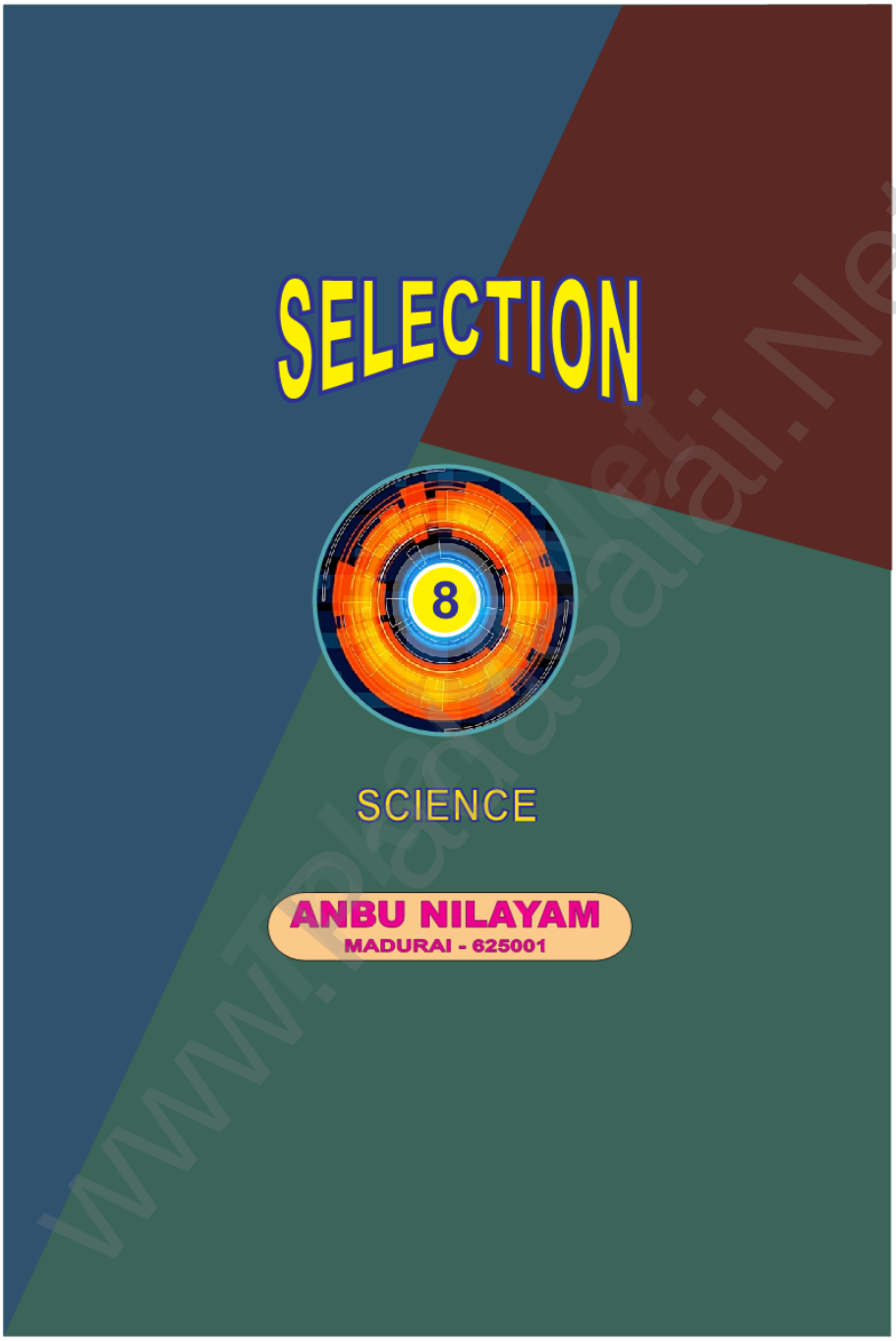

SELECTION

8

SCIENCE

EIGHTH STANDARD

Based On NEW SYLLABUS

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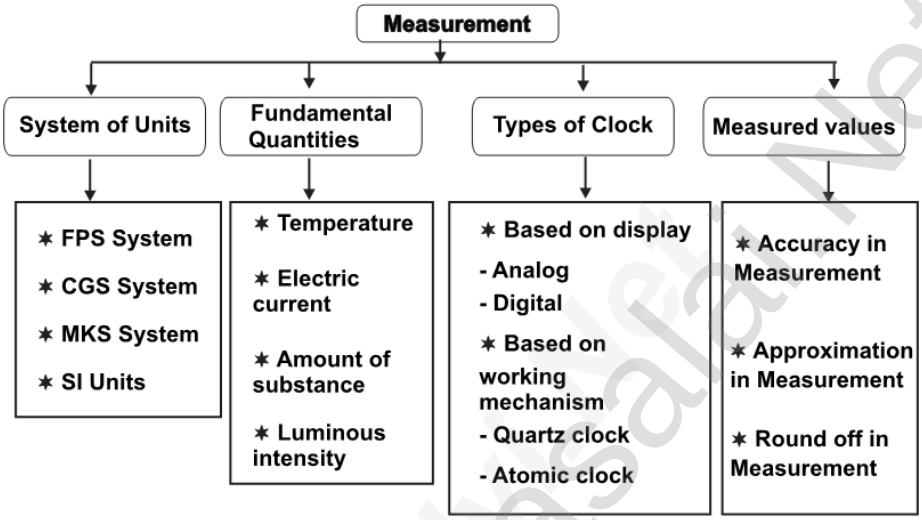


TEXT BOOK EXERCISES

I. Choose the best answer.

1. Which one of the following system of unit is the British System of unit?

a) CGS b) MKS
c) FPS d)SI

Ans : c) FPS

2. Electric current is a _____ quantity

a) base cb) supplementary
c) derived d) professional

Ans : a) base

3. SI unit of temperature is

a) celsius b) fahrenheit
c) kelvin d) ampere

Ans : c) kelvin

4. Luminous intensity is the intensity of_____

a) laser light b) UV light
c) visible light d) IR light

Ans : c) visible light

5. Closeness of two or more measured values is called as _____

a) accuracy b) precision
c) error d) approximation

Ans : b) precision

6. Which one of the following statement is wrong?

a) Approximation gives accurate value.
b) Approximation simplifies the calculation.
c) Approximation is very useful when little information is available.
d) Approximation gives the nearest value only.

Ans : a) Approximation gives accurate value.

II. Fill in the blanks.

1. The solid angle is measured in _____. **Ans : steradian**
2. Th e coldness or hotness of a substance is expressed by _____. **Ans : temperature**
3. _____ is used to measure electric current. **Ans : Ammeter**
4. One mole of a substance contains _____ atoms or molecules. **Ans : 6.023×10^{23}**
5. The uncertainty in measurement is called as _____. **Ans : errors**
6. The closeness of the measured value to the original value is _____ **Ans : Accuracy**
7. The intersection of two straight lines gives us _____. **Ans : plane angle**

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

1. Temperature is a measure of total kinetic energy of the particles in a system.
Ans : False. Temperature is a measure of **average** kinetic energy of the particles in a system.

2. If one coulomb of charge is flowing in one minute, it is called 'ampere'.
Ans : False. If one coulomb of charge is flowing in one **second**, it is called 'ampere'.

3. Amount of substance gives the number of particles present in a substance.
Ans : True.

4. Intensity of light coming from a candle is approximately equal to one 'candela'.
Ans : True

5. Quartz clocks are used in GPS devices.
Ans : False. **Atomic clocks** are used in GPS devices.

6. Angle formed at the top of a cone is an example for 'plane angle'.
Ans : False. Angle formed at the top of a cone is an example for **'solid angle'.**

7. The number 4.582 can be rounded off as 4.58.
Ans : True

IV. Match the following:

1.	Temperature	Closeness to the Actual Value
2.	Plane Angle	Measure of hotness or coldness
3.	Solid Angle	Closeness to two or more measurements
4.	Accuracy	Angle formed by the intersection of three or more planes
5.	Precision	Angle formed by the intersection of two planes

Ans :

1.	**Temperature**	**Measure of hotness or coldness**
2.	**Plane Angle**	**Angle formed by the intersection of two planes**
3.	**Solid Angle**	**Angle formed by the intersection of three or more planes**
4.	**Accuracy**	**Closeness to the Actual Value**
5.	**Precision**	**Closeness to two or more measurements**

V. Consider the statements given below and choose the correct option.

1. **Assertion:** The SI system of units is the suitable system for measurements.
Reason: The SI unit of temperature is kelvin.
a) Both assertion and reason are true and reason is the correct explanation of the assertion.
b) Both assertion and reason are true but reason is not the correct explanation of the assertion.
c) Assertion is true, but reason is false.
d) Both assertion and reason are false.
Ans : b) Both assertion and reason are true but reason is not the correct explanation of the assertion.

---

2. Assertion: Electric current, amount of substance, luminous Intensity are the fundamental physical quantities.
Reason: They are independent of each other.
a) Both assertion and reason are true and reason is the correct explanation of the assertion.
b) Both assertion and reason are true but reason is not the correct explanation of the assertion.
c) Assertion is true, but reason is false.
d) Both assertion and reason are false.
Ans : c) Assertion is true, but reason is false.

---

3. Assertion: Radian is the unit of solid angle.
Reason: One radian is the angle subtended at the centre of a circle by an arc of length equal to its radius.
a) Both assertion and reason are true and reason is the correct explanation of the assertion.
b) Both assertion and reason are true but reason is not the correct explanation of the assertion.
c) Assertion is true, but reason is false.
d) Both assertion and reason are false.
Ans : d) Both assertion and reason are false.

VI. Answer very briefly.

1. How many base quantities are included in SI system?
Ans : Seven
2. Give the name of the instrument used for the measurement of temperature.
Ans : Thermometer

3. What is the SI unit of Luminous Intensity?
Ans : Candela
4. What type of oscillations are used in atomic clocks?
Ans : Periodic vibrations
5. Mention the types of clocks based on their display.
Ans : (i) Analog clocks, (ii) Digital clocks
6. How many times will the 'minute hand' rotate in one hour?
Ans : 60
7. How many hours are there in a minute?
Ans : 1/60 hours = 0.017 hours

VII. Answer briefly.

1. What is measurement?
Ans :
★ It is the process of finding an unknown physical quantity by using a standard quantity.

2. Name the three scales of temperature.
Ans :
★ Celsius, Fahrenheit, Kelvin are the most commonly used scales of temperature.

3. Define - Ampere.
Ans :
★ If one coulomb of charge is flowing through a conductor in one second, then, the amount of current flowing is said to be one ampere.

4. What is electric current?
Ans :
★ Flow of electric charges, in a particular direction is known as 'electric current'.
★ SI unit of electric current is ampere.

5. What do you mean by luminous intensity?
Ans :
★ The measure of the power of the emitted light, by a light source in a particular direction, per unit solid angle is called as luminous intensity.
★ SI unit of luminous intensity is candela.

6. Define - Mole.
Ans :
★ The number of atoms or molecules in a substance is measured in mole.
★ Mole is defined as the amount of substance, which contains 6.023×10^{23}.

7. What are the differences between Plane angle and solid angle?

Ans :

S.No.	Plane Angle	Solid Angle
1.	It is the angle made at the point of intersection of two lines or planes.	It is the angle by the intersection of three or more planes at a common point.
2.	It is two dimensional.	It is three dimensional.
3.	Its unit is radian.	Its unit is steradian.

VIII. Answer in detail:

1. List out the base quantities with their units.

Ans : Base quantities and units.

Quantity	Unit	Symbol
Length	metre	m
Mass	kilogram	kg
Time	second	s
Temperature	kelvin	K
Electric Current	ampere	A
Amount of Substance	mole	mol
Luminous Intensity	candela	cd

2. Write a short note on different types of clocks.

Ans : (i) Types of clock based on display :

There are two types of clocks based on display. They are :

1. Analog clocks
2. Digital clocks

(ii) Types of clock based on working mechanism :

There are different types of clocks based on working mechanism. They are :

1. Quartz clock
2. Atomic clock.

(i) Types of clock based on display :

1. Analog clocks

★ Analog clocks looks like a classic clock. It has three hands to show the time.

Hours Hand:

★ It is short and thick. It shows 'hour'.

Minutes Hand:

★ It is long and thin. It shows 'minute'.

Seconds Hand:

★ It is long and very thin. It shows 'second'.

★ It makes one rotation in one minute and 60 rotations in one hour.

2. Digital clocks:

★ A digital clock displays the time directly.

★ It shows the time in numerals or other symbols.

★ It may have 12 hours or 24 hours display.

(ii) Types of clock based on working mechanism :

1. Quartz clock

★ These clocks are activated by 'electronic oscillations', which are controlled by a 'quartz crystal'.

★ The frequency of a vibrating crystal is very precise.

2. Atomic clock :

★ These clocks make use of periodic vibrations occurring within the atom.

★ These clocks have an accuracy of one second in every 10^{13} seconds.

IX. Higher Order Thinking Question.

Your friend was absent to school yesterday. You are enquiring about his absence. He told that he had fever and it was measured to be 100°C. Is it possible to have 100°C fever? If he is wrong, try to make him understand.

Ans :

(i) It is not possible of 100°C fever.

(ii) Clinical thermometer is graduated in 'Fahrenheit scale'. So, he has to say 100°F

Additional Questions and Answers

I. Choose the best answer :

1. SI unit of amount of substance is .....

a) metre b) second

c) mole d) kelvin **Ans : c) mole**

2. SI unit of electric current is .....

a) metre b) ampere

c) second d) mole **Ans : b) ampere**

3. Luminous intensity is measured by .....

a) thermometer b)ammeter

c) photometer d) ohmmeter **Ans : c) photometer**

4. SI unit of luminous intensity is.....

a) Radian b) Lumen

c) Steradian d)Candela **Ans : b) Lumen**

5. SI unit of plane angle is.....

a) Radian b) Lumen

c) Steradian d)Candela **Ans : a) Radian**

6. ..... clocks are used in Global Navigation satellite system.

a) Atomic b) Quartz

c) Digital d) Analog **Ans : a) Atomic**

7. Atomic clocks have an accuracy of one second in every..... seconds.

a) 10^{9} b) 10^{13}

c) 10^{11} d) 10^{15} **Ans : b) 10^{13}**

8. Heart beats per minute as ..... approximately.
a) 70 b) 75
c) 80 d) 85 **Ans : b) 75**

9. The crystal formed by silicon and oxygen is .....crystal.
a) quartz b) electronic
c) silicon d) oxygen **Ans : a) quartz**

10. Flow of electric charges in a unit time is called .....
a) amount of substance b) plane angle
c) solid angle d) electric current **Ans : d) electric current**

11. SI unit of Length is .....
a) kilogram b) mole
c) metre d) second **Ans : c) metre**

12. SI unit of Mass is .....
a) mole b) kilogram
c) second d) ampere **Ans : b) kilogram**

13. SI unit of Time is .....
a) kilogram b) mole
c) ampere d) second **Ans : d) second**

14. SI unit of luminous intensity is .....
a) radian b) lumen
c) steradian d) candela **Ans : d) candela**

15. The 11th General conference on weights and measures conducted in ..... year.
a) 1959 b) 1960
c) 1961 d) 1962 **Ans : b) 1960**

16. In ..... plane angle and solid angle were shifted to derived quantities.
a) 1994 b) 1995
c) 1996 d) 1997 **Ans : b) 1995**

17. Greenwich Mean Time is measured at the longitude of ..... degree.
a) 15 b) 82.55
c) 0 d) 10 **Ans : c) 0**

18. Greenwich Mean Time is calculated in .....
a) America b) France
c) London d) Italy **Ans : c) London**

II. Fill in the blanks.

1. The number 6.023×10^{23} is also known as..... **Ans : Avogadro Number**
2. ..... and ..... are derived quantities. **Ans : Plane angle, Solid angle**
3. Quartz clocks have an accuracy of one second in ..... seconds. **Ans : 10^9**
4. The Earth is divided in to ..... time zones. **Ans : 24**
5. Indian Standard Time (IST) = Greenwich Mean Time(GMT) + ... **Ans : 5 : 30 hours**
6. Quartz clocks are activated by ..... which are controlled by a quartz crystal. **Ans : electronic oscillations.**
7. Digital clocks are often called as ..... **Ans : electronic clocks**

8. Electric charge is measured in ..... **Ans : coulomb**
9. ..... is the measure of the perceived power of light.
Ans : Luminous flux or Luminous power
10. In 1960, the 11th General conference on weights and measures is held at .....in .....
Ans : Paris, France

III. Answer shortly:

1. What is Temperature?
Ans :
★ Temperature is a physical quantity that expresses the degree of hotness or coldness of a substance.
★ It's SI unit is kelvin.

2. Name common system of units for measurement.
Ans :
1. FPS System (Foot for length, Pound for mass and Second for time)
2. CGS System (Centimetre for length, Gram for mass and Second for time)
3. MKS System (Meter for length, Kilogram for mass and Second for time)

3. Define - Solid Angle.
Ans :
★ Solid angle is the angle formed by three or more planes intersecting at a common point.
★ The SI unit of solid angle is 'steradian'

4. Define - Error.
Ans :
★ Error is defined as the difference between the real value and the observed value.

5. What is accuracy?
Ans :
★ Accuracy is the closeness of a measured value to the actual value.

6. What is precision?
Ans :
★ Precision is the closeness of two or more measurements to each other.

7. What is approximation?
Ans :
★ Approximation is the process of finding the solution by means of 'estimation'.

VI. Numerical problems.

1. If 5 coulomb of charge flows through a circuit for 10 seconds, calculate the current.

Solution :

Charge (Q) = 5C
Time (t) = 10 S
Current (I) = Q/t
I = 5/10 = 0.5A

Current, $\boxed{I = 0.5A}$

---

2. Convert 90° into radian.

Solution :

1° = $\pi/180$
90° = $\pi/180 \times 90$ = $\pi/2$ radian
90° = $\pi/2$ *radian*

---

3. Convert $\pi/2$ into degrees.

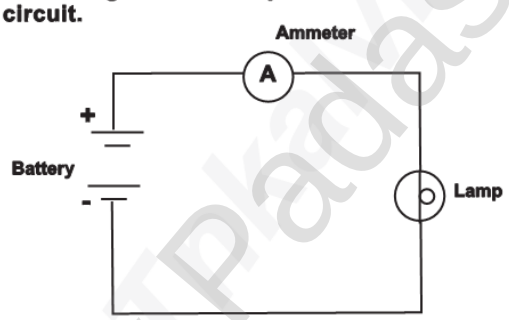
Solution :

π radian = 180°
$\pi/2$ radian = 180°/2 = 90°

V. Draw the following and label the parts.

1. Electric circuit.

Ans :



Activity : 1

Ans : Student Activity

Activity : 2

From the news paper or television, collect the highest and lowest temperature experienced in your nearest town or city for a week and record the values in a tabular column. Does this data remain same throughout the year?

