizers provide the essential micro and macro nutrients required for crop growth which may not be available in the soil.

4. What is Forensic chemistry related to?

Forensic chemistry applies scientific principles, techniques, and methods to the investigation of crime.

V. Answer in detail.

1. Explain the types of dyes based on their method of application.

Acid dyes: These are acidic in nature Eg. Picric acid

Basic dyes: containing basic group (- NH_2,- NHR, – NR_2).They are used for dyeing animal fibres and plant fibers.

Mordant dyes or Indirect dyes: These dyes have a poor affinity for cotton fabrics and hence do not dye directly. They require pretreatment of the fibre with a mordant.E.g. alizarin.

Direct dyes: They have high affinity for cotton, rayon and other cellulose fibre. E.g. Congo red

Vat dyes: This dyeing is a continuous process and is carried out in a large vessel called vat. So it is called as vat dye. E.g. Indigo

2. Name various food additives and explain their functions.

Type of additive	Function of the additive
Preservatives	They protect food from spoilage by microorganism in storage.
Colourants	They give pleasant colours to food
Artificial Sweeteners	They add sweet taste to food
Flavor enhancers	They are used to enhance the flavour of food items
Antioxidants	They prevent the oxidation of food. They protect us against cardiovascular disease.

VI. HOTS

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

A primary cell cannot be recharged. Because reaction involved producing electricity is irreversible reaction unlike in rechargeble batteries

2. Sudha met with a fire accident. What kind of drug(s), she must take?

Analgesics are to be administered to reduce the pain followed by antibiotics to prevent infection by microbes.

3. The soil pH of a cropland is 5. What kind of fertilizers should be used in that land?

The soil of pH 5 is more acidic. To reduce the acidity of soil alkaline fertilizers should be used.

Unit 17 ANIMAL KINGDOM

I. Choose the correct answer.

1) Find the group having only marine members. **Answer:(c) Echinodermata**
2) Mesoglea is present in ……**Answer:(b) Coelenterata**
3) Which one of the following pairs is not a poikilothermic animal? **Answer:(c) Aves and mammals**
4) Identify the animal having a four-chambered heart ……**Answer:(c) Crocodile**
5) The animal without skull is ……**Answer:(a) Acrania**
6) Hermaphrodite organisms are ……**Answer:(d) Hydra, Tape worm, Ascaris, Earthworm**
7) Poikilothermic organisms are ……**Answer:(c) Fish, Frog, Lizard, Snake**
8) Air sacs and pneumatic bones are seen in ……**Answer:(c) bird**
9) An excretory organ of tapeworm is ……**Answer:(a) Flame cells**
10) Water vascular system is found in ……**Answer:(c) starfish**

II. Fill in the blanks.

1. The skeletal framework of Porifera is **spicules**.
2. Ctenidia are respiratory organs in **Mollusca**
3. Skates are **Cartilaginous** fishes.
4. The larvae of an amphibian is **tadpole**.
5. **Cyclostomes** are jawless vertebrates.
6. **Placenta** is the unique characteristic feature of mammal.
7. Spiny anteater is an example for **egg-laying** mammal.

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

1. **False. Correct statement**: Canal system is seen in Porifera.
2. Hermaphrodite animals have both male and female sex organs – **True**
3. **False. Correct Statement**: Trachea are the respiratory organ of Arthropoda.
4. **False. Correct statement:** Bipinnaria is the larva of Echinodermata
5. Balanoglossus is a ciliary feeder – **True**
6. Fishes have two chambered heart – **True**
7. **False. Correct statement:** Their body is covered with homy epidermal scales.
8. Wings of birds are the modified forelimbs – **True**
9. Female mammals have mammary glands **True**.

IV. Match the following.

Phylum	Examples
1. Coelenterata	Hydra
2. Platyhelminthes	Tapeworm
3. Echinodermata	Starfish
4. Mollusca	Snail

V. Answers in brief.

1. Define taxonomy.

The theoretical study of classification which includes its basic principles, procedures and rules.

2. What is a nematocyst?

The stinging cells present at tentacles of aquatic animals like jelly fish, hydra, etc in phylum coelenterata is called nematocyst (cnidoblast)

3. Why coelenterates are called diploblastic animals?

The animals in phylum coelenterates have two layers the outer ectoderm and the inner endoderm in the body wall. So they are called diploblastic animals.

4. List the respiratory organs of amphibians.

The respiratory organs of amphibians are gills, lungs, skin and pharyngeal region.

5. How does locomotion take place in starfish?

Starfish locomotes with the help of tube feet.

6. Are Jelly fish and star fish similar to fishes? Give reasons.

No. Jelly fish and starfish are not similar to fishes because jelly fish belongs to Cnidarians. Star fishbelongs to Echinodermata. Fishes belongs to class Pisces.

7. Why are frogs said to be amphibians?

The frogs have dual adaptation in land and aquatic environments. So they are called amphibians.

VI. Short answers.

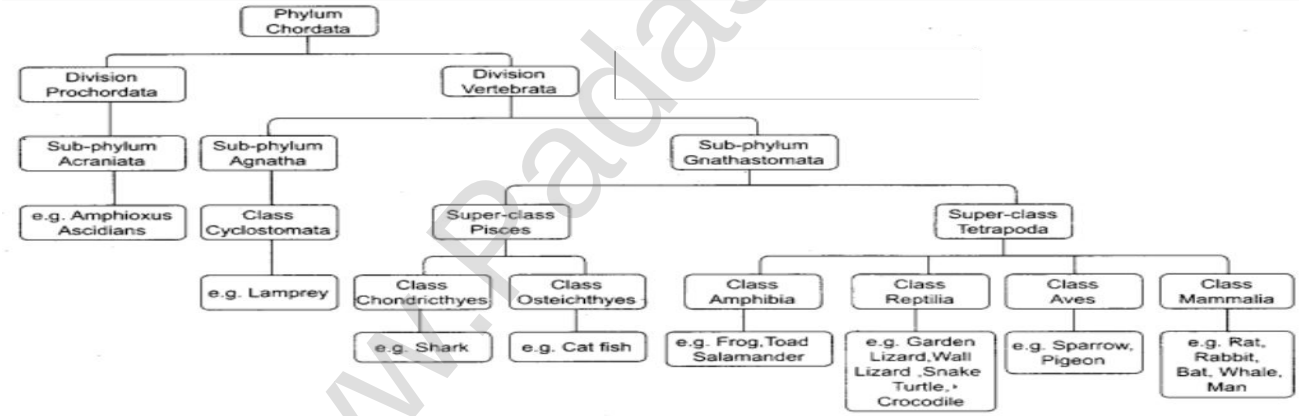
1. Give an account on phylum Annelida.

1. The animals in phylum annelida are segmented worms.
2. The animals possess body cavity called coelom.
3. Some organisms show movable bristles called setae.
4. They have no legs and no hard skeleton.
5. The body is covered by moist outer cuticle.
6. A thick multi-layered structure, outside the epidermis provides protection.
7. They have a central nervous system with a brain.
8. Metabolic wastes are removed by Nephridia.

2. Differentiate between flatworms and roundworms.

S.No	Flatworms	Roundworms
1.	It belongs to phylum platyheminthes	It belongs to the phylum Aschelminthes
2.	Alimentary canal is absent or simple	The alimentary canal is a straight tube
3.	Body is segmented	No body segments
4.	Body is covered with cuticle	Body is covered by thin cuticle
5.	Male and female sex organs present in single organism	Sexes are separate
6.	They are parasites	They exist as freeliving or as parasites

3. Outline the flow charts of Phylum Chordata.



4. List five characteristic features of fishes.

1) Fishes are poikilothermic, whose internal temperature varies, considerably.
2) The body has a covering of scales.
3) Body muscles are arranged into segments called myotomes.
4) The body is differentiated into head, trunk and tail.
5) Respiration is done by 5 to7 pairs of gills.