Ans :

Days of the week	Temperature	
	Highest	Lowest
Sunday	42°C	37°C
Monday	43°C	35°C
Tuesday	40°C	34°C
Wednesday	39°C	33°C
Thursday	37°C	33°C
Friday	40°C	34°C
Saturday	41°C	36°C

★ This data does not remain same throughout the year.

Activity : 3 See the book

Activity : 4, 5, 6 StudentActivity

Activity : 7

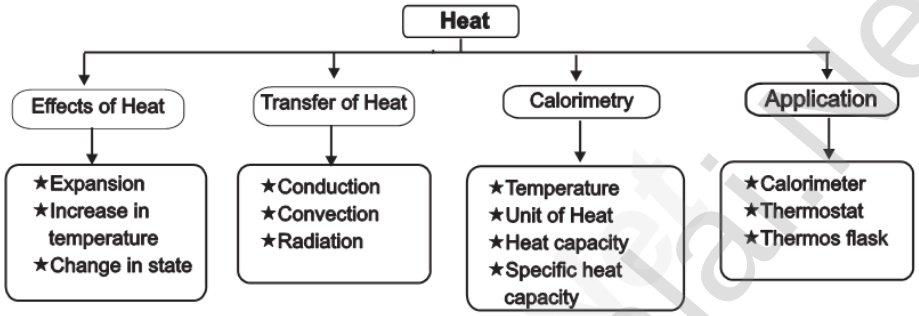
Calculate the approximate 'heart beat' of a man in a day (Hint: Take number of heart beats per minute as 75, approximately).

Ans :

Number of heart beats per minute = 75
One day = 24 hours x 60 minutes
One day = 1440 minutes
∴ So the approximate 'heart beat' of a man in a day = 1440 x 75 = 108000
The approximate 'heart beat' of a man in a day = 1,08,000

UNIT - 4. HEAT

Concept Map



TEXT BOOK EXERCISES

I. Choose the best answer.

1. Heat is a form of _____.
a) electrical energy b) gravitational energy
c) thermal energy d) None of these **Ans : c) thermal energy**

2. If you apply some heat energy to a substance, which of the following can take place in it?
a) Expansion b) Increase in temperature
c) Change of state d) All the above. **Ans : d) All the above.**

3. Which of the following substances will absorb more heat energy?
a) Solid b) Liquid
c) Gas d) All the above **Ans : a) Solid**

4. If you apply equal amount of heat to a solid, liquid and gas individually, which of the following will have more expansion?
a) Solid b) Liquid
c) Gas d) All of them **Ans : c) Gas**

5. The process of converting a liquid into a solid is called_____.
a) sublimation b) condensation
c) freezing d) deposition **Ans : c) freezing**

6. Conduction is the way of heat transfer which takes place in a_____.
a) solid b) liquid
c) gas d) All of them **Ans : a) solid**

II. Fill in the blanks.

1. A calorimeter is a device used to measure the_____.
Ans : heat capacity of a substance

2. _____ is defined as the amount of heat required to raise the temperature of 1kg of a substance by 1°C. **Ans : specific heat capacity**

3. A thermostat is a device which maintains _____.
Ans : the temperature of an object constant

4. The process of converting a substance from gaseous state to solid state is called _____. **Ans : deposition**

5. If you apply heat energy, the temperature of a system will _____.
Ans : increase

6. If the temperature of a liquid in a container is decreased, then the interatomic distance will_____. **Ans : decrease**

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

1. The applied heat energy can be realised as an increase in the average kinetic energy of the molecules. **Ans : True**

2. The dimensions of a substance are increased if the temperature of the substance is decreased. **Ans : False**

correct statement: The dimensions of a substance are **decreased** if the temperature of the substance is decreased.

3. The process of converting a substance from solid state to gaseous state is called condensation. **Ans : False**

correct statement: The process of converting a substance from solid state to gaseous state is called **sublimation.**

4. Convection is the process by which the thermal energy flows in solids. **Ans : False**

correct statement: Convection is the process by which the thermal energy flows in **liquids and gases**.

5. The amount of heat gained by a substance is equal to the product of its mass and latent heat. **Ans : False**

correct statement: The amount of heat gained by a substance is equal to the product of its mass and **heat capacity of a substance**

6. In a thermos flask, the silvered walls reflect and radiate the heat outside. **Ans : False**

correct statement: In a thermos flask, the silvered walls reflect and radiate the heat back **to the liquid in the bottle**.

IV. Match the following:

1.	Conduction	Liquid
2.	Convection	Gas to liquid
3.	Radiation	Solid to gas
4.	Sublimation	Vaccum
5.	Condensation	Solid

Ans :

1.	**Conduction**	**Solid**
2.	**Convection**	**Liquid**
3.	**Radiation**	**Vaccum**
4.	**Sublimation**	**Solid to gas**
5.	**Condensation**	**Gas to liquid**

V. Consider the statements given below and choose the correct option.

1. Assertion: Radiation is a form of heat transfer which takes place only in vacuum.
Reason: The thermal energy is transferred from one part of a substance to another part without the actual movement of the atoms or molecules.

a) Both assertion and reason are true and the reason is the correct explanation of assertion.
b) Both assertion and reason are true, but reason is not the correct explanation of assertion.
c) Assertion is true, but the reason is false.
d) Assertion is false, but the reason is true.

Ans : b) Both assertion and reason are true, but reason is not the correct explanation of the assertion.

2. Assertion: A system can be converted from one state to another state.
Reason: It takes place when the temperature of the system is constant.
a) Both assertion and reason are true and the reason is the correct explanation of assertion.
b) Both assertion and reason are true, but reason is not the correct explanation of assertion.
c) Assertion is true, but the reason is false.
d) Assertion is false, but the reason is true.
Ans : c) Assertion is true, but the reason is false.

VI. Answer briefly.
1. What are the applications of conduction in our daily life?
Ans : Applications of conduction in our daily life
★ We cook food in vessels made up of metals. When the vessel is heated, heat is transferred from the metal to the food.
★ When we iron dresses, heat is transferred from the iron to the cloth.

---

2. What are the effects of heat?
Ans : Effects of heat.
★ Expansion
★ Increase in temperature
★ Change in state

---

3. Name three types of heat transfer.
Ans : Three types of heat transfer are :
★ Conduction
★ Convection
★ Radiation

---

4. What is conduction?
Ans :
★ The process of heat transfer in solids from the region of higher temperature to the region of lower temperature without the actual movement of atoms or molecules is called conduction.

---

5. Write a note on convection.
Ans :
★ The form of heat transfer from places of high temperature to places of low temperature by the actual movement of molecules is called convection.

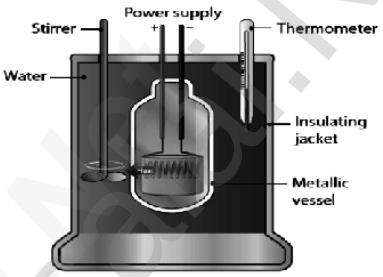
---

6. Define specific heat capacity.
Ans :
★ Specific heat capacity of a substance is defined as the amount of heat energy required to raise the temperature of 1 kilogram of a substance by 1°C or 1K.

---

7. Define one calorie.
Ans:
★ One calorie is the amount of heat energy required to raise the temperature of 1 gram of water through 1°C.

VII. Answer in detail.
1. With the help of a neat diagram, explain the working of a calorimeter.
Ans : Calorimeter.
★ A calorimeter is a device used to measure the amount of heat gained or lost by a substance.
Working of a calorimeter :
★ It consists of a vessel made up of metals like copper or aluminium which are good conductors of heat and electricity.
★ The metallic vessel is kept in an insulating jacket to prevent heat loss to the environment.
★ There are two holes in it.
★ Through one hole a thermometer is inserted to measure the temperature of the contents.
★ A stirrer is inserted through another hole for stirring the content in the vessel.



calorimeter

★ The vessel is filled with liquid which is heated by passing current through the heating element.
★ Using this device we can measure the heat capacity of the liquid in the container.

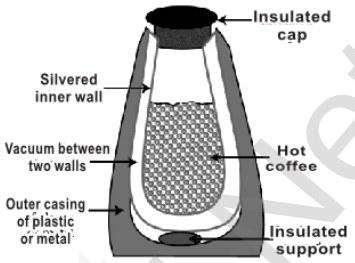
---

2. Write a note on thermostat.
Ans : Thermostat:
★ A thermostat is a device which maintains the temperature of a place or an object constant.
★ The word thermostat is derived from two Greek words, 'thermo' meaning heat and 'static' meaning staying the same.
★ Thermostats are used in any device or system that gets heated or cools down to a pre-set temperature.
★ It turns an appliance or a circuit on or off when a particular temperature is reached.
★ Devices which use thermostat include building heater, central heater in a room, air conditioner, water heater, as well as kitchen equipments including oven and refrigerators.
★ Sometimes, a thermostat functions both as the sensor and the controller of a thermal system.

---

3. Explain the working of thermos flask.
Ans : Working of thermos flask :
★ A thermos flask has double walls, which are evacuated.
★ It is silvered on the inside.
★ The vacuum between the two walls prevents heat being transferred from the inside to the outside by conduction and convection.

★ With very little air between the walls, there is almost no transfer of heat from the inner wall to the outer wall or vice versa.
★ Conduction can only occur at the points where the two walls meet, at the top of the bottle and through an insulated support at the bottom.
★ The silvered walls reflect radiated heat back to the liquid in the bottle.



Thermos flask

VIII. Higher Order Thinking Questions.

1. Why does the bottom of a lake not freeze in severe winter though the surface is all frozen?

Ans :

★ When a lake freezes, the upper layer freezes due to being in contact with the cold atmosphere.
★ This ice sheet doesn't sink as it is less dense than water.
★ This ice sheet acts like a insulator and keeps the water inside warm enough to be in a liquid form.
★ The water on the surface of a lake is frozen.

2. Which one of the following statements about thermal conductivity is correct? Give reason.

a) Steel > Wood > Water b) Steel > Water > Wood
c) Water > Steel > Wood d) Water > Wood > Steel **Ans : c) Water > Steel > Wood**

Reason :

★ Liquid conducts heat faster than solid. So water conducts heat more than steel.
★ Wood is a bad conductor of heat.
★ Steel is a good conductor of heat
★ So, steel conducts heat more than wood.

IX. Numerical Problems.

1. An iron ball requires 1000 J of heat to raise its temperature by 20°C. Calculate the heat capacity of the ball.

Solution :

Heat energy, $Q = 1000\ J$
Raise in temperature, $\Delta T = 20^{\circ}C = 20\ K$
Heat capacity, $C' = ?$

$$C' = Q / \Delta T$$

$$C' = \frac{1000\ J}{20\ K}$$

Heat capacity $C' = 50\ JK^{-1}$

2. The heat capacity of the vessel of mass 100 kg is 8000 J/°K. Find its specific heat capacity.

Solution : Mass, m = 100 kg

Heat capacity, C' = 8000 J/K

Specific heat capacity, $C = \frac{Q}{m \times \Delta T}$

Heat capacity, $C' = \frac{Q}{\Delta T}$

Specific heat capacity $C = \frac{C'}{m} = \frac{8000\ J/K}{100\ kg}$

$= 80\ J/K/Kg = 80\ JK^{-1}Kg^{-1}$

Specific Heat capacity, $C = 80\ JK^{-1}Kg^{-1}$

Additional Questions and Answers

I. Choose the best answer :

1. Heat expansion is maximum in .....

a) solids b) liquids
c) gases d) plasma **Ans : c) gases**

2. ..... is a bad conductor or insulator.

a) Steel b) Sodium
c) Silver d) Wood **Ans : d) wood**

3. A solid substance changes into gas is called.....

a) melting b) freezing
c) sublimation d) condensation **Ans : c) sublimation**

4. ..... is the only matter on earth that can be found in all three states-solid, liquid and gas.

a) Wood b) Water
c) Glass d) Mica **Ans : b) Water**

5. ..... are good conductors of heat

a) Metals b) Wood
c) Rubber d) Glass **Ans : a) Metals**

6. .....takes place in liquids and gases

a) Conduction b) Convection
c) Radiation d) Heat plating **Ans : b) Convection**

7. Heat can be transferred through empty space even through vacuum is called ....

a) conduction b) convection
c) radiation d) heat plating **Ans : c) radiation**

8. Heat energy from Sun reaches the Earth by .....

a) conduction b) convection
c) radiation d) heat plating **Ans : c) radiation**

9. The amount of energy in food items is measured by the unit.....

a) joule b) volt
c) calorie d) kilo calorie **Ans : d) kilo calorie**

10. ..... is the way of heat transfer from one place to another in the form of electromagnetic waves.
a) Conduction b) Radiation
c) Convection d) Heat transmission **Ans : b) Radiation**

11. 1 Kilo calorie = ...J
a) 3.180 b) 3180
c) 4.200 d) 4200 **Ans : d) 4200**

12. The most commonly used unit of heat is.....
a) calorie b) ohm
c) joule d) newton **Ans : a) calorie**

13. The SI unit of specific heat capacity is .....
a) JK^{-1} b) $JK^{-1}g$
c) $JKg^{-1}K^{-1}$ d) $JKgK^{-1}$ **Ans : c) $JKg^{-1}K^{-1}$**

14. We can measure the heat capacity of the liquid in the container by using .....
a) Thermostat b) Thermos flask
c) Dewar flask d) Calorie meter **Ans : d) Calorie meter**

15. A ..... is a device which maintains the temperature of a place or an object constant.
a) Thermostat b) Calorie meter
c) Thermos flask d) Dewar flask **Ans : a) Thermostat**

16. The vacuum flask was invented in 1982 by .....
a) newton b) volt
c) James Dewar d) ohm **Ans : c) James Dewar**

17. ..... is an insulating storage vessel that keeps its content hotter or cooler than the surroundings for a longer time.
a) Thermos flask b) Thermostat
c) Thermal conductor d) Calorie meter **Ans : a) Thermos flask**

18. ..... is used as a coolant because of its higher heat capacity.
a) Petrol b) Kerosene
c) Water d) Mercury **Ans : c) Water**

II. Fill in the blanks.

1. ..... is a poor conductor of heat **Ans : Snow**
2. In hot air balloons heat is transferred by .....and so the balloon raises **Ans : convection**
3..... is a physical quantity which expresses whether an object is hot or cold. **Ans : Temperature**
4. 1 calorie = ... **Ans : 4.186 J**
5. The unit of heat capacity is ..... **Ans : JK^{-1}**
6. A ..... is a device used to measure the amount of heat gained or lost by a substance. **Ans : calorie meter**
7. The world's first ..... was used by Antoine Lavoisier and pierre Simon Laplace to determine the heat **Ans : ice-calorie meter**
8. Thermos flask is also called as ..... **Ans : Dewar flask**

III. Match the following.

(i)	sublimation	gas to solid
(ii)	condensation	liquid to solid
(iii)	freezing	gas to liquid
(iv)	deposition	solid to gas

Ans :

(i)	**sublimation**	**solid to gas**
(ii)	**condensation**	**gas to liquid**
(iii)	**freezing**	**liquid to solid**
(iv)	**deposition**	**gas to solid**

IV. Answer shortly.

1. What is change of state?

Ans :

★ If heat energy is supplied to or taken out from a substance, it will undergo a change from one state of matter to another.

★ This is called change of state.

2. Give two examples for convection in daily life?

Ans : Convection in daily life :

★ Formation of land breeze and sea breeze is due to convection of air.

★ Wind flows from one region to another region by convection.

3. Give two examples for radiation in daily life?

Ans : Radiation in daily life :

★ Heat energy from the Sun reaches the Earth by radiation.

★ While standing near fire we feel the heat which is transferred as radiation.

4. What is Calorimetry?

Ans :

★ The technique used to measure the amount of heat involved in a physical or a chemical process is known as Calorimetry.

5. Name the scales to measure the temperature.

Ans :

★ Celcius scale

★ Fahrenheit scale

★ Kelvin scale

6. Define heat capacity.

Ans :

★ Heat capacity is defined as the amount of heat energy required by a substance to raise its temperature by 1° C or 1K.

7. What are the factors to determine the amount of heat energy?

Ans :

★ Mass of the substance

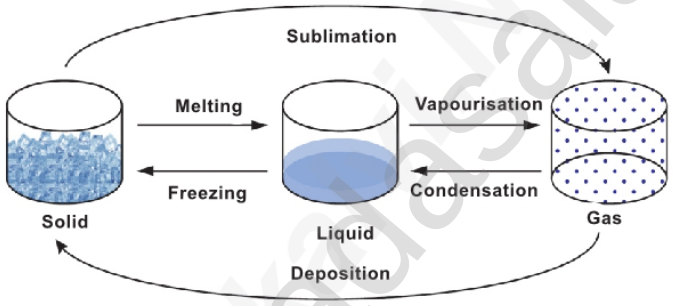
★ Change in temperature of the substance

★ Nature of the material of the substance

8. Write short note on thermos flask.
Ans :
★ The thermos flask (Vacuum flask) is an insulating storage vessel that keeps its content hotter or cooler than the surroundings for a longer time.

V. Answer in detail.
1. Write the transformations take place due to heat energy?
Ans :
One of the following transformations may take place due to heat energy.
★ Solid to Liquid (Melting)
★ Liquid to Gas (Vapourisation)
★ Solid to Gas (Sublimation)
★ Gas to Liquid (Condensation)
★ Liquid to Solid (Freezing)
★ Gas to Solid (Deposition)

2. Write the change of state in water.
Ans :



Change of state in water.

VI. Problems :
1. The temperature of a metal ball is 20° C. When an energy of 2000 J is supplied, its temperature raises by 30° C. Calculate its heat capacity.
Solution :
Heat capacity, $C' = Q / \Delta T$
Here, $Q = 2000$ J
$\Delta T = 30°C - 20°C = 10°C$ or 10 K

$$C' = \frac{2000}{10} = 200\ JK^{-1}$$

The heat capacity of the metal ball is 200 JK^{-1}

2. The energy required to raise the temperature of an iron ball by 1 K is 500 JK^{-1}. Calculate the amount of energy required to raise its temperature by 20 K.

Solution :

Heat capacity, $C' = Q / \Delta T$

$Q = C' \times \Delta T$

Here, $C' = 500\ JK^{-1}$

$\Delta T = 20\ K$

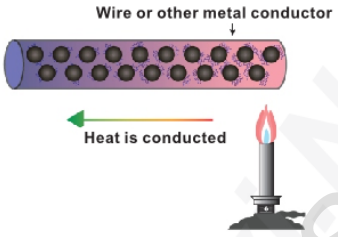
$\therefore Q = 500 \times 20 = 10000\ J.$

The amount of heat energy required is 10000 J.

VII. Draw the following and label the parts.

1. Conduction.

Ans :



Conduction in solids

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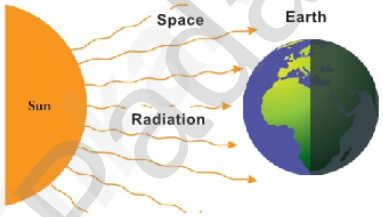
2. Convection.

Ans :



Heat transfer by radiation

Activity - 1, 2, 3, 4, 5 - See the book

Activity 6:

Take some amount of water and cooking oil in two separate vessels. Heat them till they reach a particular temperature (Caution: Heat the oil under the supervision of your teacher). Which one is heated first? Water will take more time to get heated. Why?

Ans :

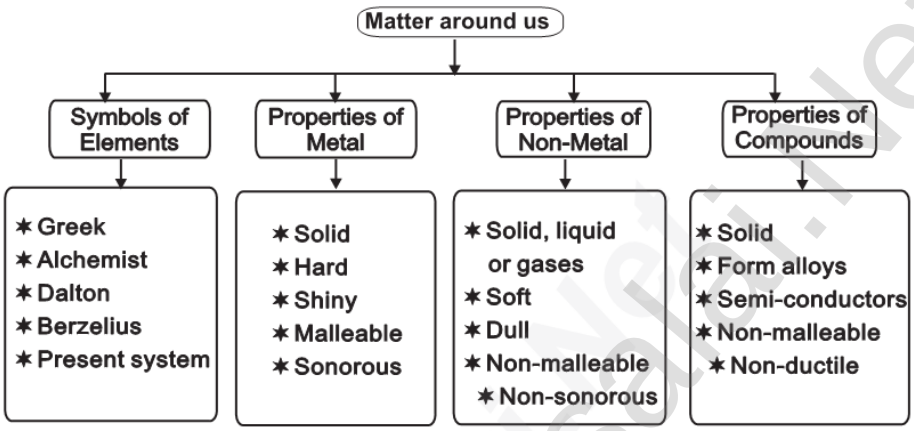
★ Oil is heated first.

★ Because the amount of heat energy gained by the substance is determined the heat capacity of a substance.

★ Oil has more heat capacity than water.

UNIT - 9. MATTER AROUND US

Concept Map



TEXT BOOK EXERCISE

I. Choose the best answer.

1. The liquid metal used in thermometers is

a) copper b) mercury
c) silver d) gold **Ans : b) mercury**

2. The Pictorial symbol for water given by the alchemists was

a)  b)  c)  d) 

Ans : c) 

3. Which one of the following element name is not derived from planet?

a) Plutonium b) Neptunium
c) Uranium d) Mercury **Ans : d) Mercury**

4. Symbol of mercury is

a) Ag b) Hg
c) Au d) Pb **Ans : b) Hg**

5. A form of non-metal which has high ductility is

a) nitrogen b) oxygen
c) chlorine d) carbon **Ans : d) carbon**

6. The property which allows the metals to be hammered into their sheets is _____

a) ductility b) malleability
c) conductivity d) shining strength **Ans : b) malleability**

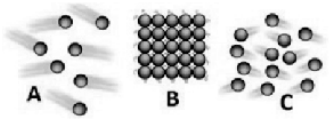
7. The non-metal which conducts electric current is

a) carbon b) oxygen
c) aluminium d) sulphur **Ans : a) carbon**

8. Pencil lead contains

a) graphite b) diamond
c) aluminium d) sulphur **Ans : a) graphite**

9. Identify the state of matter based on the arrangement of the molecules.



a) A - Gas, B - Solid, C - Liquid
b) A - Liquid, B - Solid, C - Gas
c) A - Gas, B - Solid, C - Liquid
d) A - Liquid, B - Gas, C - Solid

Ans : a) A - Gas, B - Solid, C - Liquid

II. Fill in the blanks.

1. The element which possesses the character of both metals and non metals are called..... **Ans : metalloids**
2. The symbol of tungsten is..... **Ans : W**
3. Melting point of most metal is .....than non-metal. **Ans : greater**
4. Water contains ..... and ..... element. **Ans : Hydrogen, Oxygen**
5 ..... is used as semiconductor. **Ans : Silicon**

III. Match the following.

a.

1. Iron	For making wires
2. Copper	Sewing needle
3. Tungsten	As a fuel for ignition in rocket.
4. Boron	Making the filament of a bulb

Ans :

1. Iron	**Sewing needle**
2. Copper	**For making wires**
3. Tungsten	**Making the filament of a bulb**
4. Boron	**As a fuel for ignition in rocket.**

b.

Atom	Building block of matter
Element	Atoms of different kinds
Compound	Atoms of the same kind
Molecule	Smallest unit of a substance

Ans :

Atom	**Smallest unit of a substance**
Element	**Atoms of the same kind**
Compound	**Atoms of different kinds**
Molecule	**Building block of matter**

IV. Answer very briefly.

1 .What is ductility?

Ans :

- Metals can be drawn into thin wires.
- This property of metals is called ductility.
  Example : Copper wires.

2. Write the constituent elements and their symbols for the following compounds .
a) Carbon monoxide
b) Washing soda
Ans :

Compounds	Elements	Symbols
a) Carbon monoxide	Carbon	C
	Oxygen	O
b) Washing soda	Sodium	Na
	Carbon	C
	Oxygen	O

3. Write the symbols for the following elements
a) Oxygen b) Gold c) Calcium d) Cadmium e) Iron
Ans :

Elements	Symbols
a) Oxygen	O
b) Gold	Au
c) Calcium	Ca
d) Cadmium	Cd
e) Iron	Fe

4. Which non-metal is essential for our life and all living beings?
Ans :
✶ Oxygen

---

5 .Why are bells made of metals?
Ans :
✶ On being hit, metals produce a typical sound.
✶ This property is being made used in making temple bells.

---

6. What does a chemical symbol represent?
Ans :
✶ The easiest way to represent the element and to write the chemical formula is using symbols.

---

7. Give two examples for metalloids.
Ans :
✶ Arsenic, Germanium

---

8. Mention any three compounds that exist in liquid state.
Ans :
✶ Water
✶ Acetic acid
✶ Hydrochloric acid

---

9. Write three properties of metalloids.
Ans : 1. Metalloids are solids at room temperature.

2. They can form alloys with other metals
3. Metalloids are much poorer conductor of heat and electricity than the metals.

V. Answer briefly.

1. Can you store pickle in an aluminium utensil? Give reason.

Ans :

✶ Pickle cannot be stored in aluminium utensil.
✶ Because, pickle contains acids which can react with aluminium (metal) liberating hydrogen gas.
✶ This can lead to the spoiling of pickle.

2. Tabulate the differences between metals and non-metals.

Ans :

Property	Metals	Non Metals
Appearance	Elements are shiny	Elements do not shine
Melting point	Usually high	Usually low
Boiling point	Usually high	Usually low
Density	Usually high	Usually low
Conductivity (Thermal and Electrical)	Good	Very poor

3. Why are utensils made up of aluminium and brass?

Ans :

✶ The utensils are made up of aluminium and brass because, they are good conductors of heat.
✶ These metal utensils are generally tinned from inside to prevent any reaction between such metal and foodstuff.
✶ For efficient cooking, those metals are used.

4. Define Alchemy.

Ans :

✶ The alchemists try to change less valuable metal into gold. The process was called Alchemy.

5. Name the elements with the following symbols.

a) Na b) W c) Ba d) Al e) U

Ans :

Symbols	Elements
a) Na	Sodium
b) W	Tungsten
c) Ba	Barium
d) Al	Aluminium
e) U	Uranium

6. Name six common non-metals and write their symbols.

Ans :

Name of the non-metals	Symbols
i) Nitrogen	N
ii) Oxygen	O
iii) Carbon	C
iv) Sulphur	S
v) Phosphorus	P
vi) Chlorine	Cl

7. Mention any four compounds and their uses.

Ans :

Compounds	Uses
(i) Water	For drinking and as solvent
(ii) Sugar	Preparation of sweets, toffees and fruit juices.
(iii) Slaked lime	White washing of walls.
(iv) Lime stone	Preparation of chalk pieces.

8. Name the metals that are used in jewellery.

Ans :

Gold, Silver, Copper

---

9. Mention the uses of the following compounds.

a) Baking soda b) Bleaching powder c) Quick lime

Ans :

Compounds	Uses
a) Baking soda	Fire extinguisher, preparation of baking powder and preparation of cakes and bread.
b) Bleaching powder	As bleaching agent, disinfectant and sterilisation of drinking water.
c) Quick lime	Manufacture of cement and glass

VI. Give reason.

1. Give reasons for the following.

(a) Aluminum foils are used to wrap food items.

Ans :

(i) Because aluminium being a soft malleable metal it can be beaten into sheets and form thin wrapping sheets.

(ii) Moreover it does not react with food items.

(b) Immersion rods for heating liquids are made up of metallic substances.

Ans :

(i) Metals are good conductors of heat and electricity.

(ii) So, immersion rods made up of metallic substances.

(c) Sodium and potassium are stored in kerosene.
Ans :
(i) Because kerosene contains no water and humidity.
(ii) If sodium and potassium are stored in kerosene, the reaction will be avoided.

d) Mercury is used in thermometers.
Ans :
(i) Mercury is the only one metal in liquid state at room temperature.
(ii) It is used in thermometers because, it has high co - efficient of expansion.
(iii) Hence the slightest change in temperature can be noted.

2. Why wires cannot be drawn from materials such as stone or wood?
Ans :
★ Wires are used in the conduction of electricity.
★ Stone and wood are non conductors of electricity.
★ So, wires cannot be drawn from materials such as stone or wood.

Additional Questions and Answers

I. Choose the best answer :

1. ..... are the building blocks of matter
a) Atoms b) Molecules
c) Elements d) Compounds **Ans : a) Atoms**

2. An ..... is a pure substance
a) atom b) molecule
c) element d) compound **Ans : c) element**

3. An ..... is the smallest particle of an element
a) molecule b) atom
c) compound d) mixture **Ans : b) atom**

4. There are a total of ..... elements
a) 112 b) 114
c) 116 d) 118 **Ans : d) 118**

5. The symbol used by Greek to represent fire is .....
a)  b)  c)  d) 
Ans : d)

6. The symbol of hydrogen in Dalton's symbol is .....
a) b) c) d)
Ans : d)

7. The symbol for sulphur is .....
a) O b) K
c) S d) P **Ans : c) S**

8. The symbol for Neon is .....
a) N b) Ne
c) No d) N_2 **Ans : b) Ne**

9. The metal derived from 'God mercury' is.....
a) Iodine b) Nobelium
c) Mercury d) Amersium **Ans : c) Mercury**

10. .....generally have high density.
a) Metals b) Non-metals
c) Metalloids d) Semi conductors **Ans : a) Metals**

11 .....is used for making electrical wires, coins and statue.
a) Iron b) Mercury
c) Copper d) Lead **Ans : c) Copper**

12. .....is used in electrical wires, cables and in aeroplane industries.
a) Iron b) Aluminium
c) Lead d) Mercury **Ans : b) Aluminium**

13. .....is the hardest naturally occuring substance
a) Coal b) Graphite
c) Diamond d) Platinum **Ans : c) Diamond**

14. .....is used in the manufacturing of gun powder
a) Graphite b) Sulphur
c) Nitrogen d) Phosphorus **Ans : b) Sulphur**

15. .....is used to make match boxes and rat poison.
a) Graphite b) Sulphur
c) Nitrogen d) Phosphorus **Ans : d) Phosphorus**

16. .....is used in sterilizing water.
a) Hydrogen b) Nitrogen
c) Chlorine d) Phosphorus **Ans : c) Chlorine**

17. The ratio of water by volume is.....
a) 2 : 1 b) 1 : 2
c) 1 : 8 d) 8 : 1 **Ans : b) 1 : 2**

18. The ratio of water by mass is.....
a) 2 : 1 b) 1 : 2
c) 1 : 8 d) 8 : 1 **Ans : d) 8 : 1**

19. Identify the inorganic compound from the following.....
a) protein b) carbohydrates
c) chalk d) vitamins **Ans : c) chalk**

20. The constituent elements of.....is carbon and hydrogen
a) ammonia b) sulphur di oxide
c) water d) methane **Ans : d) methane**

21. The common name of calcium sulphate is .....
a) epsum b) gypsum
c) plaster of paris d) blue vitriol **Ans : b) gypsum**

22. .....is used as a rocket fuel
a) Nitrogen b) Oxygen
c) Hydrogen d) Ammonia **Ans : c) Hydrogen**

23. .....is so hard that it can scratch glass.
a) Cadmium b) Silicon
c) Osmium d) Potassium **Ans : c) Osmium**

24. .....metal does not shine
a) Calcium b) Gold
c) Silver d) Aluminium **Ans : a) Calcium**

25. .....is a only non-metal which conducts electricity.
a) Chlorine b) Nitrogen
c) Graphite d) Sulphur **Ans : c) Graphite**

II. Fill in the blanks.

1. ..... represents the number of protons that are in the nucleus of a single atom of that element. **Ans : Atomic number**

2. A..... is an image, object etc., that stands for something **Ans : Symbol**

3. The name of an element is represented by shortened form called as .....
Ans :symbol

4. The symbol for Magnesium is..... **Ans : Mg**

5. The symbol for Copper is..... **Ans : Cu**

6. The wealth of a country is measured by the amount of ..... in its reserve.
Ans : gold

7. .....is used in automobile batteries, x-ray machines
Ans : Lead

8. In non-metals .....conducts electricity **Ans : graphite**

9. .....are elements that are hard and shiny in appearance
Ans : Metals

10. Elements that generally do not shine, that are neither too hard nor too soft are .....
Ans : Non-metals

11. .....is used as a bleaching agent. **Ans : Chlorine**

12.A compound .....is called as caustic soda **Ans : sodium hydroxide**

13. The chemical name for slaked lime is ..... **Ans : calcium hydroxide**

14. .....is used in softening of hard water . **Ans : Washing soda**

15. .....is an element which is called by the name of the scientist.
Ans : Nobelium

IV. Match the following

1.

Element	Latin name	Symbol
(i) Gold	Cupurum	Fe
(ii) Silver	Aurum	Au
(iii) Copper	Ferrum	Ag
(iv) Iron	Argentum	Cu

Ans :

Element	Latin name	Symbol
(i) Gold	**Aurum**	**Au**
(ii) Silver	**Argentum**	**Ag**
(iii) Copper	**Cupurum**	**Cu**
(iv) Iron	**Ferrum**	**Fe**

2. Match.

Metals	Uses
(i) Copper	Photography
(ii) Aluminium	Coins and statue
(iii) Lead	Aerospace industries
(iv) Silver	X-ray machine

Ans :

Metals	Uses
(i)Copper	**Coins and statue**
(ii)Aluminium	**Aerospace industries**
(iii)Lead	**X-ray machine**
(iv)Silver	**Photography**

3. Match.

Compound	Common Name
(i) Copper sulphate	Slatpetre
(ii) Ferrous sulphate	Blue vitriol
(iii) Calcium sulphate	Green vitriol
(iv) Potassium Nitrate	Gypsum

Ans :

Compound	Common Name
(i) Copper sulphate	**Blue vitriol**
(ii) Ferrous sulphate	**Green vitriol**
(iii) Calcium sulphate	**Gypsum**
(iv) Potassium Nitrate	**Slat petre**

V. Answer shortly.

1. What is an atom?

Ans :

✶ An atom is the smallest particle of an element which exhibits all the properties of that element.

2. What are the rules should be followed while writing the symbol for an element?

Ans :

✶ If the element has a single English letter as a symbol, it should be written in capital letter.

✶ For elements having two letter symbols, the first letter should be in capital followed by small letter.

3. Define - malleability.

Ans :

★ Metals can be hammered into very thin sheets.

★ This tendency of metals is called malleability.

4. What is semi conductor?

Ans :

★ Substance which acts as bad conductor at low temperature and as good conductor at high temperature is called semi conductor.

★ (E.g.) Silicon, Germanium

5. What are uses of Metalloids?

Ans : Uses of metalloids :

★ Silicon is used in electronic devices

★ Boron is used in fireworks and as a fuel for ignition in rocket.

6. What is a compound?

Ans :

★ The molecule of a substance that contains two or more atoms of different elements combined together in a definite ratio, is said to be a compound.

7. What are the uses of Metals?

Ans :

★ Copper is used for making electrical wires, coins and statue.

★ Silver and gold are used for making jewels, and for decorative purposes and photography.

8. What are the uses of Non-metals?

Ans :

★ Phosphorus is used to make match boxes, rat poison etc.,

★ Nitrogen is used for manufacturing ammonia.

9. What is a matter?

Ans :

★ Anything which occupies space and has mass is called matter.

10. What is called liquid?
Ans :
★ Material which has a definite volume, but no definite shape and has one free surface, is called liquid.

11. What is called solid?
Ans :
★ Material which has a definite shape and definite volume at room temperature with any number of free surfaces is called solid.

12. What is called Gas?
Ans :
★ Material which has neither definite shape nor definite volume, is easily compressible and has no free surface is called gas.

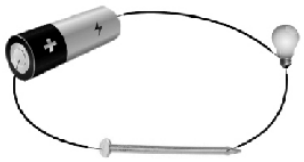
13. Differentiate Atom and Molecule.
Ans :

Atom	Molecule
★ An atom is the smallest particle of an element, which exhibits all the properties of the element	A molecule is the smallest particle of a pure substance.
★ It may or may not exist freely	It exists freely

V. Answer in detail :

1. Classify the compounds.
Ans : Classification of compounds :
★ Based on the origin of chemical constituents, compounds are classified as inorganic compounds and organic compounds.
a. Inorganic compounds :
★ Compounds obtained from non living sources such as rock, minerals etc., are called inorganic compounds.
★ Example: Chalk, baking powder etc.,
b. Organic compounds :
★ Compounds obtained from living sources such as plants, animals etc., are called organic compounds.
★ Example: Protein, carbohydrates, etc.,

Activity - 1
Take a battery, few wire pieces, a bulb, a nail and a pencil lead. First connect the nail in the circuit as shown in the figure. Is the bulb glowing? Now, connect the pencil lead in the circuit. What do you observe?
Ans :

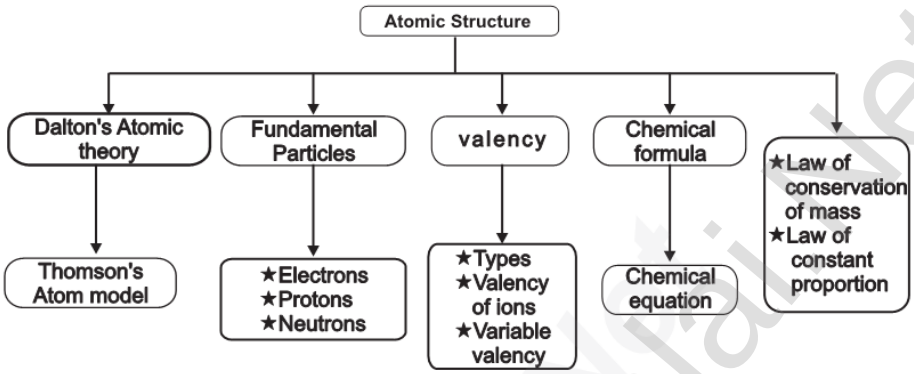


(i) When the nail is connected in the circuit the bulb is glowing. Because nail (iron) is a metal which can conduct electricity.
(ii) When the pencil lead is connected in the circuit the bulb is glowing. Because pencil's lead is graphite. Eventhough graphite is a non- metal, it conducts electricity.