5. Comment on the aquatic and terrestrial habits of amphibians.

1. The transition from aquatic to terrestrial living is clearly indicated in Amphibian.
2. They are the first vertebrates to live on land.
3. Amphibians have dual adaptation to living in aquatic and land environments.
4. The double life is called amphibious.
5. In frogs, the hind limbs have webbed feet.
6. The skin is moist and glandular usually without scale.
7. Respiration is by gills, lungs, skin and pharyngeal region.
8. The heart has three chambers, with two auricles and a single ventricle.
9. Fertilization is external.
10. The larva is a tadpole, which is metamorphoses into an adult.

6. How are the limbs of the birds adapted for avian life?

1. The forelimbs are modified as wings for aerial locomotion.
2. The air sacs present in the birds, make the bird lightweight.
3. The body is covered with feathers.

VII. Long answer

1. Describe the characteristic features of different Prochordates.

Prochordates are the forerunners of Vertebrates. They do not have a cranium or skull. So they are called Acrania. The classification is based on the nature of the notochord. The following are the three
subphyla of prochordata.

(a) **Hemichordates:**Eg- Balanoglossus.
The organism lack notochord and are without backbones. They are tuberculous forms. The body is soft, vermiform, unsegmented, bilaterally symmetrical and triploblastic. The notochord is persistent as the stomochord in the anterior region.

(b) **Cephalochordates:**Eg- Amphioxus
The notochord extends forward beyond the brain. Small fish like marine chordates with i unpaireddorsal fins.

(c) **Urochordates:** Eg- Ascidians
The notochord is confined to the tail region of the larva. In adults, they degenerate and are in sessileforms. The body is enveloped by a tunic or test.

2. Give an account on phylum Arthropoda.

1. Arthropoda is the largest phylum.
2. The organisms have jointed legs.
3. The body is segmented into head, thorax and abdomen.
4. The exoskeleton is made up of chitin.
5. The coelomic cavity is filled with haemolymph (blood).
6. They do not have defined blood vessels. This is called open circulatory system.
7. The insects shed the exoskeleton and this process is called moulting.
8. Small Arthropods absorb oxygen through the body and larger aquatic species breathe through book gills.
9. Land Arthropods breathe through a system of tiny body tubes called tracheae.
10. Excretion occurs through malphigian tubules and through green glands in crabs and prawns. .
11. Insects, spiders, crabs, shrimps, butterflies, millipedes, centipedes, and scorpions are some arthropods.

Unit 18 ORGANIZATION OF TISSUES

I. Choose the correct answer.

1. The tissue composed of a living thin-walled polyhedral cell is ……**Answer:(a) Parenchyma**
2. The fibers consists of ……**Answer:(b) Sclerenchyma**
3. Companion cells are closely associated with ……**Answer:(a) sieve elements**
4. Which of the following is a complex tissue? **Answer:(c) xylem**
5. Aerenchyma is found in ……**Answer:(b) hydrophytes**
6. Smooth muscles occur in ……**Answer:(d) All of the above**
7. Nerve cell does not contain ……**Answer:(c) Tendons**

II. Match the Following:

Sclereids	Sclerenchyma
Chloroplast	Chlorenchyma
Simple tissue	Collenchyma
Companion cell	Phloem
Trachieds	Xylem

III. Fill in the blanks.

1)..**Collenchyma** tissues provides mechanical support to organs.
2) Parenchyma, collenchyma, Sclerenchyma are **simple** type of tissue.
3) **xylem** and **phloem** are complex tissues.
4) Epithelial cells with cilia are found in **trachea** of our body.
5) Lining of small intestine is made up of **columnar epithelium**

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

1. Epithelial tissue is protective tissue in animal body – **True**
2. **False.Correct statement**: Bone and cartilage are two types of supportive connectivetissue.
3. Parenchyma is a simple tissue – **True**
4. **False. Correct Statement**: Xylem is made up of Tracheids.
5. **False. Correct Statement**: Vessels are found in xylem.

V. Answer briefly:

1. What are intercalary meristems? How do they differ from other meristems?
Intercalary meristem 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-grasses.

2. What is complex tissue? Name the various kinds of complex tissues.
Complex tissues are made of more than one type of cells that work together as aunit. Complex tissues consist of parenchyma and sclerenchyma cells. Common examples are xylem and phloem.

3. Mention the most abundant muscular tissue found in our body. State its function.
Connective tissue is the most abundant and widely distributed tissue. It provides structural framework and gives support to different tissues forming organs.

4. What is skeletal connective tissue? How is it helpful in the functioning of our body?
The supporting or skeletal connective tissues form the endoskeleton of the vertebrate body. They support the body, protect various organs and help in locomotion. This system is composed of connective tissues including bone,cartilage, tendons, and ligaments.

5. Why should gametes be produced by meiosis during sexual reproduction?
Meiosis is important as it produces gametes i.e., male or female germ cells. During meiosis a germ cell or gamete divides to make four new sex cells. As a result of fertilization two gamates join together to form an egg or zygote. Therefore only if gametes are produced, fertilization can take place

6. In which stage of mitosis the chromosomes align in an equatorial plate? How?
The chromosomes align in an equatorial plate during metaphase stage of mitosis. Each chromosome gets attached to a spindle fibre by its centromere which is known as the chromosomal fibre. During metaphase the sister chromatids are pulled back and forth until they align along the equator of the cell called equatorial plane.

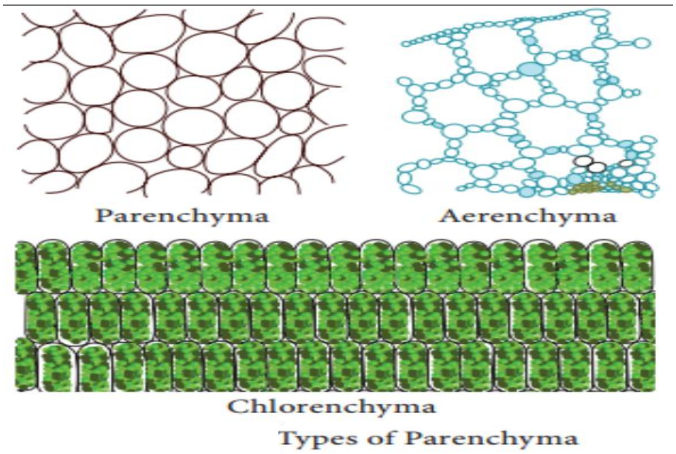
VI. Answer in detail.

1. What are the permanent tissues? Describe the different types of simple permanenttissue.
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

1. simple tissue and
2. complex tissue.

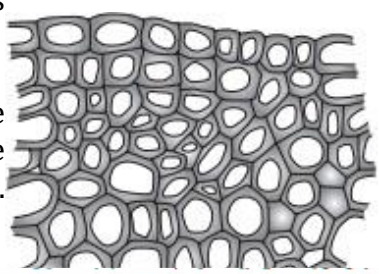
1) Simple Tissues:
Simple tissue are homogeneous-composed of structurally and functionally similar cells eg., Parenchyma, Collenchyma, and Sclerenchyma.

(i) Parenchyma
Parenchyma are simple permanent tissue composed of living cells. Parenchyma cells are thin-walled, oval, rounded or polygonal in shape with well-developed spaces among them. In



Types of Parenchyma

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.



(ii) Collenchyma

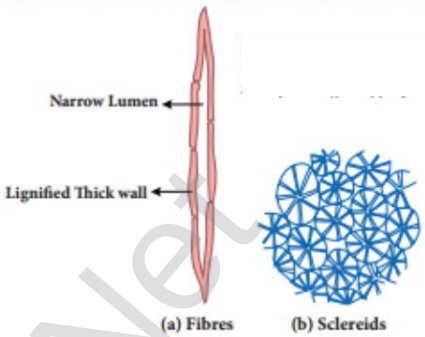
Collenchyma is a living tissue found beneath the epidermis. Cells are elongated with unevenly thickened non-lignifie walls. Cells have rectangular oblique or tapering ends and persistent protoplasts. Theypossess thick primary non-lignified walls.