Activity - 2 - See the book

UNIT - 12. ATOMIC STRUCTURE

Concept Map



TEXT BOOK EXERCISES

I. Choose the best answer.

1. The same proportion of carbon and oxygen in the carbon dioxide obtained from different sources proves the law of _____

a) reciprocal proportion b) definite proportion
c) multiple proportion d) conservation of mass

Ans : b) definite proportion

2. Cathode rays are made up of

a) neutral particles` b) positively charged particles
c) negatively charged particles d) None of the above

Ans : c) negatively charged particles

3. In water, hydrogen and oxygen are combined in the ratio of _____by mass.

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

4. Which of the following statements made by Dalton has not undergone any change?

a) Atoms cannot be broken.
b) Atoms combine in small, whole numbers to form compounds.
c) Elements are made up of atoms.
d) All atoms of an elements are alike **Ans : c) Elements are made up of atoms.**

5. In all atoms of an element

a) the atomic and the mass number are same.
b) the mass number is same and the atomic number is different.
c) the atomic number is same and the mass number is different
d) both atomic and mass numbers may vary.

Ans : d) both atomic and mass numbers may vary.

II. Fill in the blanks.

1. _____is the smallest particle of an element. **Ans : Atom**
2. An element is composed of _____atoms. **Ans : same kind of**
3. An atom is made up of _____, _____ and _____. **Ans : protons, electrons, neutrons**
4. A negatively charged ion is called _____, while positively charged ion is called _____ **Ans : anion, cation**
5. _____is a negatively charged particle (Electron/Proton). **Ans :Electron**
6. Proton is deflected towards the _____charged plate (positively, negatively). **Ans : positively**

III. Match the following:

1.	Law of conservation of mass	Sir William Crookes
2.	Law of constant proportion	James Chadwick
3.	Cathode rays	Joseph Proust
4.	Anode rays	Lavoisier
5.	Neutrons	Goldstein

Ans :

1.	**Law of conservation of mass**	**Lavoisier**
2.	**Law of constant proportion**	**Joseph Proust**
3.	**Cathode rays**	**Sir William Crookes**
4.	**Anode rays**	**Goldstein**
5.	**Neutrons**	**James Chadwick**

IV. Answer briefly.

1. State the law of conservation of mass.

Ans :

✶ During any chemical change, the total mass of the products is equal to the total mass of the reactants.

2. State the law of constant proportions.

Ans :

✶ In a pure chemical compound the elements are always present in definite proportions by mass.

3. Write the properties of anode rays.

Ans : Properties of Anode rays :

✶ Anode rays travel in straight lines.
✶ Anode rays are made up of material particles.
✶ Anode rays are deflected by electric and magnetic fields.

4. Define valency of an element with respect to hydrogen.

Ans : Valency of an element with respect to hydrogen:

✶ Valency of an element can also be defined as the number of hydrogen atoms which combine with one atom of it.

5. Define the term ions or radicals.

Ans : Ions or radicals :

✶ An atom or a group of atoms when they either lose or gain electrons, get converted into ions or radicals

6. What is a chemical equation?
Ans : Chemical equation:
✶ A chemical equation is a short hand representation of a chemical reaction with the help of chemical symbols and formulae.

7. Write the names of the following compounds.
a) CO b) N_2O c) NO_2 d) PCl_5
Ans :

compounds		Names
a) CO	-	Carbon monoxide
b) N_2O	-	Nitrous oxide
c) NO_2	-	Nitrogen dioxide
d) PCl_5	-	Phosphorous penta oxide

V. Answer the following.
1. Find the valency of the element which is underlined in the following formula.
a) NaCl b) CO_2 c) $Al(PO_4)$ d) $Ba(NO_3)_2$ e) $CaCl_2$
Ans :

a) NaCl	-	Valency of Na is 1
b) CO_2	-	Valency of C is 4
c) $Al(PO_4)$	-	Valency of Al is 3
d) $Ba(NO_3)_2$	-	Valency of Ba is 2
e) $CaCl_2$	-	Valency of Ca is 2

2. Write the chemical formula for the following compounds
a) Aluminium sulphate b) Silver nitrate
c) Magnesium oxide d) Barium chloride
Ans :

Compounds	Chemical formula
a) Aluminium sulphate	$Al_2(SO_4)_3$
b) Silver nitrate	$AgNO_3$
c) Magnesium oxide	MgO
d) Barium chloride	$BaCl_2$

3. Write the skeleton equation for the following word equation and then balance them.
a) Carbon + Oxygen → Carbon dioxide
b) Phosphorus + Chlorine → Phosphorus pentachloride.
c) Sulphur + Oxygen → Sulphur dioxide
d) Magnesium + hydrogen chloride → Magnesium chloride + Hydrogen

Ans :

a) Carbon + Oxygen → Carbon dioxide

C + O_2 → CO_2 (Skeleton eqn)

C + O_2 → CO_2 (Balanced eqn)

b) Phosphorus + Chlorine → Phosphorus pentachloride.

P + Cl_2 → PCL_5 (Skeleton eqn)

2P + $5Cl_2$ → $2PCL_5$ (Balanced eqn)

c) Sulphur + Oxygen → Sulphur dioxide

S + O_2 → SO_2 (Skeleton eqn)

S + O_2 → SO_2 (Balanced eqn)

d) Magnesium + hydrogen chloride → Magnesium chloride + Hydrogen

Mg + HCl → $MgCl_2$ + H_2 (Skeleton eqn)

Mg + 2HCl → $MgCl_2$ + H_2 (Balanced eqn)

---

4. Balance the following chemical equation.

a) $Na + O_2 \rightarrow Na_2O$

b) $Ca + N_2 \rightarrow Ca_3N_2$

c) $N_2 + H_2 \rightarrow NH_3$

d) $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$

e) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$

Ans :

a) $Na + O_2 \rightarrow Na_2O$

$\underline{4}Na + O_2 \rightarrow \underline{2}Na_2O$ (The equation is balanced)

b) $Ca + N_2 \rightarrow Ca_3N_2$

$\underline{3}Ca + N_2 \rightarrow Ca_3N_2$ (The equation is balanced)

c) $N_2 + H_2 \rightarrow NH_3$

$N_2 + \underline{3}H_2 \rightarrow \underline{2}NH_3$ (The equation is balanced)

d) $CaCO_3 + HCl \rightarrow CaCl_2 + CO_2 + H_2O$

$CaCO_3 + \underline{2}HCl \rightarrow CaCl_2 + CO_2 + H_2O$ (The equation is balanced)

e) $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$

$\underline{2}Pb(NO_3)_2 \rightarrow \underline{2}PbO + \underline{4}NO_2 + O_2$ (The equation is balanced)

VI. Higher Order Thinking Questions.

1. Why does a light paddle wheel placed in the path of cathode rays begin to rotate, when cathode rays fall on it?

Ans :

✶ A light paddle wheel when placed in the path of the cathode rays, began to rotate because the small particles of the cathode rays have mass and energy.

---

2. How can we prove that the electrons carry negative charge?

Ans :

✶ J.J.Thomson performed cathode rays experiment to find the charge of an electron. From this experiment we conclude that electrons carry negative charge.

---

3. Ruthresh, Hari, Kanishka and Thahera collected different samples of water from a well, a pond, a river and underground water. All these samples were sent to a testing laboratory. The test result showed the ratio of hydrogen to oxygen as 1:8.
a) What conclusion would you draw from the above experiment?
Ans :
✶ Water collected from a well, a pond, a river and underground water will always consist of the same two elements hydrogen and oxygen, in the ratio 1 : 8 by mass.
b) Which law of chemical combination does it obey?
Ans :
✶ It obeys 'Law of definite proportions'.

Additional Questions and Answers

I. Choose the best answer :

1. The first scientific theory about atom was given by.....
a) Neton b) Thomson
c) Chadwick d) John Dalton **Ans : d) John Dalton**

2. All the matters are made up of extremely small particles called.....
a) atoms b) molecules
c) compounds d) mixtures **Ans : a) atoms**

3. Atoms of the same element have different masses are called .....
a) Isobars b) Isotopes
c) Isomerism d)Isotones **Ans : b) Isotopes**

4. Invisible ray coming from the cathode are called ..... rays.
a) anode b) cathode
c) infra red d) ultra violet **Ans : b) cathode**

5. In television tube ..... rays are deflected by magnetic fields
a) anode b) cathode
c) infra red d) ultra violet **Ans : b) cathode**

6. Positive or anode rays are called as .....rays
a) infra red b) canal
c) cathode d) ultra violet **Ans : b) canal**

7. A proton can be defined as an..... ion.
a) nitrogen b) cathode
c) hydrogen d) oxygen **Ans : c) hydrogen**

8. ..... carries no charge.
a) proton b) electron
c) neutron d) positron **Ans : c) neutron**

9. Mass of neutron is .....
a) 1.6×10^{-24} g b) 1.6×10^{24} g
c) 9.1×10^{-28} g d) 9.1×10^{28} g **Ans : a) 1.6×10^{-24} g**

10. Mass of electron is .....
a) 1.6×10^{-24} g b) 1.6×10^{24} g
c) 9.1×10^{-28} g d) 9.1×10^{28} g **Ans : c) 9.1×10^{-28} g**

11. Valency of oxygen is .....
a) 1 b) 2
c) 3 d) 4 **Ans : b) 2**

11. Valency of magnesium is .....
a) 1 b) 2
c) 3 d) 4 **Ans : b) 2**

13. When an atom gains an electron, it becomes .....
a) cation b) anion
c) sodium d) chloride **Ans : b) anion**

14. The negatively charged electrode or an electron donor is called .....
a) cathode b) anode
c) electrolite d) terrilite **Ans : a) cathode**

15. The positively charged electrode or an electron acceptor is called.....
a) cathode b) anode
c) electrolite d) terrilite **Ans : b) anode**

II. Fill in the blanks.

1.An ..... is the smallest particle of matter that takes part in a chemical reaction. **Ans : Atom**

2.Atoms of the different elements may have same masses are called ..... **Ans : Isobars**

3. Cathode rays are also called as ..... **Ans : crookes' rays**

4. Air is a ..... conductor of electricity **Ans : poor**

5.Thomson's atom model was also called as..... **Ans : plum pudding model**

6.The arrangement of electrons in the orbits is known as..... **Ans : electronic configuration**

7. The combining capacity of an atom is called..... **Ans : valency**

8. The valency of carbon is ..... **Ans : 4**

9. Atoms which carry positive or negative charges are called ..... **Ans : ions**

10. The chemical formula of sodium chloride is ..... **Ans : Nacl**

III. Match the following : **Ans :**

(i)	Atomic theory	James Chadwick
(ii)	Discovery of electron	Goldstein
(iii)	Discovery of Proton	J.J.Thomson
(iv)	Discovery of Neutron	John Dalton

(i)	**Atomic theory**	**John Dalton**
(ii)	**Discovery of electron**	**J.J.Thomson**
(iii)	**Discovery of Proton**	**Goldstein**
(iv)	**Discovery of Neutron**	**James Chadwick**

IV. Answer shortly.

1. Say the advantages of Dalton's atomic theory.

Ans : Advantages of Dalton's Atomic Theory :

* Dalton's theory explains most of the properties of gases and liquids.
* This explains the law of chemical combination and the law of conservation of mass

2. Write the limitations of Dalton's Atomic theory.
Ans : Limitations of Dalton's Atomic Theory :
✶ Atom is no longer considered as the smallest indivisible particle.
✶ Atoms of the same element have different masses (Isotopes).

3. What is discharge?
Ans :
✶ Electricity, when passes through air, removes the electrons from the gaseous atoms and produces cations.
✶ This is called electrical discharge.

4. Write the properties of cathode rays.
Ans : Properties of Cathode rays :
✶ Cathode rays travel in straight line from cathode towards anode.
✶ Cathode rays are made up of material particles which have mass and kinetic energy.

5. What are called fluorescent materials?
Ans :
✶ When invisible radiation falls on materials like zinc sulphide, they emit a visible light (or glow).
✶ These materials are called fluorescent materials.

6. Write the limitations of Thomson's atom model.
Ans :
1. Thomson's model failed to explain how the positively charged sphere is shielded from the negatively charged electrons without getting neutralised.
2. This theory explains only about the protons and electrons and failed to explain the presence of neutral particle neutron.

7. Define valency.
Ans :
✶ Valency is defined as the number of electrons lost, gained or shared by an atom in a chemical combination so that it becomes chemically inert.

8. What are the laws of chemical combinations?
Ans :
(i) Law of conservation of mass.
(ii) Law of constant proportions.
(iii) Law of multiple proportions.
(iv) Gay Lussac's law of gaseous volumes.

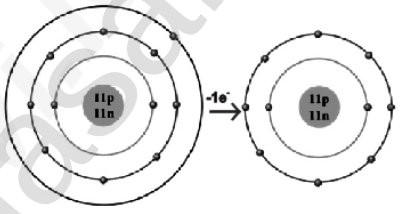
9. What is discharge tube?
Ans :
✶ The discharge tube used in the experiment is now referred as Crookes tube or Cathode Ray Tube (CRT).

✶ It is a long glass tube filled with gas and sealed at both the ends.

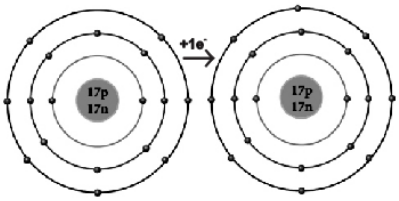
10. What is chemical formula?
Ans :
✶ Chemical formula is the short hand notation of a molecule of a substance (compound).
✶ It shows the actual number of atoms of each element in a molecule of a substance.

V. Answer in detail :
1. What are the main postulates of Dalton's atomic theory.
Ans :
✶ All the matters are made up of extremely small particles called atoms.
✶ Atoms of the same element are identical in all aspects.
✶ Atoms of different elements have different sizes and masses, and possess different properties.
✶ Atoms can neither be created nor be destroyed. i.e. atom is indestructible.

2. Explain the types of ions with example.
Ans : Types of Ions.
✶ Ions are classified into two types.
✶ They are cations and anions.
Cations :
✶ If an atom loses one or more electrons during a chemical reaction, it will have more number of positive charge on it.
✶ These are called cations (or) positive radicals. Sodium atom loses one electron to attain stability and it becomes cation.
✶ Sodium ion is represented as Na^+.
Anions:
✶ If an atom gains one or more electrons during a chemical reaction, it will have more number of negative charge on it.
✶ These are called anions or negative radicals. Chlorine atom attains stable electronic configuration by gaining an electron.
✶ Thus, it becomes anion. Chlorine ion is represented as Cl^-



Sodium atom (Na) Sodium ion (Na^+)
Electronic configuration of Sodium



Chlorine atom (Cl) Chlorine ion (Cl^-)
Electronic configuration of Chlorine

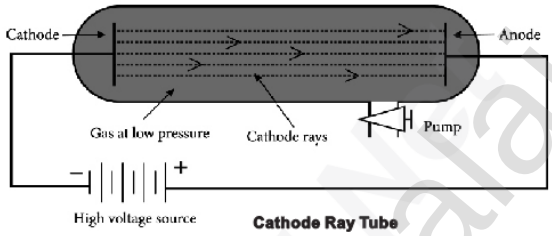
3. What are the steps involved in writing the skeleton equation?
Ans :
✶ Write the symbols and formulae of each of the reactants on the left hand side (LHS) and join them by plus (+) sign.

✶ Follow them by an arrow (→) which is interpreted as gives or forms.
✶ Write on the right hand side (RHS) of arrow the symbols and formulae for each of the products.
✶ If the product is a gas it should be represented by upward arrow (↑) and if it is a precipitate it should be represented by downward arrow(↓).
Example: $Mg + H_2SO_4 \longrightarrow MgSO_4 + H_2\uparrow$
✶ The equation thus written is called as skeleton equation (unbalanced equation).

VI. Draw the following :

1. Cathode Ray Tube.

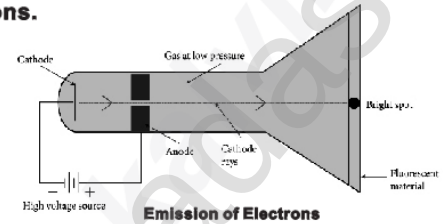
Ans :



Cathode Ray Tube

2. Emission of Electrons.

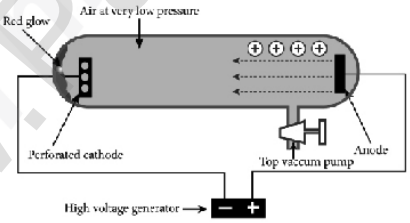
Ans :



Emission of Electrons

3. Emission of Protons.

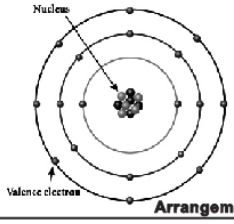
Ans :



Emission of Protons

4. Arrangement of electrons in atom.

Ans :

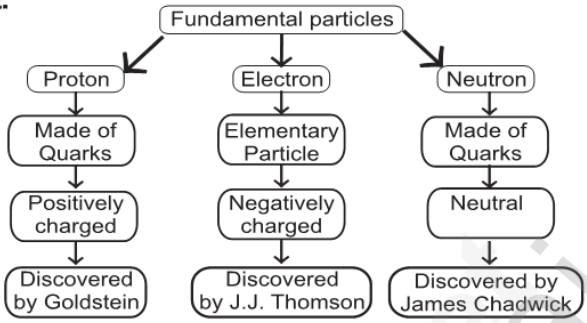


Arrangement of electrons in atom

Activity : 1

Collect more information about the properties of fundamental particles and prepare a chart.

Ans :



Activity : 2

Classify the following ions into monovalent, divalent and trivalent.

$Ni^{2+}, Fe^{3+}, Cu^{2+}, Ba^{2+}, Cs^{+}, Zn^{2+}, Cd^{2+}, Hg^{2+}, Pb^{2+}, Mn^{2+}, Fe^{2+}, Co^{2+}, Sr^{2+}, Cr^{3+}, Li^{+}, Ca^{2+}, Al^{3+}$

Ans :

Monovalent	Divalent	Trivalent
Cs^{+}, Li^{+}	$Ni^{2+}, Cu^{2+}, Ba^{2+}, Zn^{2+}, Cd^{2+}, Hg^{2+}, Pb^{2+}, Mn^{2+}, Co^{2+}, Sr^{2+}, Ca^{2+}, Fe^{2+},$	$Cr^{3+}, Al^{3+}, Fe^{3+}$

Activity 3

Write the chemical formula of the compounds.

Ans :

Compound	Symbols with valencies	Simplest ratio if any	Chemical formula
Magnesium chloride	$Mg^{2+}Cl_2^{-}$	1:2	$MgCl_2$
Sodium hydroxide	$Na^{+}OH^{-}$	1:2	NaOH
Calcium oxide	$Ca^{2+}O^{2-}$	1:1	Ca O
Aluminium sulphate	$Al_2^{3+}(SO_4)_3^{2-}$	3:16	$Al_2(SO_4)_3$
Calcium phosphate	$Ca^{2+}(PO_4)_2^{3-}$	1:1	$Ca_3(PO_4)_2$

Activity 4

Write the names of the chemical compounds.

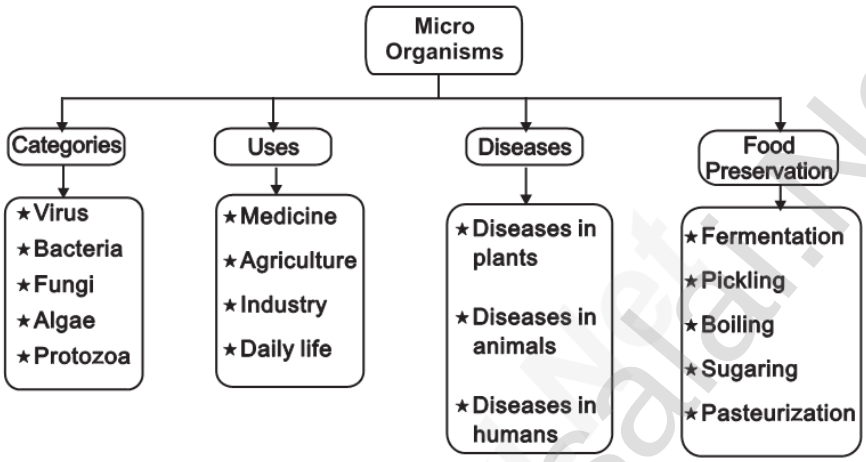
Ans :

Chemical Compound	Name
SO_3	Sulphur trioxide
Na_2SO_3	Sodium sulphite
PCl_5	Phosphorous penta chloride
$CaCl_2$	Calcium chloride
$NaNO_3$	Sodium nitrate
BaO	Barium oxide

Activity : 5, 6 - See the book

UNIT - 16. MICROORGANISMS

Concept Map



TEXT BOOK EXERCISES

I. Choose the best answer.

1. Microorganisms are measured in _____.
a) cm b) mm
c) micron d) meter. **Ans : c) micron**

2. _____ shows both living and nonliving characteristics.
a) Protozoa b) Virus
c) Bacteria d) Fungi **Ans : b) Virus**

3. _____ is a prokaryotic microorganisms.
a) Virus b) Algae
c) Fungi d) Bacteria **Ans : d) Bacteria**

4. Based on shape, the bacteria are classified into _____ types.
a) two b) three
c) four d) five **Ans : c) four**

5. Common cold in human is caused by _____.
a) plasmodium b) influenza
c) vibrio cholera d) aphthovirus **Ans : b) influenza**

II. Fill in the blanks.

1. _____ is prepared from a mould called Penicillium. **Ans :Penicillin**
2. _____ are the infectious protein particles. **Ans :Prions**
3. The infecting virus particle found outside the host cell is _____. **Ans : virions**
4. Microorganism can be seen with the help of a _____. **Ans :microscope**
5. Bacteria, which has a flagellum at one end is classified as _____. **Ans : monotrichous**

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

1. Disease causing microorganisms are called pathogens. **Ans : True**

2. Female anopheles mosquito is a carrier of dengue virus. **Ans : False.**

Correction statement : Female anopheles mosquito is a carrier of **plasmodium (protozoan)**.

3. Chicken pox is a communicable disease. **Ans : True**

4. Citrus canker is transmitted by insects. **Ans : False.**

Correction statement : Citrus canker is transmitted by **air and water**

5. Yeast is used in the large scale production of alcohol. **Ans : True**

IV. Match the following:

1.	Nitrogen fixing bacteria	Vaccine
2.	Tuberculosis	Prion
3.	Kuru	Lactobacillus acidophilus
4.	Probiotics	Bacteria
5.	Edward Jenner	Rhizobium

Ans :

1.	**Nitrogen fixing bacteria**	**Rhizobium**
2.	**Tuberculosis**	**Bacteria**
3.	**Kuru**	**Prion**
4.	**Probiotics**	**Lactobacillus acidophilus**
5.	**Edward Jenner**	**Vaccine**

V. Answer the following questions.

Mark the correct one as :

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

1. **Assertion:** Malaria is caused by Protozoa.
   Reason: The disease is transmitted by mosquito.
   Ans : (a) If both assertion and reason are true and reason is the correct explanation of assertion.

2. **Assertion:** Algae are heterotrophic.
   Reason: They do not have chlorophyll
   Ans : (d) If both assertion and reason are false.

VI. Answer very briefly:

1. Write the name of any nitrogen fixing bacteria.

Ans : Nitrogen fixing bacteria are :
1. Rhizobium
2. Cyano bacteria
3. Nostoc

2. Name the bacteria used in the production of vinegar.

Ans : Acetobacter is used in the production of vinegar.

3. Write the names of any three protozoans.
Ans : Names of three protozoans:
1. Paramecium
2. Euglena
3. Plasmodium

4. Who discovered penicillin?
Ans : Sir Alexander Fleming discovered Penicillin.

5. Which diseases can be prevented by vaccination?
Ans : Diseases prevented by vaccination :
★ Mumps
★ Measles
★ Rubella
★ Tuberculosis

VII. Answer briefly.
1. Write the four types of bacteria, based on their shape.
Ans : 1. Bacilli - Rod shaped bacteria.
2. Spirilla - Spiral shaped bacteria.
3. Cocci - Spherical or ball shaped bacteria.
4. Vibrio - comma shaped bacteria.

2. What are antibiotics?
Ans :
★ The word 'anti' means 'against'.
★ Antibiotic is a chemical that kills or inhibits the growth of microorganisms.
★ It is used to treat infections.
★ Examples : Penicillin, Streptomycin

3. What are pathogens?
Ans :
★ Pathogens are microorganisms that cause diseases.
★ They are harmful to plants, animals and humans.
★ They are transmitted by air, water and contaminated food.
★ Examples : Bacteria, Virus, Fungi, Protozoans.

4. How disease causing microorganisms enter into human beings?
Ans :
★ Pathogens enter into the body through cuts and wounds in the skin, mouth or nose.
Example :
★ Viruses causing 'flu' are spread through air.
★ When the patient sneezes droplets containing viruses spread in air and enters to another person when he breathes.

5. Why microorganisms are essential for agriculture?
Ans : Microorganisms are essential for agriculture because,
★ Microorganisms (decomposers) act upon degradable waste to make the soil fertile. (compost)
★ Rhizobium bacteria, fixing the atmospheric nitrogen which are essential for the growth of plants.
★ Microorganisms are used to protect the crops from pest.
★ Eg. : Bacillus Thuringiensis (Bt cotton).

VIII. Answer in detail.

1. Write a short note on bacteria and its structure.

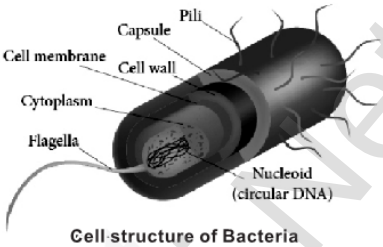
Ans :

Bacteria :

★ Bacteria are single-celled prokaryotes (cells without nuclei).

★ Bacteria are grouped under the kingdom Monera.

★ The size of bacteria range from 1µm to 5µm (micrometer).



Cell structure of Bacteria

Cell structure of Bacteria:

★ A bacterium has an outer covering known as the cell wall.

★ Nuclear material is without nuclear membrane.

★ An extra chromosomal DNA called plasmid is present in the cytoplasm.

★ Protein synthesis is by 70S ribosomes.

★ Cell organelles are absent.

★ Flagella aids in locomotion.

---

2. How microorganisms are useful in the field of medicine?

Ans :

a). Antibiotics

★ Antibiotic is a substance produced by living organisms which is toxic for other organisms.

Examples :

★ Penicillin, discovered by Sir Alexander Fleming is used to treat diseases like tetanus, and diptheria.

★ Streptomycin cures bacterial infections.

b) Vaccines :

★ Vaccines are prepared from dead or weakened microbes.

★ Vaccine injected body produces antibodies to fight against the germs and protect from future invasion of germs.

Examples :

1. Small pox vaccine - discovered by Edward Jenner.
2. MMR vaccine (For Measles, Mumps, Rubella)
3. BCG vaccine (For Tuberculosis).

---

3. Write a short note on common human diseases caused by microorganisms.
Ans : Diseases caused by microorganisms in Humans:

Sl. No.	Human diseases	Causative microorganisms	Mode of transmission	Symptoms	Preventive measures/ Treatment
1.	Tuberculosis	Mycobacterium tuberculosis (Bacteria)	Through air and sputum of infected person	Persistent cough, blood mucus, loss of weight, breathlessness	BCG Vaccine
2.	Cholera	Vibrio cholera (Bacteria)	By flies and contaminated food and water	Watery diarrhoea, vomiting, rapid dehydration.	Anticholera vaccine, maintaining personal hygiene.
3.	Common cold	Influenza (virus)	Through air	Running nose, sneezing	Isolation of patient
4.	Rabies	Rhabdo viridae (virus)	Animal bite	Fever, hallucination, paralysis inability to swallow	Anti-rabies vaccine.

4. How can we improve the beneficial bacterial count in human beings?
Ans :

★ Lactobacillus acidophilus that lives in the human intestine helps in digestion of food and fights against harmful disease causing organisms.
★ E.coli bacteria living in human intestine help in synthesizing vitamin K and vitamin B complex.
★ Fermentation is the microbial conversion of starch and sugars into alcohol. It makes foods more nutritious and palatable.

---

5. Write a short note on Probiotics.
Ans : Probiotics :

★ Probiotics are live food supplements used in yoghurt and other fermented milk products.
★ Eg. Lactobacillus acidophilus and Bifidobacterium bifidum.
★ These bacteria improve the microbial spectrum in the gut and thus contribute to the following effects:
- ★ Decrease the risk of colon cancer
- ★ Decrease cholesterol absorption
- ★ Prevent diarrheal diseases by increasing the immunity.

Additional Questions and Answers

I. Choose the best answer :

1. The study of fungi is called .....
a) Bacteriology b) Mycology
c) Viriology d) Microbiology
Ans : b) Mycology

2. ..... is a photosynthetic bacteria.
a) Pseudomonas b) Bacillus
c) Cyano bacteria d) Vibrio cholera
Ans : c) Cyano bacteria

3. ..... are known as "grass of water".
a) Fungi b) Bacteria
c) Algae d) Virus
Ans : c) Algae

4. Potato blight disease is caused by .....
a) fungi b) bacteria
c) virus d) insects
Ans : a) fungi

5. Microbiology is the science that deals with the study of .....
a) insects b) birds
c) microorganisms d) humans
Ans : c) microorganisms

6. Spherical shaped bacteria that occur in bunches are called.....
a) diplococcus b) staphylococcus
c) streptococcus d) bacillus
Ans : b) staphylococcus

7. Bacteria with tuft of flagella at one end are .....
a) lophotrichous b) monotrichous
c) amphitrichous d) peritrichous
Ans : a) lophotrichous

8. The word "Pyriform" means .....shape
a) oval b) pear
c) spherical d) rod
Ans : b) pear

9. .....is a free living bacteria in soil.
a) Rhizobium b) Lactobacillus
c) Mycobacterium d) Nostoc
Ans : d) Nostoc

10. .....is transmitted by animal bite.
a) Rabies b) Tuberculosis
c) Cholera d) Malaria
Ans : a) Rabies

11. An example of multicellular and macroscopic algae is.....
a) chlamydomonas b) sargassum
c) volvox d) ulothrix
Ans : b) sargassum

12. Chlamydomonas has .....flagella.
a) one b) two
c) three d) none
Ans : b) two

13. ..... is a macroscopic fungi.
a) Yeast b) Trichoderma
c) Phytophthora d) Mushroom
Ans : d) Mushroom

14. Green algae, ... is rich in proteins and vitamins.
a) ulva b) chlorella
c) volvox d) hydrodicatyon
Ans : b) chlorella

15. Malaria in humans is caused by .....
a) bacteria b) virus
c) fungi d) protozoa
Ans : d) protozoa

II. Fill in the blanks.

1. The protein coat surrounding a virus is ..... **Ans : capsid**
2. The study of virus is called ..... **Ans : virology**
3. An algae with cup-shaped chloroplast is ..... **Ans : chlamydomonas**
4. First living organism on Earth is..... **Ans : bacteria**
5. ..... is used in anaerobic treatment of sewage. **Ans : Methanobacterium**
6. Alcoholic drinks are prepared by .....process. **Ans : fermentation**

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

1. **The study of algae is called phycology** **Ans : True**
2. **Chlamydomonas is a multicellular algae.** **Ans : False.**

Correct statement : Chlamydomonas is an **unicellular algae**.

3. **Amoeba is a single celled Prokaryote.** **Ans : False.**

Correct statement : Amoeba is single celled **Eukaryote.**

4. **Compost is called as natural fertilizer.** **Ans : True**
5. **Citrus canker disease can be treated with fungicides.** **Ans : False.**

Correct statement : Citrus canker disease can be treated with **bactericides.**

IV. Match the following.

1.	Common cold	Biogas
2.	Methanogens	Bacteria
3.	Linen thread	Influenza virus
4.	Xanthomonas	Zymase
5.	Enzyme	Flax plants

Ans :

1.	**Common cold**	**Influenza virus**
2.	**Methanogens**	**Biogas**
3.	**Linen thread**	**Flax plants**
4.	**Xanthomonas**	**Bacteria**
5.	**Enzyme**	**Zymase**

V. Answer shortly.

1. What are the two types of bacteria based on respiration?

Ans :

★ Aerobic bacteria (requires oxygen)
★ Anaerobic bacteria (does not require oxygen)

2. What is chemosynthesis?

Ans :

★ The process by which bacteria live in harsh environment by using chemicals like ammonia, H_2s etc are called chemosynthesis.

3. Mention the two techniques followed in food preservation?

Ans :

★ Traditional techniques
★ Modern techniques

4. Define - Pasteurization.

Ans :

★ Pasteurization is a method of preserving milk, which is heated up to 70°C and then cooled to 10°C, to prevent the growth of bacteria.

5. What is fermentation?
Ans :
★ Fermentation is the microbial conversion of starch and sugars into alcohol.

6. Name the two types of pickling with examples.
Ans :
★ Chemical pickling. Eg. : Vinegar, alcohol
★ Fermentation pickling. Eg.: Lactobacillus.

7. What is Pseudopodia?
Ans :
★ Pseudopodia in latin means "False feet"
★ They are the extended part of cell membrane in protozoans (Amoeba)
★ It helps to catch its prey.

8. Differentiate Prions and Virions
Ans :

Prions	Virions
★ Prions are mutated form of protein ★ They do not have DNA or RNA	★ Virions are entire virus particle. ★ They have RNA or DNA

9. Expand the following.
a) MMR b) BCG
Ans :
★ a) MMR - Measles, Mumps, Rubella.
★ b) BCG - Bacille Calmette Guerin

10. What are bio-control agents? Give examples.
Ans :
★ Microbes used to protect the crops from pest are called bio-control agents.
★ E.g : Baculo viruses - attacks insects and arthropods.

11. Define - Retting.
Ans :
★ Retting is the process by which fibres of the stem tissue are loosened by bacteria.

12. What are microorganisms?
Ans :
★ The organisms which can be seen only with the help of microscope are called micro organisms.

13. Who invented Pasteurization method?

Ans :

★ Pasteurization method was invented by Louis Pasteur in 1862.

VI. Answer in detail.

1. List out the living and non-living characters of virus.

Ans :

Living characters.

★ Virus respond to heat, chemicals and radiations.

★ They reproduce inside the host cells and produce copies of themselves.

Non-Living characters:

★ Virus are inactive when present freely in the environment.

★ They can be crystallized and stored for a very long time, like other non-living things.

---

2. Classify bacteria based on number and arrangement of flagella.

Ans :

(i) **Monotrichous** - Single flagella at one end.
Eg. Vibrio cholera


monotrichous

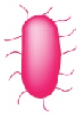
(ii) **Lophotrichous** - Tuft of flagella at one end.
Eg. Pseudomonas.


lophotrichous

(iii) **Amphitrichous** - Tuft of flagella at both ends.
Eg. Rhodospirillum rubrum.


amphitrichous

(iv) **Peritrichous** - Flagella all around.
Eg. E.coli.


peritrichous

(v) **Atrichous** - Without any flagella.
Eg. Corynebacterium diptherae.


atrichous

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3. What are the types of protozoans based on their organelles for movement ?

Ans :

★ **Ciliates** - presence of cilia for locomotion (Eg. Paramecium)
★ **Flagellates** - presence of flagella for locomotion (Eg. Euglena)
★ **Pseudopods** - presence of pseudopodia for locomotion (Eg. Amoeba)
★ **Sporozoans** - parasites (Eg. Plasmodium)

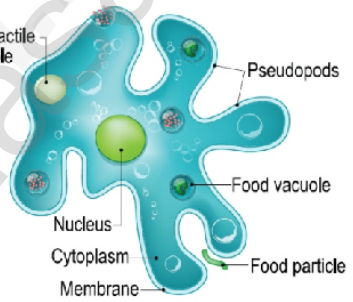
---

4. Write a note on preparation of curd and cottage cheese.
Ans :
★ Lactose in the milk gets turned into Lactic acid by the action of *Lactobacillus* (bacteria).
★ Therefore, milk becomes thick (curd).
★ It gives the sour taste.
★ When curd is processed cottage cheese (panneer) is obtained.

5. What is the role of yeast in bakeries?
Ans :
★ Yeast is used in bakeries to make bread and cakes.
★ They are added to the dough to produce carbon dioxide which makes the dough rise.
★ Bread and cakes are soft due to carbon dioxide gas.