(iii) Sclerenchyma

Sclerenchyma consists of thick-walled cells which are often lignified. Sclerenchyma cells do not possess living protoplasts at maturity.

Sclerenchyma cells are grouped into

1. fibres and
2. Sclereids.



Sclerenchyma (a) Fibres, (b) Sclereids

2. Write about the elements of Xylem.

Xylem is a conducting tissue which conducts water, mineral nutrients upward from root to leaves. Xylem is also meant for mechanical support to the plant body. Xylem is composed of different kinds of elements. They are

(i) **Xylem tracheids:** They are elongated or tube-like dead cells with hard, thick and lignified walls. Their ends are tapering, blunt or chisel-like. These cells are 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 fibers:** These cells are elongated, lignified and pointed at both the ends. Xylem fibres help in conduction of water and nutrients from root to the leaf and also provide mechanical support to the plant.

(iii) **Xylem vessels:** They 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 transport of water and minerals from root to leaf, and also to provide mechanical strength.

(iv) **Xylem parenchyma:** Its cells are living and thin walled. The main function of xylem parenchyma is to store starch and fatty substances.

3. List out the differences between mitosis and meiosis.

Mitosis	Meiosis
Occurs in somatic cells.	Occurs in reproductive cells.
Involved in growth and occurs continuously throughout life.	Involved in gamete formation only during the reproductively active age.
Consists of single division.	Consists of two divisions.
Two diploid daughter cells are formed.	Four haploid daughter cells are formed.
The chromosome number in the daughter cell is similar to the parent cell (2n).	The chromosome number in the daughter cell is just half (n) of the parent cell.
Identical daughter cells are formed.	Daughter cells are not similar to the parent cell and are randomly assorted.

VII. Higher Order Thinking Skills.

1. What is the consequence that occur if all blood platelets are removed from theblood?

If platelets are absent, this important defense reaction cannot occur, and protracted bleeding from small wounds (prolonged bleeding time) results.

2. Which are not true cells in the blood? Why?

RBC and Platelets don't have nucleus so they are actually not true cells.

Unit 19 PLANT PHYSIOLOGY

I. Choose the correct answer.

1. The tropic movement that helps the climbing vines to find suitable support is ..... **Answer:(c) thigmotropism**
2. The chemical reaction occurs during photosynthesis is .....**Answer:(a) CO_2 is reduced and water is oxidized**
3. The bending of root of a plant in response to water is called .....**Answer:(c) Hydrotropism**
4. A growing seedling is kept in the dark room. A burning candle is placed near it for afew days. The tip part of the seedling bends towards the burning candle. This is an example of .....**Ans:(c) phototropism**
5. The root of the plant is .....**Answer:(b) (ii) and (iii)**
6. The non-directional movement of a plant part in response to temperature is called **...Ans:(b) term nasty**
7. Chlorophyllin a leaf is required for .....**Answer:(a) photosynthesis**
8. Transpiration takes place through .....**Answer:(d) stomata**

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

1. **False**. **Correct:** The response of a plant part to the chemical stimulus iscalled chemotropism.
2. Shoot is positively phototropic and negatively geotropic – **True**
3. **False**. **Statement**: When the weather is hot, water evaporates faster which isdue to opening of stomata.
4. **False. Correct Statement**: Photosynthesis produces glucose and oxygen.
5. Photosynthesis is important in releasing oxygen to keep the atmosphere inbalance – **True**
6. **False. Correct Statement**: Plants lose water, when the stomata on leaves are opened.

III. Fill in the blanks.

1. The shoot system grows upward in response to **Sunlight**
2. **Root** is positively hydrotropic as well as positively geotropic.
3. The green pigment present in the plant is **chlorophyll**
4. The solar tracking of sunflower in accordance with the path of sun is due to... **Photonasty**
5. The response of a plant part towards gravity is **geotropism**
6. Plants take in carbon dioxide for photosynthesis but need **oxygen** for their living.

IV. (a) Match column A with column B

Roots growing downwards into soil	(d) Positive geotropism
Shoots growing towards the light	(a) Positive phototropism
Shoots growing upward	(b) Negative geotropism
Roots growing downwards away from light	(c) Negative phototropism

V. Answer the following in one or two sentences.

1. What is nastic movement?

Non-directional response to the stimulus is called Nastic movements.

2. Name the plant part

1. **Which bends in the direction of gravity but away from the light.** Ans: Roots
2. **Which bends towards light but away from the force of gravity.**Ans: Stem

3. Differentiate phototropism from photo nasty.

Phototropism	**Photonasty**
Movement of a plant part towards light.	Movement of a part of a plant in response to light
Unidirectional	Non directional
Groth dependent	Temporary and reversible
Slow	Fast

4. Photosynthesis converts energy X into energy Y.

(a)**What are X and Y?**

X is light energy. Y is chemical energy.

(b)**Green plants are autotrophic in their mode of nutrition. Why?**

because they prepare theirfood, through a process called photosynthesis.

5. Define transpiration.

The loss of water in the form of water vapour from the aerial parts of the plant body.

6. Name the cell that surrounds the stoma.

Each stomata is surrounded by guard cells.

VI. Short answer

1. Give the technical terms for the following:

(a) Growth dependent movement in plants. Trophic movements

(b) Growth independent movement in plants. Nastic Movements.

2. Explain the movement seen in Pneumatophores of Avicennia.

Negatively Geotropic movement.

3. Fill in the blanks:

Answer:

$$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} C_6H_{12}O_6 + 6O_2\uparrow$$

4. What is chlorophyll?

Green pigments present in leaves.

5. Name the part of plant which shows positive geotropism. Why?

Root shows positive geotropism because of the unidirectional movement inresponse to gravity.

6. **What is the difference between movement of flower in sunflower plant and closingof the leaves in the Mimosa pudical?**

Movement of sunflower: photonasty

Movement of mimosa pudica : Thigmonasty

7. Suppose you have a rose plant growing in a pot, how will you demonstrate transpiration in it?

Tie a plastic bag over leaves of rose plant and place in sunlight. After a few hours, we see water condensing inside the plastic bag. This is due to loss of water in theform of water vapour, which condenses into water. This is due to transpiration.

8. Mention the differences between stomatal and lenticular transpiration.

Stomatal	**Lenticular**
Occur through stomata	Loss water through lenticets
Maximum water transpire from leaves 90-95%	Insignificant amount
Occur in all plants	Only in trees with bark

9. To which directional stimuli do (a) roots respond (b) shoots respond?

a) Gravity.

b) Sunlight.

VII.Long answer

1. Differentiate between tropic and nastic movements

Trophic Movements	**Nastic Movements**
Unidirectional response to the stimulus	Non-directional response to the stimulus
Growth dependent movements	Growth independent movements
More or less permanent and irreversible	Temporary and reversible
Found in all plants	Found only in a few specialized plants
Slow action	Immediate action

2. How will you differentiate the different types of transpiration?

There are three types of transpiration:

Stomatal transpiration: Loss of water from plants through stomata. It accounts for90- 95% of

the water transpired from leaves.

Cuticular transpiration: Loss of water in plants through the cuticle.

Lenticular transpiration: Loss of water from plants as vapour through the lenticels. The lenticels are tiny openings that protrude from the barks in woody stems and twigs as well as in other plant organs.