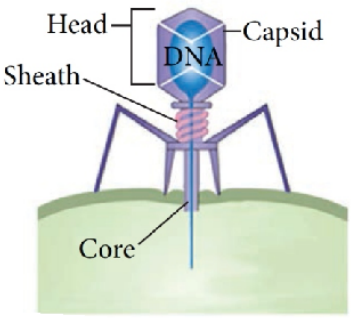
6. Name the diseases caused by microorganisms in plants and Animals.
Ans :
In plants - ★ Citrus canker (by Bacteria)
★ Potato blight disease (by Fungi)
In animals - ★ Anthrax (by Bacteria)
★ Foot and mouth disease (by Virus)

VII. Draw and label.
1) Structure of Amoeba. (Protozoa)
Ans :



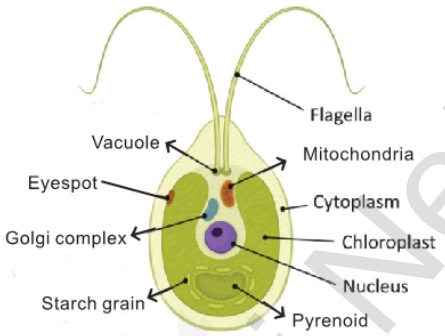
Structure of Amoeba

2) Structure of Bacteriophage (Virus)
Ans :



Structure of Bacteriophage

3) Structure of Chlamydomonas. (Algae)
Ans :



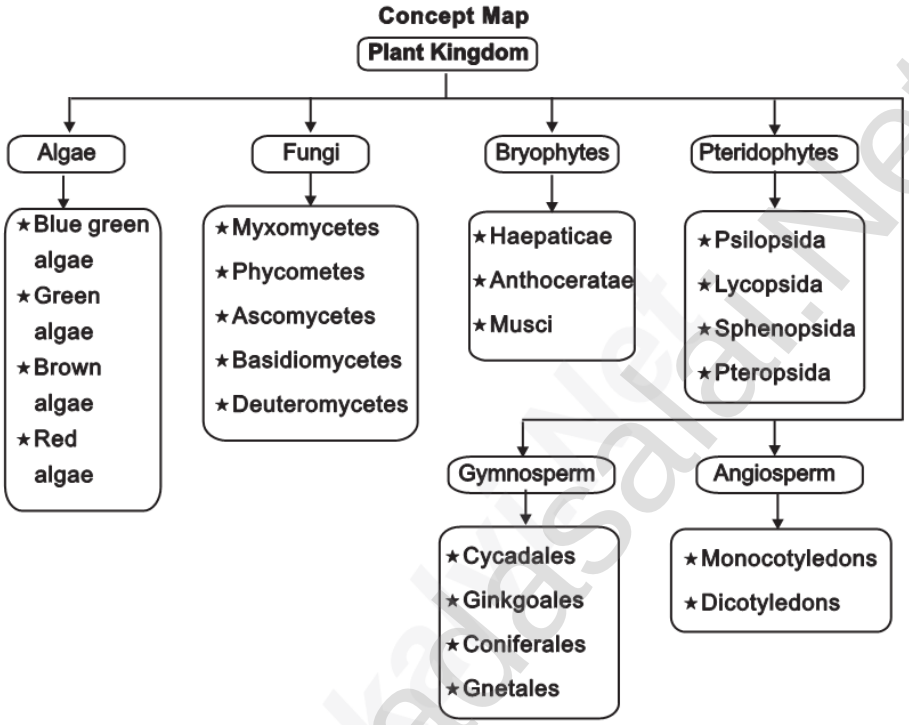
Structure of Chlamydomonas

Activity : 1
Take one or two drops of butter milk on a slide and spread it. Heat the slide slightly on a lamp (3 – 4 seconds). Add a few drops of crystal violet and leave it for 30 to 60 seconds. Then wash the slide gently with water. Observe the slide under the compound microscope.
Observations :
★ The microbes observed under the microscope was Lactobacillus bacteria.
★ Lactose in the milk gets turned into Lactic acid by the action of this bacteria.

Activity : 2
Take one or two drops of hay (In tamil, vaikol) decoction on a slide and observe it under the microscope.
Observations :
★ The observed microbe in the drops of hay is Cellulomonas.
★ It is a rod shaped bacteria.
★ It has the ability to degrade the cellulose.

UNIT - 17. PLANT KINGDOM

Concept Map



TEXT BOOK EXERCISES

I. Choose the best answer:

1. Solanum trilobatum is the binomial name of Thoothuvalai. The word 'Solanum' refers to

a) Species b) Genus
c) Class d) Orders

Ans : b) Genus

2. Floridian starch is a reserve food material of

a) Chloroplyceae b) Phaeophyceae
c) Rhodophyceae d) Cyanophyceae

Ans : c) Rhodophyceae

3. An example for colonial form of algae is.

a) Oscillatoria b) Nostac
c) Volvox d) Chlorella

Ans : c) Volvox

4. One of the following is an edible mushroom

a) Polyporus b) Agaricus
c) Pennicillium d) Aspergillus

Ans : b) Agaricus

5. Plants that prevent soil erosion are

a) algae b) fungi
c) bryophytes d) pteridophytes

Ans : c) bryophytes

6. The first land plants are
a) bryophytes b) pteridophytes
c) gymnosperm d) angiosperm **Ans : b) pteridophytes**

7. The well-developed sporophytic plant body is seen in
a) bryophytes b) pteridophytes
c) gymnosperms d) angiosperms **Ans : d) angiosperms**

8. Binomial Nomenclature was first introduced in the year
a) 1970 b)1975
c) 1978 d) 1623 **Ans : d) 1623**

9. Penicillin is an antibiotic which is extracted from
a) algae b) fungi
c) bryophytes d) pteridophytes **Ans : b) fungi**

II. Fill in the blanks:

1. The word 'Taxonomy' is derived from _____ **Ans : Greek**
2. Binomial Nomenclature was first introduced by _____ **Ans : Gaspard Bauhin**
3. The book "Genera Plantarum" was published by _____ **Ans : Bentham and Hooker**
4. Monocotyledon seed bears only _____cotyledon. **Ans : One**
5. Brown algae belongs to _____class. **Ans : Phaeophyceae**
6. Agar Agar is obtained from _____ algae. **Ans : Red**
7. The reserve food material of fungi are _____ and _____ **Ans : Glycogen, oil**
8. The first true land plant is _____ **Ans : Pteridophytes**
9. Xylem and phloem are absent in_____ plants. **Ans : Bryophytic**
10. Reticulate venation is present in _____ plants. **Ans : Dicotyledon.**

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

1. In polypetalae, the petals are free. **Ans : True**
2. Binomial name should contain more than two words. **Ans : False**
Correct statement : Binomial name should contain **only two words.**
3. Artificial system of classification is based on few characters of the plant. **Ans : True**
4. Cell wall of fungi is made up of chitin. **Ans : True**
5. Pinus is a closed seeded plant. **Ans : False**
Correct statement : Pinus is a **naked** seeded plant.
6. All bryophytes are hydrophytes. **Ans : False**
Correct statement : All bryophytes **are not** hydrophytes.
7. Dicotyledons have well developed characters than the gymnosperms. **Ans : True**
8. Mosses are the well developed plant in bryophytes. **Ans : True**
9. The dominant phase of the bryophytes is sporophyte. **Ans : False**
Correct statement : The dominant phase of the bryophytes is **gametophyte**
10. The dominant phase of the pteridophyte is gametophytic phase. Ans : False
Correct statement : The dominant phase of the pteridophyte is **sporophytic** phase.

IV. Match the following

1	Cyanophyceae	Green algae
2	Chlorophyceae	Blue green algae
3	Phaeophyceae	Red algae
4	Rhodophyceae	Brown algae

Ans :

1	**Cyanophyceae**	**Blue green algae**
2	**Chlorophyceae**	**Green algae**
3	**Phaeophyceae**	**Brown algae**
4	**Rhodophyceae**	**Red algae**

V. Answer very briefly.

1. Define - Thallus.

Ans :

★ The plant body of algae are called thallus.

---

2. What is meant by binomial nomenclature? Give example.

Ans :

★ Scientific method of naming the plants with two words are known as Binomial Nomenclature

★ Example : Binomial name of Mango is Mangifera indica.

---

3. Write any two characters of dicotyledons.

Ans :

1. Seed have two cotyledons
2. Plants have tap root system and reticulate venation in leaves.

---

4. Seeds of gymnosperm plants are naked. Why?

Ans :

★ Seeds of gymnosperm plants are naked because the ovule is not enclosed by ovary.

---

5. Write any two economic importance of fungi.

Ans :

★ Antibiotics are obtained from fungi. Eg. Penicillin from Penicillin notatum

★ Fungi like mushrooms are edible food which contains proteins and minerals.

VI. Answers briefly.

1. Write a short note on natural system of classification.

Ans:

★ In this system, plants are classified on the basis of several characters.

★ Bentham and Hooker's classification is an example of natural system of classification.

★ This system of classification is based on morphological and reproductive characters of the seeded plants.

---

2. Write any three economic importance of algae.

Ans :

★ Iodine :

Iodine is obtained from brown algae like Laminaria.

★ space Travel :

Chlorella pyrenoidosa is used in space travel to get rid of CO_2 and to decompose human wastes.

★ **Single Cell Protein (SCP):**
Some of the single cell algae and blue green algae are used to produce protein.
Eg. Chlorella, Spirulina.

3. Write the differences between algae and fungi.
Ans :

S. No.	Algae	Fungi
1.	Algae are autotrophs.	Fungi are heterotrophs.
2.	They have pigments.	They have no pigments
3.	Reserve food material is starch.	Reserve food materials are glycogen and oil.
4.	Some algae are prokaryotic in nature E.g: Cyanobacteria (Nostac, Anabenae)	All are eukaryotic nature. E.g: Agaricus

4. How many classes are there in bryophytes? What are they?
Ans :
Bryophytes are classified into three classes. They are :
(i) Hepaticae - (Liverworts) - Eg : Riccia
(ii) Anthoceratae (Hornworts) - Eg : Anthoceros
(iii) Musci (Mosses) - Eg : Funaria

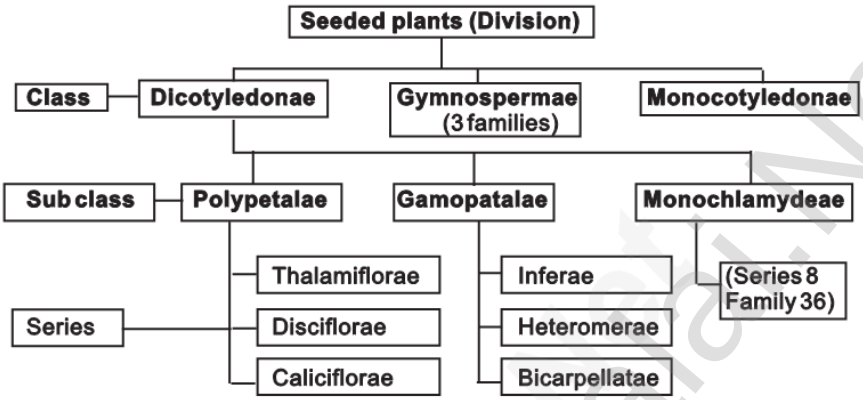
5. Write any four characters of pteridophytes?
Ans :
(i) Plant body can be differentiated into root, stem and leaf.
(ii) Pteridophytes are true land plants.
(iii) Vascular tissues are present.
(iv) The dominant phase of the plant body is sporophyte.

VII. Answer in detail.

1. Draw the outline of Bentham and Hooker's system classification.

Ans :

Outline of Bentham and Hooker's system of classification



2. Write any five differences between monocot and dicot plants.

Ans :

	Monocot Plants	Dicot Plants
1.	Seed has only one cotyledon.	Seed has two cotyledons.
2.	Plants have fibrous root system, and leaves are with parallel venation.	Plants have tap root system and leaves are with reticulate venation.
3.	Flowers are trimerous and not differentiated into calyx and corolla.	Flowers are tetramerous or pentamerous. Calyx and corolla are well differentiated.
4.	Pollination occurs mostly by wind.	Pollination occurs mostly by insects.
5.	Examples are Grass, Paddy, Banana.	Examples are Bean, Mango, Neem

3. Write the differences between gymnosperm and angiosperm.

Ans :

S.No.	Gymnosperm	Angiosperm
1.	Gymnosperms are naked seeded plants	★ Angiosperms are closed seeded plants
2.	The ovule is not enclosed by ovary	★ Ovule is enclosed by ovary
3.	Gymnosperms have sporophytic and gametophytic cycle.	★ Angiosperms have only gametophytic cycle
4.	Xylem has tracheid	★ Xylem contains vessel, tracheid, xylem parenchyma and xylem fibre.
5.	Phloem has sieve cells.	★ Phloem contains sieve tubes, phloem Parenchyma, Companion cells and Phloem fibres.

4. Write the economic importance of Ggymnosperms.

Ans :

★ Woods of many conifers are used in the paper industries. E.g. Pinus, Agathis
★ Conifers are the sources of soft wood for construction, packing and plywood industry E.g. Cedrus, Agathis
★ Seeds of Pinus gerardiana are edible.
★ Ephedrine is an alkaloid extracted from Ephedra. It cures asthma and respiratory problems.
★ Araucaria bidwillii is an ornamental plant.

5. Write the names of medicinal plants and explain their uses

	Medicinal Plants	Uses
1.	**Acalypha indica (Kuppaimeni)**	★ The paste obtained from the leaves of this plant is used to cure the burns on the skin. ★ The juice of this plant leaves is mixed with lemon juice to cure ringworm
2.	**Aegle marmelos (Vilvam)**	★ The unripe fruit of this tree is used to treat indigestion. ★ It is used to cure chronic diarrhoea and dysentery.
3.	**Solanum trilobatum (Thoodhuvalai)**	★ The leaves and fruits of this plant cure cough and cold. ★ It is widely used in the treatment of tuberculosis and bronchial asthma.
4.	**Phyllanthus amarus (Keezhanelli)**	★ The entire plant is used for the treatment of jaundice. ★ It gives additional strength to human liver and it is used to treat other liver disorders.

5.	**Aloe vera (Sothu Katrazhai)**	★ Leaves of this plant is used to cure piles and inflammations on the skin. ★ It cures peptic ulcer.

Additional Questions and Answers

I. Choose the best answer :

1. Algae belongs to .....
a) bryophyta b) thallophyta
c) pteridophyta d) cryptogams **Ans : b) thallophyta**

2. Manitol is the reserve food material of ..... algae.
a) blue green b) green
c) brown d) red **Ans : c) brown**

3. Fungus Ashbya gospii are used to produce vitamin .....
a) B_1 b) B_2
c) B_{12} d) B_6 **Ans : b) B_2**

4. Fungal disease in sugarcane is .....
a) wilt disease b) white rust
c) tikka disease d) red rot **Ans : d) red rot**

5. ..... is known as "Queen of medicine"
a) Penicillin b) Vermifuge
c) Ephedrine d) Turpentine **Ans : a) Penicillin**

6. ..... is known as clubmoss
a) Psilotum b) Lycopodium
c) Equisetum d) Nephrolepis **Ans : b) Lycopodium**

7. Archegonium is the ..... of pteridophytes.
a) male gamete b) thallus
c) rhizome d) female gamete **Ans : d) Female gamete**

8. Cycas has .....roots
a) coralloid b) fibrous
c) haustoria d) prop **Ans : a) coralloid**

9. An essential oil extracted from pinus is .....
a) ephedrine b) turpentine
c) vermifuge d) riboflavin **Ans : b) turpentine**

10. ..... species of fungi cause allergy to children.
a) Aspergillus b) Trichophyton
c) Micro sporum d) Cercospora **Ans : a) Aspergillus**

11. The word 'Taxonomy' was first coined by .....
a) Carolus Linnaeus b) Bentham and Hooker
c) Augustin - Pyramus de candolle d) Alexander Fleming
Ans : c) Augustin - Pyramus de candolle

12. Largest Herbarium of India is in.....
a) Mumbai b) Kolkata
c) Delhi d) Chennai **Ans : b) kolkata**

13. Aloe vera belongs to the family .....
a) Liliaceae b) Rutaceae
c) Solanaceae d) Euphorbiaceae **Ans : a) Liliaceae**

14. ..... are essential to fix atmospheric nitrogen.
a) Chlorella b) Anabaena
c) Spirulina d) Laminaria **Ans : b) Anabaena**

15. Tikka disease affects .....
a) Sugarcane b) Cotton
c) Radish d) Ground nut **Ans : d) Ground nut**

II. Fill in the blanks.

1..... are otherwise sea weeds **Ans : Algae**
2. Cell wall of fungi is made up of..... **Ans : chitin**
3. Yeast contain enzymes like..... and ..... **Ans : Invertase, zymase**
4. ..... is the hallucinogenic fungi **Ans : Claviceps purpuriya**
5. Cladosporium protects against..... **Ans : allergy**
6. ..... discovered penicillin **Ans : Sir Alexander Fleming**
7. ..... are called as Amphibians of plant kingdom **Ans : Bryophytes**
8. ..... is known as horse-tail **Ans : Equisetum**

III. Match the following.

1.	Antherozoid	Species plantarum
2.	Parasitic Root	Binomial name
3.	Carolus Linnaeus	Male gamete
4.	Gaspard Bauhin	Prevent soil erosion
5.	Bryophytes	Haustoria

Ans :

1.	**Antherozoid**	**Male gamete**
2.	**Parasitic Root**	**Haustoria**
3.	**Carolus Linnaeus**	**Species plantarum**
4.	**Gaspard Bauhin**	**Binomial name**
5.	**Bryophytes**	**Prevent soil erosion**

IV. Answer shortly.

1. How do you classify plant kingdom in the traditional system?
Ans :
In traditional system of classification, plant kingdom is divided into,
★ Cryptogams - Non flowering plants
★ Phenerogams - Flowering plants.

2. What are phyto planktons?
Ans :
★ Very minute algae that float on the surface of the water are called phyto planktons.

3. What are symbionts?
Ans :
★ Symbionts are the algae living with fungi and are mutually benefitted
★ Eg. : Lichens

4. Classify algae based on their pigments.
Ans :
★ Blue green algae - Phycocyanin
★ Green algae - Chlorophyll
★ Brown algae - Fucoxanthin
★ Red algae - Phycoerythirin

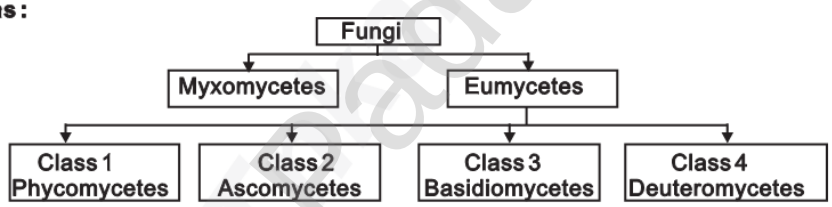
5. Define - Hyphae.
Ans :
★ Hyphae is filament like structures on the plant body of fungus.

6. What do you mean by mycelium?
Ans :
★ The network arrangement of several hyphae forms the mycelium.

7. Mention the types of heterotrophs.
Ans :
★ Parasites
★ Saprophytes
★ Symbionts

8. Give the function of haustoria.
Ans :
★ Haustoria is a special parasitic root of fungus that absorbs food from the living organisms.

9. Classify different classes of fungi in a flowchart.
Ans :



10. Why fungi are placed as third kingdom in R.H. Wittekar's five kingdom classification?
Ans :
★ Fungi are placed as third kingdom in R.H.Wittekar's five kingdom of classification because of absence of chlorophyll and starch.