Unit 20 ORGAN SYSTEMS IN ANIMALS

I. Choose the correct answer:

1. Which of the following is not a salivary gland?**Answer:(b) Lachrymal**
2. Stomach of human beings mainly digests **Answer:(b) Proteins**
3. To prevent the entry of food into the trachea, the opening is guarded by**Answer:(a) Epiglottis**
4. Bile helps in the digestion of **Answer:(c) Fats**
5. The structural and functional unit of the kidney is **Nephron**
6. Which one of the following substances is not a constituent of sweat?**Answer:(b) Protein**
7. The common passage meant for transporting urine and sperms in male is **Answer:(b) Urethra**
8. Which of the following is not a part of female reproductive system? **(c) testes**

II. Fill in the blanks.

1) The opening of the stomach into the intestine is called **Pylorus**
2) The muscular and sensory organ which helps in mixing the food with saliva is **tongue**.
3) Bile, secreted by liver is stored temporarily in **gall bladder**
4) The longest part of alimentary canal is **small intestine**
5) The human body functions normally at a temperature of about **37°C**
6) The largest cell in the human body of a female is **ovum**

III. State whether the following statements are true or false. If false, correct the wrong statements:

1. **False. Correct Statement:** Hydrochloric acid kills the bacteria swallowed along withfood.
2. During digestion, proteins are broken down into amino acids – **True**
3. Glomerular filtrate consists of many substances like amino acids, vitamins, hormones, salts, glucose, and other essential substances – **True**

IV. Match the following:

Organ	Ans
1. Skin	Sweat
2. Lungs	Carbon di oxide
3. Intestine	Undigested food
4. Kidneys	Urine

V. Differentiate the following terms:

a. Excretion and Secretion
b. Absorption and Assimilation
c. Ingestion and Egestion
d. Diphyodont and Heterodont
e. Incisors and CaninesAnswer:

a. Excretion and secretion

Excretion	Secretion
Elimination of waste product. It is done by kidney.	Selection is the process in which fluids are secreted by cell glands or organs in the body. eg. salivary - glands.

b. Absorption and assimilation

Absorption	Assimilation
It is the process by which nutrients obtained after digestion are absorbed by villi present in small intestine.	Incorporation of the absorbed food materials into the tissue cells as their internal and homogenous compound

c. Ingestion and egestion

	Ingestion	Egestion
1.	The process of intake of food is known as ingestion	The undigested or unassimilated portion of the ingested food material is thrown out from the body through the anus as faecal matter is known as egestion or defecation
2.	The intake of food is through the mouth	This takes place through the anus

d. Diphyodont and heterodont

Diphyodont	Heterodont
In man, development of two sets of teeth in their life time is called Diphyodont. e.g. Milk teeth - in child hood. permanent teeth - replaces milk teeth	The permanent teeth are of four types according to their structure and function. This is known as heterodent. They are incisors, canines, premolars and molars.

e. Incisors and canines

	Incisors		Canines
1	These are for cutting and biting	1	These are for tearing and piercing
2	These are 8 in number	2	These are 4 in number
3	These are well developed in herbivores	3	These are well developed in carnivores.

VI. Answer briefly:

1. How is the small intestine designed to absorb digested food?

Ileum is the longest part of the small intestine. It contains minute finger like projections called villi where absorption of food takes place. They are approximately 4 million in number. Internally, each villus contains fine blood capillaries and lacteal tubes.

2. Why do we sweat?

Our body functions normally at a temperature of about 37°C. When it gets hot sweat glands start secreting sweat. This helps in cooling the body.

3. Mention any two vital functions of the human kidney.

Two vital functions of the kidneys are;

1) Maintain the fluid and electrolyte balance in our body.
2) Maintain the osmotic pressure in blood and tissues.

4. What is micturition?

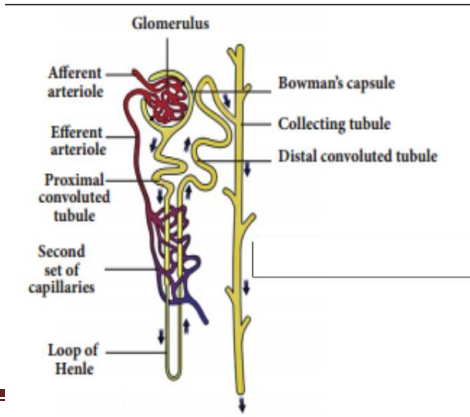
When the urinary bladder is full the urine is expelled out through the urethra. This process is called micturition.

5. Name the types of teeth present in an adult human being. Mention the functions ofeach.

Types of teeth	Function
Incisors	Cutting and biting
Canines	Tearing and piercing
Pre molars	Crushing and grinding
Molars	Crushing, grinding and mastication

6. Explain the structure of nephron.

Nephrons or uriniferous tubules are structural and functional units of the kidneys. Each nephron consists of Renal corpuscle or Malphigian corpuscle and renal tubule. The renal corpuscle consists of a cup-shaped structure called Bowman's capsule containing a bunch ofcapillaries called glomerulus.

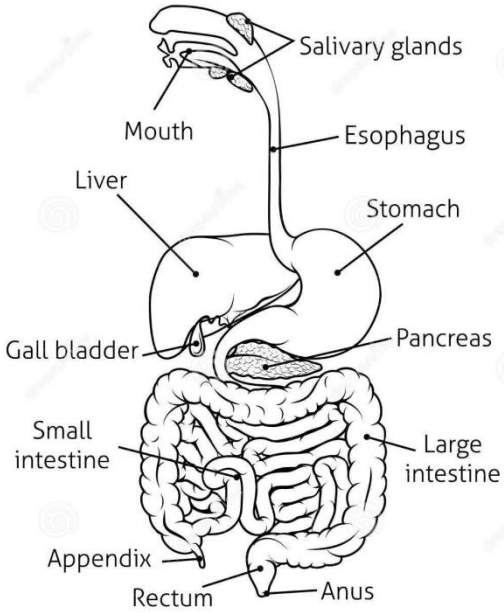


Structure of Nephron

The Bowman's capsule continues as the renal tubule which consists of three regions proximal convoluted tubule, U-shaped hairpin loop,the loop of Henle and the distal convoluted tubule. The distal convoluted tubule which opens into the collecting tubule. The collecting tubule opens into the renal pelvis

VII. Answer in detail.

1. Describe the alimentary canal of man.



Mouth: The mouth leads into the buccal cavity. It is bound by two soft, movable upper and lower lips. The jaws bear teeth.

Salivary glands: Three pairs of salivary glands are present in the mouth cavity.

Tongue: The tongue is a muscular, sensory organ which helps in mixing and tasting the.

Pharynx: membrane lined cavity behind the nose and mouth, connecting them to the oesophagus. **Oesophagus:** is a muscular-membranous canal about 22 cm conducts food from pharynx to the stomach.

Stomach: is a wide J-shaped muscular organ located between oesophagus and the small intestine.

Small intestine: is the longest part of the alimentary canal, which is a long coiled tube measuring about 5 – 7 m. It comprises three parts- duodenum, jejunum and ileum.

Liver:largest digestive gland of the body which is reddish brown in colour secrete bile which is temporarily stored in the gall bladder.

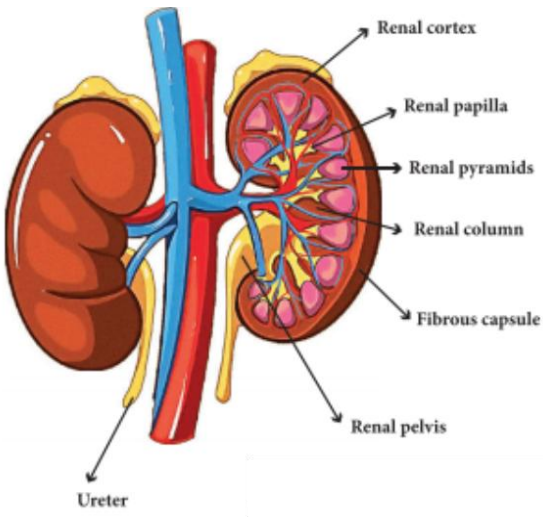
Pancreas:lobed, leaf shaped gland situated between the stomach and duodenum. The intestinal glands secrete enzymes.

Large intestine: The unabsorbed and undigested food is passed into the large intestine. It extends from the ileum to the anus. It is about 1.5 meters in length. It has three parts-caecum, colon and rectum.

2. Explain the structure of kidney and the steps involved in the formation of urine.

Kidneys are bean-shaped organs reddish brown in colour. The kidneys lie on either side of the vertebral column in the abdominal cavity attached to the dorsal body wall. The right kidney is placed lower than the left kidney as the liver takes up muchspace on the right side. Each kidney is about 11 cm long, 5 cm wide and 3 cm thick. The kidney is covered by a layer of fibrous connective tissue, the renal capsules, adipose capsule and a fibrous membrane.

Internally the kidney consists of an outer dark region, the cortex and an inner lighter region, the medulla. Both of these regions contain uriniferous tubules or nephrons.



Longitudinal section of human kidney

The medulla consists of multi tubular conical masses called the medullary pyramids or renal pyramids whose bases are adjacent to cortex. On the inner concave side of each kidney, a notch called hilum is present through which blood vessels and nervesenter in and the urine leaves out.

Mechanism of Urine Formation

Glomerular filtration: Urine formation begins with the filtration of blood through epithelial walls of the glomerulus and Bowman's capsule, The filtrate is called as the glomerular filtrate. Both essential and non-essential substances present in the blood are filtered.

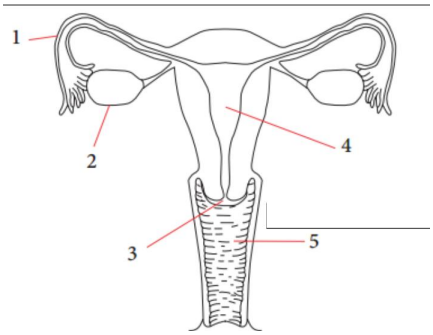
Tubular reabsorption: The filtrate in the proximal tubule

consists of essential substances such as glucose, amino acids, vitamins, sodium, potassium, bicarbonates,and water that are reabsorbed into the blood by a process of selective reabsorption.
Tubular secretion: Substances such as H+ or K+ ions are secreted into the tubule. Certain substances like potassium and a large number of drugs like penicillin and aspirin are passed into the filtrate in the distal convoluted tubule. This tubular filtrate is finally known as urine, which is hypertonic in man. Finally, the urine passes into collecting ducts to the pelvis and through the ureter into the urinary bladder by urethral peristalsis. When the urinary bladder is full the urine is expelled out through the urethra. This process is called micturition. A healthy person excretes one to twolitres of urine per day.

VIII. Assertion and Reason.Mark the correct answer.

1) Answer:a) both Assertion and Reason are true and Reason is the correct explanation of Assertion
2) Answer:a) both Assertion and Reason are true and Reason is the correct explanation of Assertion

XI. **Match the parts of the given figure with the correct option**.



1. a. Fallopian tube,
2. d. Ovary,
3. d. Cervix,
4. d. Uterus,
5. a. Vagina

X. Higher Order Thinking Skills.

1.**If pepsin is lacking in gastric juice, then which event in the stomach will beaffected?**
Answer: breaking of proteins into peptides.

2. Name the blood vessel that (a) enter Malpighian capsule and (b) leaves the Malpighian capsule.
a) afferent atriole
b) Efferent atriole

3. Why do you think that urine analysis is an important part of medical diagnosis?
When there is an illness or disease, the constituents and its levels in urine also changes. Therefore urine analysis is also an important diagnostic tool which may be used to diagnose many diseases.

4. Why your doctor advises you to drink plenty of water?
Water helps to maximize physical performance.
Hydration has a major effect on energy levels and brain function.
Drinking more water may help relieve constipation.

5. Can you guess why there are sweat glands on the palm of our hands and the soles of our feet?
Sweating is important for thermal regulation. Sweat works as a defense against microbes to which our hands and feet are mostly exposed than the other parts of ourbody.

Unit 21 NUTRITION AND HEALTH

I. Choose the best answer.

1) The nutrient required in trace amounts to accomplish various body functions is ...**Answer:(c) Vitamin**
2) The physician who discovered that Scurvy can be cured by ingestion of citrus fruit is ___**Answer:(a) James Lind**
3) The sprouting of onion and potatoes can be delayed by the process of .....**Answer:(b) Irradiation**

4) Food and Adulteration Act was enacted by the Government of India in the year ……**Answer:(b) 1954**
5) An internal factor responsible for spoilage of food is ……..**Answer:(c) Moisture content in food**

II. Fill in the blanks.

1. Deficiency diseases can be prevented by taking **balanced** diet.
2. The process of affecting the natural composition and the quality of food substance is known as **Food spoilage**
3. Vitamin D is called as **Calciferol** vitamin as it can be synthesised by the body from the rays of the sunlight.
4. Dehydration is based on the principle of removal of **water**
5. Food should not be purchased beyond the date of **expiry**
6. AGMARK is used to certify **Livestock** and **Agricultural products** products on India.

III. Mention whether the following statements are true or false. If false, write the correct statement.

1. **False. Correct Statement**: Iodine is required for the proper functioning of thyroid gland.
2. **False. Correct** Statement: Vitamins are required in small quantities for normal functioning of thebody.
3. Vitamin C is a water-soluble Vitamin – **True**
4. Lack of adequate fats in the diet may result in low body weight – **True**
5. **False. Correct Statement**: AGMARK is mandatory to certify Agricultural products.

IV. Match column A with column B.

1.Calcium	Osteoporosis
2.Sodium	Muscular cramps
3.Potassium	Muscular fatigue
4.Iron	Anaemia
5.Iodine	Goitre

V. Fill in the blanks with suitable answer

Vitamin	**Rich Source**	**Deficiency Disease**
Calciferol	Liver, fish, egg	Rickets
Retinol	papaya	Night blindness
Ascorbic acid	Citrus fruits	Scurvy
Thiamine	whole grains	Beriberi

VI. Give abbreviations for the following food standards.

1. **ISI** – Indian Standards Institution.
2. **FPO** – Fruit Process Order.
3. **AGMARK** – Agricultural Marking.
4. **FCI** – Food Corporation of India.
5. **FSSAI** – Food Safety and Standard Authority of India.

VII. Assertion and reason.

1. Ans:(a) If both Assertion and Reason are true and the Reason is the correct explanation of Assertion.

2. Ans:(d) If both Assertion and Reason is false.

VIII. Give one reason for the following statements.

(a) **Salt is added as a preservative in Pickles**.
Addition of salt removes the moisture content in the food by the process of Osmosis.

(b) **We should not eat food items beyond the expiry date.**
Food may become poison.

(c) **Deficiency of Calcium in diet leads to poor skeletal growth.**
Calcium plays important role in formation of bones. Any deficiency of calcium in food leads to Oestoporosis.

IX. Answer briefly.

1. Differentiate: a) Kwashiorkar from Marasmus b) Macronutrients from Micronutrients

Kwashiorkar	Marasmus
Protien deficiency affecting children between 1-5 years	Protein deficiency affecting infants below te age of one year
Face and feet swelling, belly enlarged	Weight loss and body muscle waste, Severe diarrhoea

Macronutrients	Micronutrients
They are needed in large quantities	Required in minimum quantities
Calcium, Magnesium etc	Iron, copper, Iodine etc

2. Why salt is used as a preservative in food.
1) It removes the moisture content in the food.
2) Prevents the growth of bacteria.
3) Reduces the activity of microbial enzymes.