11. Give three examples for fungal diseases in human.
Ans :
★ Ring worm
★ Dandruff
★ Athletes foot.

12. Define - 'Taxonomy'
Ans :
★ Taxonomy is the branch of biology that deals with the study of identification, classification, description and nomenclature of living organisms.

13. Mention four types of classification.
Ans :
1. Artificial system of classification
2. Natural system of classification
3. Phylogenetic system of classification
4. Modern system of classification

---

14. Expand ICBN and Mention its significance.
Ans :
★ ICBN - International code of Botanical Nomenclature.
Significance :
★ The rules and recommendations regarding binomial nomenclature were found in ICBN. Now it is known as ICN (International Code of Nomenclature)

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15. Name the sex organs of bryophytes.
Ans :
★ Male sex organ - Antheridium
★ Female sex organ - Archegonium

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16. Write a note on "Sphagnam"
Ans :
★ Sphagnam is a bryophyte.
★ It can absorb large amount of water and is used by the gardeners in nursery.
★ A valuable fuel peat is obtained from it.

---

17. Define - Prothallus.
Ans :
★ Prothallus is the gametophytic generation by spores of pteridophytes.

---

18. Differentiate homosporous and heterosporous plants.
Ans :

Homosporous plants	Heterosporus plants
Plants of pteridophytes produce only one type of spore. either microspore or megaspore.	Plants of pteridophytes produce both microspore and megaspore

19. Define - Herbarium.
Ans :
Herbarium is the collection of pressed, dried plants pasted on a sheet and arranged according to any one of the accepted systems of classification.

V. Short answer.

1. Differentiate Bryophytes and Pteridophytes.

S. No.	Bryophytes	Pteridophytes
1.	Plant body cannot be differentiated into root, stem and leaf.	Plant body can be differentiated into root, stem and leaf.
2.	Bryophytes are amphibians.	Pteridophytes are true land plants.
3.	Vascular tissues are absent.	Vascular tissues are present.
4.	The dominant phase of the plant body is gametophyte.	The dominant phase of the plant body is sporophyte.
5.	Sporophytic generation depends on the gametophytic generation. e.g. Riccia	Gametophytic generation does not depend on sporophytic generation. eg. Selaginella

2. Write the economic importance of Pteridophytes.

Ans : Economic importance of Pteridophytes.

★ Ferns are used as ornamental plants.
★ The rhizome and petioles of Dryopteris yield the vermifuge drug.
★ The sporocarp of Marsilea (water fern) is used as food by some people.

3. Classify gymnosperms and describe their leaves.

Ans :

Types		Leaf structure
Cycadeles	-	Pinnately compound
Ginkgoales	-	Fan shaped
Coniferales	-	Needle like
Gnetales	-	Small group of plants.

Activity -1

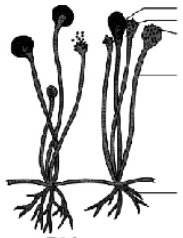
Take a piece of bread and pour some water on it and cover it for four days. After four days place the bread on a slide and observe it through microscope. What will you see? Name the organisms which you see in the slide.

Observation :

★ Growth of fungus will be seen on the bread.

Name of the organism : Rhizopus.

★ They are saprophytes that grow upon dead and decaying matters and get food from them.



Rhizopus

Activity - 2

Visit a nearby nursery and observe how *Sphagnum* is used in horticulture and make a note on it.

Ans :

★ Sphagnam can absorb large amount of water. Hence, it is used by the gardeners in nursery.
★ Peat which is a valuable fuel like coal is obtained from Sphagnum.

Activity -3

Collect some flowering plants from your surroundings and classify them as monocot or dicot based on their root system and venation.

Ans :

S. No.	Plants Name	Root sytem	Venation	Dicot/ Monocot
1.	Hibiscus	Tap root	Reticulate venation	Dicot
2.	Mango	Tap root	Reticulate venation	Dicot
3.	Banana	Fibrous root	Parallel	Monocot
4.	Bean	Tap root	Reticulate venation	Dicot
5.	Paddy	Fibrous root	Parallel	Monocot

Activity - 4

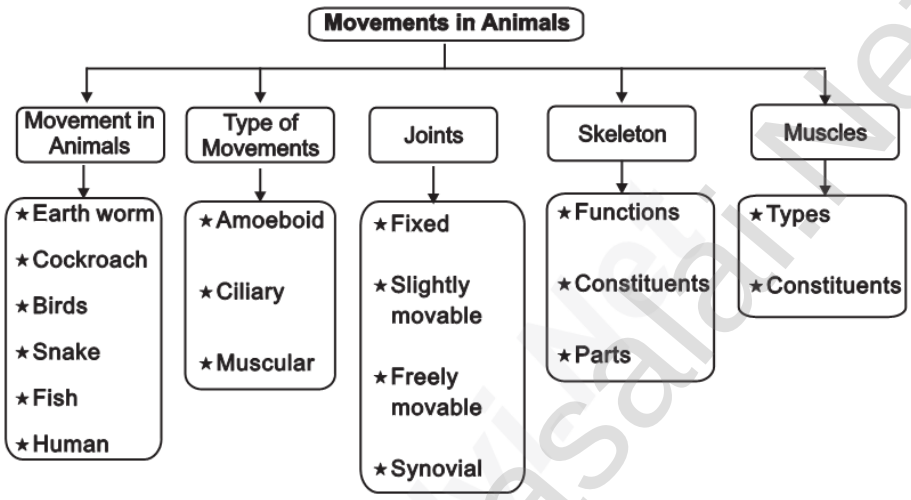
Collect some plants which are growing inside your school area, write their vernacular name, binomial name and classify them into dicotyledons or monocotyledons in the given table.

Ans :

S. No.	Vernacular name	Binomial name	Monocotyledons/ Dicotyledons
1.	Kuppaimeni	Acalypha indica	Dicotyledon
2.	Vilvam	Aegle marmelos	Dicotyledon
3.	Thoodhuvalai	Solanum trilobatum	Dicotyledon
4.	Keezhanelli	Phyllanthus amarus	Dicotyledon
5.	Sothu katrazhai	Aloe vera	Monocotyledon

UNIT - 19. MOVEMENTS IN ANIMALS

Concept Map



TEXT BOOK EXERCISES

I. Choose the best answer.

1. Which of the following parts of our body help us in movement?
(i) Bones (ii) Skin (iii) Muscles (iv) Organs
Choose the correct answer from the options below.
(a) (i) and (iii) (b) (ii) and (iv)
(c) (i) and (iv) (d) (iii) and (ii) **Ans : (a) (i) and (iii)**

2. Which one of the following organisms lack muscles and skeleton for movement?
(a) Dog (b) Snail
(c) Earthworm (d) Human being **Ans : b) Snail**

3. _____ joints are immovable.
(a) Shoulder and arm (b) Knee and joint
(c) Upper jaw and skull (d) Lower jaw and upper jaw **Ans : (c) Upper jaw and skull**

4. Why do underwater divers wear fin-like flippers on their feet ?
(a) To swim easily in water.
(b) To look like a fish.
(c) To walk on water surface.
(d) To walk over the bottom of the sea (sea bed). **Ans : (a) To swim easily in water**

5. External ear (pinna) is supported by
(a) bone (b) cartilage
(c) tendon (d) capsule **Ans : (b) cartilage**

6. Cockroach moves with the help of its
(a) leg (b) bone
(c) muscular foot (d) whole body **Ans : (a) leg**

7. Which one of the following categories of vertebrae are correctly numbered?
(a) Cervical-7 (b) Thoracic-10
(c) Lumbar-4 (d) Sacral-4 **Ans : (a) Cervical-7**

II. Fill in the blanks.
1. Movement of organisms from place to place is called _____. **Ans : Locomotion**
2. _____ refers to change in position of the part of an organism's body. **Ans : Movement**
3. A structure which provides rigid frame work to the body is called _____ **Ans : Skeleton**
4. Axil skeleton in human consists of_____,_____,_____ and _____. **Ans : Skull, Ribs, Sternum and vertebral column**
5. Appendicular skeleton in human consists of _____ and _____. **Ans : Pectoral girdle, pelvic girdle**
6. The place where two bones meet is termed as _____. **Ans : Joint**
7. _____ is attached to soft parts of the body like blood vessels, iris, bronchi and the skin **Ans : Antagonistic muscles**
8. _____ muscle makes pupil of eyes wider. **Ans : Radial**

III. State true or false. If false, correct the statement.
1. Skull in humans consists of 22 bones. **Ans : True**
2. There are 12 pairs of ribs in human body. **Ans : True**
3. Pelvic girdle is a part of axial skeleton. **Ans : False**
Correct statement : Pelvic girdle is a part of **appendicular** skeleton.
4. Hinge joint is slightly movable joint. **Ans : False**
Correct statement : Hinge joint is a **freely** movable joint.
5. Cardiac muscle is a voluntary muscle. **Ans : False**
Correct statement : Cardiac muscle is an **involuntary** muscle.
6. The flexor and extensor muscle of the arm are antagonistic muscles. Ans : True

---

IV. Answer very briefly.
1. What is skeleton?
Ans :
★ Skeleton is the framework of bones which helps in the movement of the body.

---

2. What is cranium?
Ans :
★ Cranium or brain box is formed of 8 bones.

★ It forms the hard structure of skull.

3. Why our backbone is slightly moveable?
Ans :
★ In the backbone, the vertebrae are joined by gliding points.
★ So our backbone is slightly moveable.

4. Differentiate axial and appendicular skeleton.
Ans :

S.No.	Axial skeleton	Appendicular skeleton
1.	It consists of bones along the axis or central line of the human body.	It contains the bones in the appendages.
2.	It includes skull, facial bones, sternum, ribs and vertebral column.	It comprises shoulder girdle, pelvic girdle.

5. What is ligament?
Ans :
★ Ligaments are cords of tissue that attach bone to bone.

6. Define Muscle.
Ans :
★ Muscles are contractile tissue, which provides the means of all movements in the body.

7. Differentiate tendons and ligament.
Ans :

S.No.	Tendons	Ligament
1.	Tendons are made of elastic tissue	Ligaments are short bands of tough fibrous connective tissues
2.	Connect bones to muscle	Connect bone to bone.

V. Answer briefly.
1. Differentiate between the following.
a) Movement and Locomotion.
Ans :

S.No.	Locomotion	Movement
1.	Locomotion is the movement of an organism from one place to another	Movement is the act of changing the place or position by one or more parts of the body

2.	It is always voluntary	It can either be voluntary or involuntary.
3.	Locomotion takes place at the organism level.	A movement takes place at the biological level.
4.	Locomotion doesn't necessarily require energy.	Movement requires energy.

b) Endoskeleton and Exoskeleton

Ans :

S.No.	Endoskeleton	Exoskeleton
1.	Found inside the body	Found on the exterior layer of the body
2.	Originates from the mesoderm.	Originates from embryonic ectoderm or mesoderm.
3.	Form the main body structure. Eg : vertebrates	Protects and preserves the inner organs. Eg : Scales of fish, feathers of birds.

c) Pectoral and Pelvic girdle

Ans :

S.No.	Pectoral girdle	Pelvic girdle
1.	Formed by collar bone at the front and shoulder blade at the back	Formed by five fused vertebrae at the back and form a cavity in the centre.
2.	Attachment of arms	Attachment of legs.
3.	Includes arm, wrist and hand bones.	Includes leg, ankle and foot bones.

d) Ball and socket Joint and Hinge Joint

Ans :

S.No.	Ball and socket joint	Hinge joint
1.	Ball shaped head of one bone articulates with a cup like socket of an adjacent bone	Cylindrical protrusion of one bone articulates with a trough shaped depression of an adjacent bone
2.	Examples. Shoulder, Hip	Examples : Elbow, knee, ankle.

e) Voluntary and Involuntary muscle

Ans :

S.No.	Voluntary muscle	Involuntary muscle
1.	They are multi nucleated unbranched and striated	They are single, central nucleated, branched and non-striated
2.	Attached to bones, arms, legs, neck.	Attached to soft parts of the body like blood vessels, iris, bronchi and the skin.

2. What are antagonistic muscles? Give one example.

Ans :

★ Muscles which work in pairs against each other are called antagonistic muscles.
★ They can be found all over the body.
Examples : Two sets of muscles in the iris of the eye.
★ Radial muscles → Makes the pupil of the eye wider.
★ Circular muscles → Makes the pupil smaller.

---

3. How is the skeleton of a bird well-suited for flying?

Ans :

★ Bones of birds are light and strong.
★ They have special flight muscles.
★ Fore limbs are modified as wings.
★ The wings and tail have long feathers which helps in flying.

---

4. What are the functions of skeleton in human body?

Ans :

1. Skeleton provides structure and shape to the body.
2. It supports and surrounds the internal organs of the body.
3. Calcium and phosphorus, for important regulatory functions, are stored inside the bones.
4. Red blood cells are produced in the bone marrow.
5. The bones of the skeletal system act as levers for muscular action.

VI Answer in detail.

1. Name the different types of joints? Give one example for each type.

Ans :

	Types of joints	Examples
1.	Fixed or Immovable joints.	Skull box.
2.	Slightly movable joints	Joint between ribs and breast bone
3.	**Freely movable joints :**	
	(i) Ball and socket joint	Shoulder, Hip.
	(ii) Hinge joint	Elbow, Knee, Ankle.
	(iii) Pivot joint	Spine
	(iv) Condyloid	Wrist

	(v) Gliding	Spine
	(vi) Saddle	Thumb, inner ear, Shoulder.
4.	synovial joints	Knee bone.

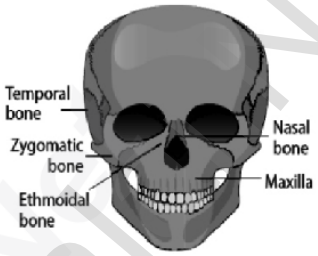
2. Write about the human axial skeleton, giving suitable labelled diagram.

Ans :

The axial skeleton consists of the skull, facial bones, sternum, ribs and vertebral column.

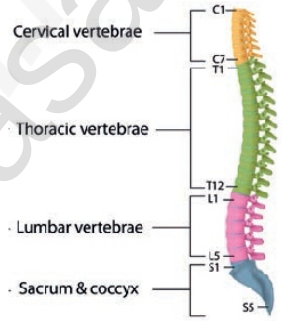
a) skull :

★ Formed of 22 bones.
(Cranium - 8, Face - 14)
★ Protects the brain.



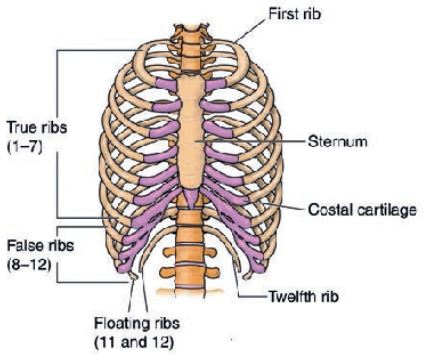
b) Vertebral Column :

★ Made up of vertebrae.
★ It consists of,
Cervical vertebrae - 7
Lumbar vertebrae - 12
Sacral vertebrae - 5
Coccygeal vertebrae - 3
★ Protects the spinal cord.



c) Sternum or Rib cage:

★ Twelve pairs of ribs.
★ Protects the heart, lungs and liver.



3. Discuss various types of movements seen in living organisms.
Ans : Types of movement.
Amoeboid movement :
★ It is brought about by pseudopodia.
★ Which move with movement of protoplasm within a cell.
Ciliary movement :
★ This movement is brought about by cilia which are the hair-like extensions of the epithelium.
Muscular movement :
★ It is a more complex movement which is brought about by the musculoskeletal system.
★ This type of movement is seen in the higher vertebrates.

---

4. What is a streamlined body? How does it help in the movement of animals that fly or swim in water?
Ans :
★The body of a fish is streamlined to reduce friction while moving in water.
★They have strong muscles, which help in swimming.
★When a fish swims its front part curves to one side and the tail part stays in the opposite direction.
★The caudal or tail fin helps in changing direction.

---

5. Write a short note on different types of muscles.
Ans :

Muscle	Location	Characteristics
Striated /Skeletal / Voluntary muscle	Attached to bones. Found in arms, legs, neck.	Multinucleate, Unbranched, Voluntary.
Non striated / Smooth / Involuntary muscle	Attached to soft parts of the body like blood vessels, iris, bronchi and the skin.	Single, central nucleus Involuntary
Cardiac muscle	Heart	Branched, 1 -3 central nuclei Involuntary

Additional Questions and Answers

I. Choose the best answer :

1. Which of the following is a movement?
a) Walking b) Pumping of blood
c) Running d) Locomotion **Ans :b)Pumping of blood**

2. A cockroach has..... pairs of jointed legs.
a) three b) two
c) one d) four **Ans :a) three**

3. Movement of snake is called.....
a) gliding b) flapping
c) slithering d) swimming **Ans :c) slithering**

4. ..... use their muscles and scales to move.
a) Earthworm b) Snakes
c) Cockroach d) Birds **Ans :b) Snakes**

5. Cheetah can run..... km/hr
a) 100 b) 50
c) 76 d) 176 **Ans : c) 76**

6. ..... can run faster than man.
a) Hippopotamus b) Cheetah
c) Cockroach d) Elephant **Ans : a) Hippopotamus**

7. Flexion and extension movement by.....joint
a) gliding b) saddle
c) condyloid d) pivot **Ans : b) saddle**

8. .....joint is known as diarthrosis joint.
a) Synovial b) Ball and socket
c) Hinge d) Pivot **Ans : a) Synovial**

9. The longest and strongest bone of the human skeleton is .....
a) femur b) humerus
c) sternum d) carpals **Ans : a) femur**

10. Fingers are made up of.....
a) radius b) carpals
c) ulna d) phalanges **Ans : d) phalanges**

11. The hardest working muscle is in .....
a) liver b) lungs
c) eyes d) stomach **Ans : c) eyes**

12. There are ..... muscles to smile and ..... muscles to frown.
a) 16, 32 b) 15, 25
c) 18, 40 d) 17, 42 **Ans : d) 17, 42**

13. Heart is made up of ..... muscle
a) smooth b) skeletal
c) cardiac d) voluntary **Ans : c) cardiac**

14. Muscles of the skin are..... and .....
a) Straited / Voluntary
b) Non-straited / Voluntary
c) Smooth / Involuntary
d) Branched / straited **Ans : c) Smooth / Involuntary**

II. Fill in the blanks.

1.Body of cockroach is covered by..... **Ans : chitin**
2. In birds, ... are modified to hold flight muscles. **Ans : breast bones**
3.The fastest mammal that can swim..... **Ans : Dolphin**
4. Wrist is an example of .....joint **Ans : Condyloid**
5. Deposition of uric crystals in the joints causes ..... **Ans : arthritis**
6. The smallest and lightest bone in the middle ears of human is.....
Ans : stapes
7. Humans and ..... have the same number of bones in the neck.
Ans : Giraffes
8.Knee cap is called as..... **Ans : Patella**
9.The muscle in the front of upper arm is..... **Ans : biceps (flexor)**
10.Movement can be both.....and ..... **Ans : voluntary, involuntary**

III. Answer shortly.

1. Define - Triceps.
Ans :
★ Triceps are the muscles or extensor at the back of the upper arm.

---

2. What are Setae? Mention its function?
Ans :
★ Setae are large number of bristles on the underside of the body of earthworm.
★ It helps to get grip on the ground.