3. What is an adulterant?
An adulterant is an undesirable substance added to the food against the food safety standards.

4. Name any two naturally occurring toxic substances in food.
Alkaloids and Aflatoxin.

5. What factors are required for the absorption of Vitamin D from the food by the body?
The factor that regulates the absorption of Vitamin D is the presence of dietary fat (Egg, Liver, Dairyproducts, Fish, etc). When our body absorbs this fat, it also absorbs the dissolved Vitamin D. When the sun rays fall on the skin, the fat is converted into Vitamin D.

6. Write any one function of of the following minerals.
1. **Calcium**: Enamel of teeth.
2. **Sodium**: Maintains fluid balance.
3. **Iron**: Important component of Haemoglobin, which carries Oxygen from Lungs to body.
4. **Iodine**: Formation of Thyroid hormone.

7. Explain the two methods of food preservation.
Drying: Drying inhibit the growth of mcro organism such as bacteria, moulds.
Smoking: The drying action of smoke to preserve the food.

8. What are the effects of consuming adulterated food?
Increases the impurity in the food items
Lack of Nutritional value
Leads to various diseases

X. Answer in detail.

1. **How are Vitamins useful to us? Tabulate the source, deficiency diseases and symptoms of fat soluble Vitamins.**

Vitamins	Sources	Deficiency disorders	Symptoms
	Fat Soluble Vitamins		
Vitamin A (Retinol)	Carrot, papaya, leafy vegetables, fish liver oil, egg yolk, liver, dairy products	Xerophthalmia Nyctalopia (Night blindness)	Dryness of Cornea Unable to see in the night (dim light) Scaly skin
Vitamin D (Calciferol)	Egg, liver, dairy 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

2. Explain the role of food control agencies in India.

1. ISI (Indian Standards Institution):It **Certifies Industrial products** like Electrical appliances like switches, wiring cables, water heater, electric motor, kitchen appliances etc.
2. AGMARK (Agricultural Marking): **certifies Agricultural and Livestock products** like cereals/essential oils, pulses, honey, butter etc.
3. FPO (Fruit Process Order):**certifies the Fruit products** like Juice, jams, sauce, canned fruits andvegetables, pickles etc.
4. FSSAI (Food Safety and Standards Authority of India) responsible for protecting and promoting public health through **regulation and supervision of food safety**.

XI. Higher Order Thinking Skills.

1. Look at the pcture and answer the question that follows.

a) Name the process involved in the given picture? Ans: Pasterization of milk

b) Which dairy food is preserved by this process? Ans: Milk

c) What is the temperature required for the above process? Ans: 63C and boil for 30 min

2.The doctor advises an adolescent girl who is suffering from anaemia to include more of leafyvegetables and dates in her diet. Why so?

Iron deficiency is the most common nutrient deficiency in adolescent girls. Insufficient iron can lead to anaemia. Leafy vegetables and dates are rich in iron and other minerals. So the doctor advises to include more of these in the diet.

3. Sanjana wants to buy a jam bottle in a grocery shop. What are the things she should observe on the label before purchasing it?

1. Name of the product
2. Manufacturer's details, Contents/Ingredients
3. Net Weight
4. Maximum Retail Price (MRP)
5. Date of Manufacture
6. Date of Expiry
7. Date of best before use

Unit 22 WORLD OF MICROBES

I. Choose the correct answer.

1. Which of the following is transmitted through air? **Answer:(a) Tuberculosis**
2. One of the means of indirect transmission of disease is …….**Answer:(c) vectors**
3. Diptheria affects the ……**Answer:(b) Throat**
4. The primary organ infected during tuberculosis is ……**Answer:(d) lungs**
5. Microbes that generally enter the body through nose are likely to affect……**Answer:(b) lungs**
6. The organ affected by jaundice is ……**Answer:(a) liver**
7. Poliomyelitis virus enters the body through **……Answer:(b) mouth and nose**

II. Fill in the blanks.

1….**Nitrification** break down organic matter and animal waste into ammonia.
2. Typhoid fever is caused by **Salmonella typhi**
3. H1N1 virus causes **Swine Flu**
4. **Aedes aegypti mosquito** is a vector of viral disease dengue.
5. **BCG (Bacillus Calmette Guerin)**vaccine gives considerable protection against tuberculosis.
6. Cholera is caused by **Vibrio cholerae** and malaria is caused by **Plasmodium**

III. Expand the following

1. **ORS** – Oral Rehydration Solution.
2. **HIV** – Human Immunodeficiency Virus
3. **DPT** – Dipetheria, Pertussis (whooping cough) and Tetanus.
4. **WHO** – World Health Organization.
5. **BCG** – Bacillus Calmette Guerin

IV. Pick out the odd one.

1. AIDS, Retrovirus, Lymphocytes, **BCG**,
2. Bacterial disease, **Rabies**, Cholera, Common cold and Influenza

V. State whether True or False. If false write the correct statement.

1. Rhizobium, associated with root nodules of leguminous plants fixes atmospheric nitrogen – **True**.
2. Non- infectious diseases remain confined to the person who develops the disease and do not spread to others – **True**.
3. The process of vaccination was developed by Jenner – **True**.
4. Hepatitis B is more dangerous than Hepatitis A – **True**.

VI. Match column A with column B.

Swine flu	(d) Influeuza virus HIN1
Genital warts	(a) Human Papilloma virus
AIDS	(b) Human Immunodeficiency Virus
Tuberculosis	(c) Mycobacterium

VII. Define the following.

1. Pathogen

A pathogen is a biological agent that causes disease to its host. e.g. bacteria, virus,etc.

2. Bacteriophages

Bacteriophages are virus that infect bacterial cells, e.g. T4 bacteriophage.

3. Vaccines

Preparation of antigenic proteins of pathogens (weakened or killed) which on inoculation into a healthy person provides temporary/permanent immunity against aparticular disease.

4. Prions

Viral particles which contain only protein. They do not contain nucleic acid.

VIII. Answer the following in brief.

1. Distinguish between Virion and Viroid.

Virion	**Viriod**
The simple virus particles with protein coat and Nucleic acid	The protein free pathogenic RNA of virus is viriod
Grow and multiply onle in living cells	Found in plant cells
They can live on plants, animals, human being and even bacteria and cause diseases	They cause diseases onle in plants- the infectious agents that encode no protein
Easily transmitted from one host to another	Spread by contaminated from machinery and insects

2. Name the vector of the malarial parasite. Mention the species of malarial parasite which cause malignant and fatal malaria.

Vector :female Anopheles mosquito. **Parasite**: Plasmodium falciparum.

3. What is triple antigen? Mention the disease which can be prevented by using theantigen.

DPT is called triple antigen vaccine. It protects against Diptheria, Pertusis and Tetanus.

4. Name the chronic diseases associated with respiratory system.

Tuberculosis.

5. Name the organism causing diarrhoel disease and give one precaution against it.

Cholera (Acute diarrhoeal disease) is caused by Vibrio cholerae.

It can be prevented byhygienic sanitary condition, intake of Oral Rehydration Solution (ORS).

6. Name two common mosquitoes and the diseases they transmit

Anopheles mosquito transmit malaria

Aedes aegypti mosquito transmit Chikungunya and Dengue.

IX. Answer in detail.

1. Give an account of classification of bacteria based on the shape.:

1. Spherical shaped bacteria called as cocci (or coccus for a single cell).
2. Rod-shaped bacteria called as bacilli (or bacillus for a single cell).
3. Spiral shaped bacteria called as spirilla (or spirillum for single cell)

2. Describe the role of microbes in agriculture and industries.

Microbes play a vital role in the cycling of elements like carbon, nitrogen, oxygen, sulphur and phosphorus.

1. Microbes as biocontrol agents

Microorganisms used for controlling harmful or pathogenic organisms and pests of plants are called as biocontrol agents (Biopesticides)..

2. Microbes as biofertilizers

Microorganisms which enrich the soil with nutrients are called as biofertilizers..

3. Microbes in Industries

Microorganisms play an important role in the production of wide variety of valuable products for the welfare of human beings.

1. Production of fermented beverages:
2. Curing of coffee beans, tea leaves and tobacco leaves:
3. Production of curd: Lactobacillus sp. converts milk to curd. .
4. Production of organic acids, enzymes and vitamins

3. Explain the various types of viruses with examples.

Viruses are categorized as:

(i) Plant virus: Virus that infect plants, e.g. Tobacco mosaic virus, Cauliflower mosaic virus, Potato virus.

(ii) Animal virus: Virus that infect animals, e.g. Adenovirus, Retrovirus(HIV), Influenza virus, Poliovirus.

(iii) Bacteriophages: Virus that infect bacterial cells, e.g. T4 bacteriophage.

4. Suggest the immunization schedule for a newborn baby till 12 months of age. Why it is necessary to follow the schedule?

Age	Vaccine	Dosage
New bom	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

It will protect the children in future from infectious and life-threatening diseases.

X. Assertion and Reason.

1. Answer:(a) If both A and R are true and R is a correct explanation of A.
2. Answer:(d) If both A and R are false.

XI. Questions based on thinking skills.

1. Suggest precautionary measures you can take in your school to reduce the incidence of infectious disease.

Precautionary measures that can be taken are;

1. The sick student or staff can be asked to stay at home.
2. Clean and disinfect classroom materials and surfaces.
3. Adopt healthy practices such as safe handling of food and usage of toilets.
4. Provide awareness in daily announcements about preventing spread of germs and illnesses.

2. Tejas suffered from typhoid while, Sachin suffered from tuberculosis. Which disease could have caused more damage and why?

Tuberculosis is more dangerous than Typhoid as Typhoid can be treated wherease treating TB is long process.

Unit 23 ECONOMIC BIOLOGY

I. Choose the correct answer.

1. The production and management of fish is called ……..**Answer:(a) Pisciculture**
2. Which one of the following is not an exotic breed of cow?**Answer:(c) Sahiwal**
3. Which one of the following is an Italian species of honey bee?**Answer:(a) Apis mellifera**
4. Which one of the following is not an Indian major carp?**Answer:(d) Singhara**
5. Drones in the honey bee colony are formed from**Answer:(a) unfertilized egg**
6. Which of the following is an high milk yielding variety of cow?**Answer:(a) Holstein- Friesan**
7. Which Indian variety of honey bee is commonly used for apiculture?**Answer:(d) Apis indica**
8. …….. is the method of growing plants without soil. **Answer:(b) Hydroponics**
9. The symbiotic association of fungi and vascular plants is ……..**Answer:(c) Mycorhizae**
10. The plant body of mushroom is ……..**Answer:(b) Mycelium**

II. Fill in the blanks.

11. Quinine drug is obtained from **Cinchona officinalis**
12. Carica papaya leaf can cure disease. **Dengue**
13. Vermicompost is a type of soil made by **earthworm** and microorganisms.
14. **Aquaculture** refers to the culture of prawns, pearl and edible oysters.
15. The largest member in a honey bee haive is the **Queen bee**.
16. **Formic acid** is a preservative in honey.
17. **Polyculture** is the method of culturing different variety of fish in a waterbody.

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

1. **False. Correct Statement**: Mycorrhiza is a fungi
2. **False. Correct Statement**: Milch animals are domesticated for obtaining only milk.
3. **False. Correct Statement:** Apis Florea is a little bee
4. **False. Correct Statement**: Ongole is a dual-purpose breed of cattle
5. Sheep manure contains high nutrients than farmyard manure – **True**.

IV. Differentiate the following

1. Exotic breed and Indigenous breed.

a) Exotic breed and Indigenous breed

Exotic breed	Indigenous breed
They are important breeds from foreign countries	They are native breeds of India
They are selected for long lactation periods	Milk production depends on the duration of the lactation

b) Pollen and Nectar

Pollen	Nectar
Male gamete of flower	It is a sweet viscous secretion secrete by the flower of plants

c) Shrimp and Prawn

Shrimp	Prawn
The marine penaeid prawns are called as shrimps	It is a freshwater prawn and non – penaeid prawns are called prawn.

d) Farmyard manuare and Sheep manure

Farmyard manuare	Sheep manure
It is a mixture of cattle dung, urine, litter material and other dairy wastes	It contains higher nutrients than farm yard manure
It consists of 0.5% Nitrogen, 0.2% Phosphate and 0.5% Potash	It consists of 3% nitrogen, 1% Phosphorus pentoxide, 2% Potassium oxide.

V. Match the following.

1.	Lobsters	(a) Marine fish	c
2.	Catla	(b) Pearl	e
3.	Sea bass	(c) Shell fish	a
4.	Oysters	(d) Paddy	b
5.	Pokkali	(e) Fin fish	d
6.	Pleurotus sps	(f) Psoriosis	g
7.	Sarpagandha	(g) Oyster mushroom	h
8.	Olericulture	(h) Reserpine	i
9.	Wrighta tinctoria	(i) Vegetable farming	f

VI. Answer in brief.

1. What are secondary metabolites?

Organic compounds from medicinal plants are called secondary metabolites.

2. What are the types of vegetable garden?

1. Kitchen or Nutrition gardening, 2.Commercial gardening, 3. Vegetable forcing.

3. Mention any two mushroom preservation methods.

Drying and Freezing

4. Enumerate the advantages of vermicompost over chemical fertiliser.

- It is a rich source of nutrients essential for plant growth. It makes the soil fertile.
- It improves soil structure, texture, aeration and 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.
- Vermicompost is free from pathogens and toxic elements.
- Vermicompost is rich in beneficial microflora.

5. What are the species of earthworm used for vermiculture?

Perionyx excavatus (Indian blueworm), Eisenia fetida (Red worms), Eudrilus eugeniae (African night crawler).

6. List the medicinal importance of honey.

Uses 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.

1. Enumerate the advantage of hydroponics.

- Crops can be grown in places where the land is limited, doesn't exist, or is heavily contaminated.
- The climate – temperature, humidity, light, the composition ofthe air can be monitored.
- Conservation of water and nutrients.
- Controlled plant growth.
- No intrusion by weeds.Fewer pests & diseases
- Minimal use of insecticide or herbicides
- In deserts and Arctic regions hydroponics can be an effective alternative method.
- successfully employed for the commercial production of seedless cucumber and tomato.

2. Define Mushroom culture. Explain the mushroom cultivation methods.

Mushroom culture is the process of producing food, medicine, and other products by the cultivation of mushrooms.

Major stages of mushroom cultivation are;

Composting: Compost is prepared by mixing paddy straw with number of organic materials.

Spawning: Spawn is the mushroom seed.

Casing: Compost is covered with a thin layer of soil.

Pinning: Mycelium starts to form little buds called pins.

Harvesting: Mushroom grow better in 15°C – 23°C. They grow 3 cm in a week which is the normal size for harvesting.

3. What are the sources of organic resources for vermicomposting?

- Agricultural wastes (crop residue, vegetable waste, sugarcane trash)
- Crop residues (rice straw, tea wastes, cereal and pulse residues, rice husk,tobacco wastes, coir wastes)
- Leaf litter
- Fruit and vegetable wastes
- Animal wastes (cattle dung, poultry droppings, pig slurry, goat and sheepdroppings)
- Biogas slurry

4. Give an account of different types of fish ponds used for rearing fishes.

1. **Breeding pond:** Healthy and sexually mature male and female fishes are collected and introduced in this pond for breeding.
2. **Hatchling pits:** The fertilized eggs are transferred to hatching pits for hatching.
3. **Nursery ponds:** After 2 to 7 days the hatchlings grow into fry and are cultured in these ponds for about 60 days till they reach 2 -2.5 cm in length.
4. **Rearing ponds:** Rearing ponds are used to culture the fry. The fish fry are maintained for about three months till they reach 10 to 15 cm fingerlings.
5. **Stocking pond:** These ponds are used to rear fingerlings upto the marketable size.

5. Classify the different breeds of the cattle with suitable examples.

1. Dairy breeds,
2. Draught (or) Draft breeds,
3. Dual-purpose breeds

Dairy breeds:

- Dairy animals are domesticated for obtaining milk. The cows are high milk yielders.
- The dairy breeds may be indigenous breeds (or) exotic breeds.
- Indigenous breeds are native of India. They are strong and resistant to disease eg: Sahiwal, and Gir.
- The exotic breeds are imported from foreign countries. They have long lactation periods eg: Jersey.

Draught (or) Draft breeds:

They are used for agricultural work, such as tilling, irrigation and carting. Eg: Amritmahal, Kangayam.

Bullocks are good draft animals while the cows are poor milk yielders.

Dual-purpose breeds:

Indian farmers likes the breeds provide milk and also useful for farm work. E.g:Haryana, Ongole.

VIII. Higher Order Thinking Skills.

1. Biomanuring plays an important role in agriculture. Justify

Biomanure also knwon as organic manures, are predominantly derived from plant debris, animal faeces and microbes. They make the soil fertile by adding nutrientslike nitrogen. They are eco-friendly. Biomanure is easy to generate and very economical.

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.

The cell is formed in a sheet of wax. The hexagonal shape allows to hold the queenbee's eggs and store the pollen and honey the worker bees bring to the hive.

Unit 24 ENVIRONMENTAL SCIENCE

I. Choose the correct answer.

1. All the factors of biosphere which affect the ability of organisms to survive and reproduce are called as……**Answer:(b) abiotic factors**
2. The ice sheets from the north and south poles and the icecaps on the mountains, get converted into watervapour through the process of ……**Answer:(c) sublimation**
3. The atmospheric carbon dioxide enters into the plants through the process of …….**Answer: (a) photosynthesis**
4. Increased amount of in the atmosphere, results in greenhouse effect and global warming. **Answers(d) carbon dioxide**

II. Match the Following:

S.No.	Microorganism		Role Played	
1.	Nitrosomonas	a	Nitrogen fixation	c
2.	Azotobacter	b	Ammonification	a
3.	Pseudomonas species	c	Nitrification	d
4.	Putrefying bacteria	d	Denitrification	b

III. State whether the statements are true or false. Correct the false statements.

1. **False. Correct statement**: Atmosphere is a rich source of nitrogen and contains about 78% nitrogen.
2. **False. Correct statement**: The roots of mesophytes are well developed and are provided with root caps.
3. Bats are the only mammals that can fly – **True**
4. **False. Correct statement**: Bats use the remarkable high frequency system called echoes.
5. **False. Correct statement**: Aestivation is an adaptation to overcome hot and dry condition.

IV. Answer in brief.

1. What are the two factors of biosphere?

1. **Biotic or living factors** which include plants, animals and all other living organisms.
2. **Abiotic or non-living factors** which include all factors like temperature, pressure, water, soil, air andsunlight which affect the ability of organisms to survive and reproduce.

2. How do human activities affect nitrogen cycle?

Burning fossil fuels, application of nitrogen based fertilizers and other activities can increase the amountof biologically available nitrogen in an ecosystem.

3. What is adaptation?

Any feature of an organism or its part that enables it to exist under conditions of its habitat is calledadaptation.

4. What are the challenges faced by hydrophytes in their habitat?

1. Availability of more water than needed.
2. Water current may damage the plant body.
3. Water levels may change regularly.
4. Maintain buoyancy in water.

5. Why is it important to conserve water?

- It creates more efficient use of water resources.
- It ensures that we have enough usable water.
- It helps in decreasing water pollution.
- It helps in increasing energy saving.

6. List some of the ways in which you could save water in your home and school?

Don't let tap open when brushing.
Repair damaged taps.
Use waste water for garden.
Make rainwater harvesting methods

7. What are the uses of recycled water?

Agriculture, Landscape, Public parks, Golf course irrigation, Cooling water for power plants and

oilrefineries, Toilet flushing, Dust control and Construction activities.

8. What is IUCN? What is the vision of IUCN?

IUCN is an international organization working in the field of nature conservation and sustainable use ofnatural resources.

The vision of IUCN is 'A just world that values and conserves nature'.

V. Answer in detail.

1. Describe the processes involved in the water cycle?

Water cycle process involves evaporation, sublimation, transpiration, condensation, precipitation, surface runoff and infiltration.

Evaporation: Water evaporates from the surface of the earth turn into water vapour.

Sublimation: Ice sheets and ice get converted into water vapour directly, without converting into liquid.

Transpiration: Transpiration is the process by which plants release water vapour to atmosphere.

Condensation: The water vapour condenses to form very tiny particles of water droplets. These particles come close together to form clouds and fog.

Precipitation: Due to change in wind or temperature, clouds combine to make bigger droplets, and pour down as precipitation(rain).

Runoff: As the water pours down, it runs over the surface of earth. Runoff water combines to formchannels, rivers, lakes and ends up into seas and oceans.

2. Explain carbon cycle with the help of a flow chart?

- 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.

3. List out the adaptations of xerophytes?

1. They have well-developed roots. Roots grow very deep and reach the layers where water is available as in Calotropis.
2. They store water in succulent water-storing parenchymatous tissues, e.g. Opuntia, Aloe vera.
3. They have small-sized leaves with waxy coating, e.g. Acacia. In some plants, leaves are modified into spines, e.g. Opuntia.
4. Some of the xerophytes complete their life cycle within a very short period when sufficient moisture is available.

4. How does a bat adapt itself to its habitat?

Nocturnality: Bats are active at night. black wing membrane may cause excessive heat absorption during the day. This may lead to dehydration.

Flight adaptation: Forelimbs are modified serve wings. Tendons of hind limbs provide a tight grasp when the animals are suspended upside down at rest.

Hibernation: Bats are warm blooded animals but unlike other mammals, they let their internal temperature reduce when they are resting.

Echolocation: Bats use a remarkable high-frequency system called echolocation to identify its prey

5. What is water recycling? Explain the conventional wastewater recycling treatment?

Water recycling is reusing treated wastewater for beneficial purposes such as agricultural and landscape irrigation, industrial processes, flushing in toilets and groundwater recharge.

The wastewater treatment involves the following stages:

Primary treatment:

Primary treatment involves temporary holding of the wastewater in a tank. The heavy solids get settled at the bottom while oil, grease and lighter solids float over the surface. The settled and floating materials are removed. The remaining liquid may be sent for secondary treatment.

Secondary treatment:

Secondary treatment is used to remove the biodegradable dissolved organic matter. This is performed inthe presence of oxygen by aerobic microorganisms. The microorganisms must be separated from treated waste water by sedimentation. After separating the sediments of biological solids, the remaining liquid is discharged for tertiary treatment.

Tertiary treatment:

Tertiary or advanced treatment is the final step of sewage treatment. It involves removal of inorganic

constituents such as nitrogen, phosphorus and microorganisms. The fine colloidal particles in the sewage water are precipitated by adding chemical coagulants like alum or ferric sulphate.

VI. Give reason.

1. Roots grow very deep and reach the layers where water is available. Which type of plants develops the above adaptation? Why?

Xerophytes are the type of plants that grow deep roots so as to reach the water source as they exist in adry habitat.

2. Why streamlined bodies and presence of setae is considered as adaptations of earthworm?

Stream-lined bodies helps them to live in narrow burrows underground and for easy penetration into thesoil.

Setae help the earthworm to move through the soil and provide anchor in the burrows.

3. Why is it impossible for all farmers to construct ponds in their fields?

They occupy a lot of space.

They need lot of water management system which will cost more water, labour and cost.