---

3. How do snakes move?
Ans :
★ Since snakes do not have legs, they use their muscles and their scales to move.

---

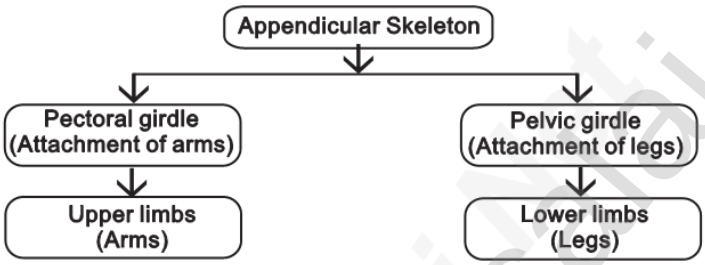
4. Mention the thrusts involved in forward movement.
Ans :
★ Sideway thrust
★ Resultant thrust
★ Backward thrust

---

5. What are synovial joints?
Ans :
★ A synovial joint is a joint which makes connection between two bones consisting of a cartilage lined cavity filled with liquid.

6. What are the constituents of skeleton?
Ans :
★ Human skeleton consists of bones, cartilages and ligaments.

7. Write the flow chart for appendicular skeleton.
Ans :



8. What are floating ribs?
Ans :
★ The two pairs of ribs, that are free in the Ribcage or sternum.
★ They are called floating ribs.

9. Name the two ends of a muscle.
Ans :
★ Fixed end → Muscle originates
★ Movable end → Pulls other parts

10. What is responsible for your goosebumps?
Ans :
★ Muscles in the root of the hair is responsible for the goosebumps.

11. What helps birds to fly? and how?
Ans :
★ Strong muscles and light bones help the birds to fly.
★ They fly by flapping their wings.

12. How do fish swim in water?
Ans :
★ Fish swim by forming loops alternately on two sides of the body.

13. Differentiate the movements in snakes and earthworms.
Ans :

Movement in snakes	Movement in Earthworms
★ Snakes slither on the ground by looping sideways.	★ Earthworms move by alternate extension and contraction of the body using muscles.

14. Define sternum.
Ans :
★ Sternum is long flat bone located in the central part of the chest.

15. How do locomotion occur in aquatic animals?
Ans :
★ In aquatic animals, locomotion results from a series of wave-like muscle contraction.

IV. Answer in Detail.
1. Explain types of bones in human skeletal system.
Ans :
Long Bones: Found in arms and legs.
Short Bones: Found in wrist ankle, vertebral column.
Flat Bones: Found in skull, ribs, shoulder and hips.
Irregular Bones: Found in spine and vertebral column, mandible, palatine, inferior nasal concha, and hyoid.

2. State any four functions of vertebral column.
Ans :
★ It protects the spinal cord.
★ It supports the head.
★ It serves as an attachment for the ribs.
★ It provides movement for the human skeleton.

3. Differentiate arm bone and leg bone.
Ans :

	Arm bone	Leg bone
1.	Arm bone is the upper limb	Leg bone is the lower limb
2.	Humerus makes up the upper arm.	Femur makes up the thigh bone.
3.	Fore-arm is made up of radius and ulna.	Leg is made up of tibia and fibula.
4.	Wrist is made up of carpals.	Ankle is made up of tarsals.
5.	Palm is made up of metacarpals.	Foot is made up of metatarsals.

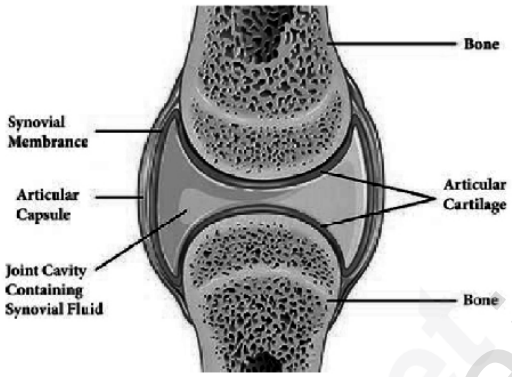
4. Tabulate the features and functions of Synovial joint.
Ans :

Feature	Function
Ligament	To connect bone to bone.
Synovial fluid	To reduce friction between the articular cartilage in the joint.
Articular cartilage	To absorb shock and to prevent friction between the ends of the bones in the joint.
Joint Capsule	The fibrous capsule helps to strengthen the joint, while the synovial membrane lines the joint and secretes synovial fluid.

V. Draw and label

1. Synovial joint.

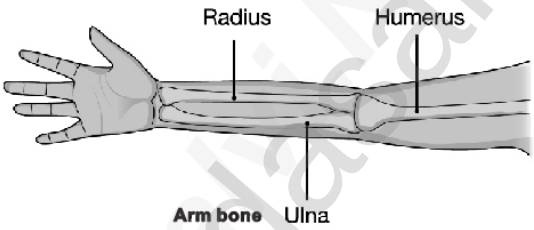
Ans :



Synovial joint

2. Arm bone.

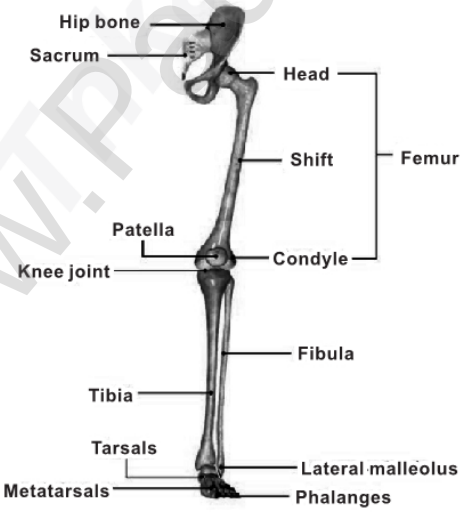
Ans :



Arm bone

3. Leg bone.

Ans :



Leg bone

Activity : 1

Observe an earthworm moving on soil in the garden. Gently lift it and place it on a piece of blotting or filter paper. Observe its movement now. In which of the above two surfaces do you find that the earthworm is able to move easily?

Ans :

★ Earthworm move easily in the soil.
★ Body of earthworm has large number of bristles called setae, which are connected with muscles.
★ These bristles help to get grip on the ground.
★ Repeating muscle contraction and relaxations, the earthworm can move through soil.
★ A slimy substance secreted by it body helps this movement.

Activity : 2

Observe a cockroach and identify its legs and wings. Try to know more about other parts of cockroach with the help of your teacher.

Ans :

★ Three pairs of jointed legs, helps to walk, run and climb.
★ Two pairs of wings for flying.
★ Large and strong muscles help in the movement of legs.
★ The body is covered by chitin, a light protective material.
★ Chitin is shed regularly so that the body can grow.

Activity : 3

Observe a hen and crow. How do they move? Write about the similarities and dissimilarities found among them, in your note book.

Ans : Hens

★ Hens move by wadding
★ Chickens can't as selective breeding has made them too heavy.
★ They walk and run every where.

Crow :

★ Crows migrate.
★ They fly to maintain balance among the group.
★ Crows are always on the move.

Activity : 4

Make a paper boat; put it in water and push it with narrow end pointing forward. Now hold the boat sideway and push it into water from the broad side. What did you observe? In which process was it easy to move the boat? Have you noticed that the shape of a boat is some what like a fish?

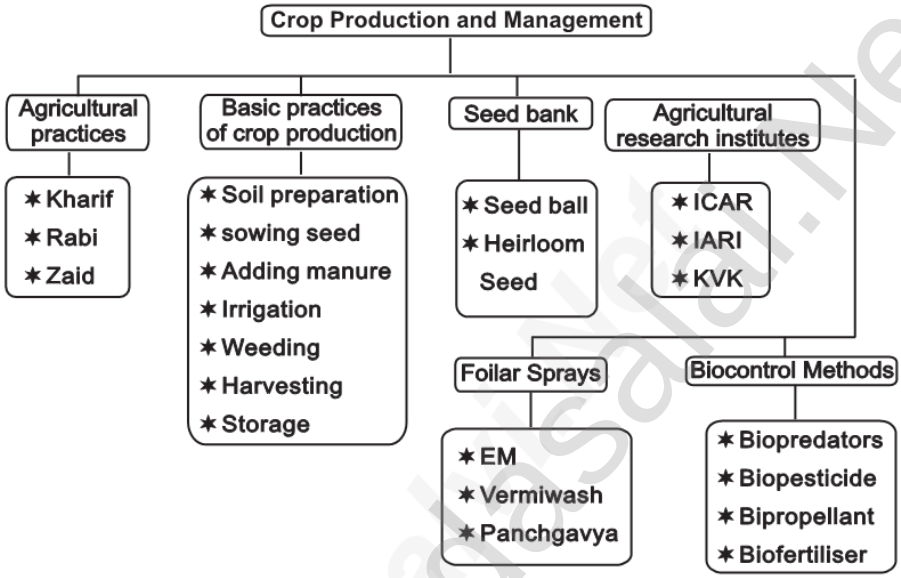
Ans :

★ The boat moves smoothly with the flow of water.
★ Forward movement (swimming) is the process to move the boat easily.
★ Shape of a boat is streamlined like that of a fish.

Activity : 5- Student Activity

UNIT - 21. CROP PRODUCTION AND MANAGEMENT

Concept Map



TEXT BOOK EXERCISES

I. Choose the best answer.

1. The process of placing seeds in the soil is called as

a) ploughing b) sowing
c) crop production d) crop rotation

Ans :b) sowing

2. Organism that control insects and pests of plant crops is

a) bio-pesticides b) bio-fertilizers
c) earthworms d) neem leaves

Ans : a) bio-pesticides

3. The method in which water flows over the soil surface and allow it to infiltrate is

a) irrigation b) surface irrigation
c) springler irrigation d) drip irrigation

Ans :c) springler irrigation

4. Effective microorganisms preparation is not used in

a) seed treatment b) foliar spray
c) soil treatment d) bio-predators

Ans : a) seed treatment

5. Which of the following is not present in Panchagavya?

a) Cow dung b) Cow's urine
c) Curd d) Sugar **Ans : d) Sugar**

II. Fill in the blanks.

1. The process of actively growing seedling from one place and planting in the main field for further growth is called --------- ----- **Ans: Transplanting**
2. ---------- is a plant growing in a place where it is not wanted. **Ans: Weed**
3. The chemicals used for killing the weeds or inhibiting their growth are called as --------- **Ans: Herbicide**
4. --------- seeds transfer their unique characteristics to the descents. **Ans: Heirloom**
5. ---------- centers serve as the ultimate link between ICAR and farmers. **Ans: KVK (Krishi Vigyan Kendra)**
6. Several popular high yielding varieties of major crops have been developed by --------- **Ans: IARI (Indian Agricultural Research Institute.**

III. Match the following

1	Bio-pesticide	-	Neem Leaves
2	Bio-predators	-	Bacillus thuringiensis
3	Bio-fertilizer	-	Control white flies
4	Bio-indicators	-	Improve soil fertility
5	Bio-repellants	-	Quality of environment

Ans :

1	**Bio-pesticide**	-	**Bacillus thuringiensis**
2	**Bio-predators**	-	**Control white flies**
3	**Bio-fertilizer**	-	**Improve soil fertility**
4	**Bio-indicators**	-	**Quality of environment**
5	**Bio-repellants**	-	**Neem Leaves**

IV. Answer briefly.

1. Define Ploughing.

Ans :

* Ploughing or tilling is the process of loosening and turning the soil up and down.

2. Name the methods of sowing.

Ans :

* Sowing by hand
* seed drill
* Dibbling

3. What is foliar spray?

Ans :

* Foliar spray is a technique of feeding plants by applying liquid fertilizer directly to their leaves.

4. Give a brief account on Krishi Vigyan Kendra.
Ans :
* Krishi Vigyan Kendra is a farm science centre.
* These centres serve as the ultimate link between ICAR (Indian Council of Agricultural Research)and farmers.

5. What is bio-indicator ? How does it help human beings?
Ans :
* Bio-indicator is any species or group of species, whose function reveals the qualitative status of the environment.
* It is used to document and understand changes in earth's living organisms.

6. What do you mean by weeding?
Ans :
* Removal of undesirable plants (weeds) are called weeding.

7. What is crop rotation?
Ans :
* Crop rotation is planting a series of different crops in the same field following a defined order.

8. What is green manure?
Ans :
* The green plants which are added to the soil in the form of nutrients to enhance the growth of plants are called green manure.

V. Answer in detail.
1. Explain the agricultural practices.
Ans :
(i) Soil preparation :
* Soil is loosened by earthworm and soil microbes.

(ii) Sowing of seeds :
* Planting the selected and high quality seeds.

(iii) Adding Manure and Fertilizers :
* Supply of nutrients to crop plants in suitable proportions.

(iv) Irrigation :
* Supply of water to crops.

(v) Weeding :
* Removal of undesirable plants.

(vi) Harvesting of crops:
* Cutting and gathering crops.

(vii) Storage of food grains :
* Collected food grains are stored in godowns.

2. Give a detailed account on irrigation.

Ans :

* The supply of water to crops at regular intervals is called irrigation.

Methods of irrigation :

a) Traditional Methods

* Pulling water from wells or canals by cattles and pumps.

b) Modern Methods :

* It involves two methods.
  (i) Sprinkler system
  (ii) Drip system

(i) Sprinkler System

* Advisable in areas facing water scarcity.
* Water is sprinkled evenly over the crops.

(ii) Drip System

* Effective in regions where water is less.
* Water is released drop by drop at the root zone.

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3. What is weed? Explain the different methods of weed control.

Ans :

* Undesirable plants that grow along with the main crop are called weeds.

Methods of weed control :

1) Mechanical methods

* Weeds are destroyed physically by hand or hoe.

2) Tillage methods

* Weeds are buried in soil and exposed to sun heat .

3) Biological weed control

* Insects and pathogens are used to reduce and regulate weed population.

4) Chemical methods

* Chemicals mixed with water, is used to kill weeds and inhibit their growth.

Additional Questions and Answers

I. Choose the best answer :

1. The crops sown in the rainy season are..... crops.

a) Rabi b) Kharif
c) Zaid d) Fodder **Ans : b) Kharif**

2. ..... is an example of zaid crops.

a) Soyabean b) Cotton
c) Wheat d) Watermelon **Ans : d) Watermelon**

3. ..... crops are used for cordage and textile.

a) Fibre b) Oil
c) Food d) Ornamental **Ans : a) Fibre**

4. Our country is the largest producer of..... and ..... in the world.
a) Wheat and Rice b) Paddy and Maize
c) Cotton and Hemp d) Bananas and Mangoes **Ans : d) Bananas and Mangoes**

5. Which of the following is not a ploughing implement?
a) Hoe b) Seed drill
c) Plough d) Cultivator **Ans : b) Seed drill**

6. ..... helps in uniform distribution of water during irrigation.
a) Ploughing b) Weeding
c) Leveling d) Harvesting **Ans : c) Leveling**

7. Food corporation of India was set up at.....
a) Mumbai b) Delhi
c) Kolkata d) Chennai **Ans : d) Chennai**

8. ..... is commonly known as the Pusa Institute.
a) FCI b) IARI
c) KVK d) ICAR **Ans : b) IARI**

9. A farm science centre located at pondicherry is.....
a) ICAR b) IARI
c) FCI d) KVK **Ans : d) KVK (Krish Vigyan Kendra)**

10. The first KVK was established in .....
a) 1874 b) 1994
c) 1974 d) 1894 **Ans : c) 1974**

11. Combination of five products called Panchgavya is obtained from.....
a) Horse b) Elephant
c) Donkey d) Cow **Ans : d) Cow**

12. Black kneel capsid is an example for.....
a) Bio-predator b) Bio-pesticide
c) Insect-Repellant d) Bio-fertilizer **Ans : a) Bio-predator**

13. Compound Azadiractin is obtained from seeds of .....
a) Margosa b) Coconut
c) Neem d) Legume **Ans : c) Neem**

14. Trichodermaviride is a .....
a) Bacteria b) Fungus
c) Insect d) Weed **Ans : b) Fungus**

15. The process of scattering of seeds on soil surface is.....
a) Threshing b) Winnowing
c) Harvesting d) Broad casting **Ans : d) Broad casting**

II. Fill in the blanks.

1. Green plants make their food by..... **Ans : photosynthesis**
2. India is the second largest producer of.....and..... **Ans : Wheat, Rice**
3. Croton and Bougainvillea are.....crops. **Ans : ornamental**
4. The main part of plough is..... **Ans : plough shaft**
5. NPK is a ..... **Ans : synthetic fertilizer**
6. The process of separating grain is..... **Ans : winnowing**
7. Seed bank located in New Delhi is..... **Ans : Navadanya**
8. A natural bio-indicator of chemical changes are..... **Ans : lichens**

III. Match the following.

1.	Rabi crops	Cyanobacteria
2.	Bio-fertilizer	Foliar spray
3.	Organic seeds	Bacillus thuringiensis
4.	Vermi wash	Winter crops
5.	Lepidoptera	Heirloom seeds.

Ans :

1.	**Rabi crops**	**Winter crops**
2.	**Bio-fertilizer**	**Cyanobacteria**
3.	**Organic seeds**	**Heirloom seeds.**
4.	**Vermi wash**	**Foliar spray**
5.	**Lepidoptera**	**Bacillus thuringiensis**

IV. Answer shortly.

1. Tabulate the three categories of crops with examples.

Ans :

Name of the crop	Season	Examples
1) Kharif crops	Rainy	Paddy, Maize
2) Rabi crops	Winter	Wheat, Gram
3) Zaid crops	Summer	Watermelon, Cucumber.

2. Name any four agricultural implements.

Ans :

* Plough
* Hoe
* Cultivator
* Leveller

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3. Define - Dibbling.

Ans :

Dibbling is the placement of seed material in a furrow, pit or hole at predetermined spacing.

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4. What is mono cropping?

Ans :

Planting of same crop in the same field year after year.

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5. Define - Vermiwash.

Ans :

* A liquid that is collected after the passage of water through a column of worm action.

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6. What is Panchgavya?
Ans :
* A promoter with a combination of five products obtained from the cow, which includes cow dung, cow's urine, milk, curd and ghee.

7. Mention the sources of irrigation.
Ans :
* Wells, tube wells, ponds, lakes, rivers, dams and canal.

8. Name the post-harvest practices.
Ans :
* Threshing
* Winnowing

9. What are two methods used in crop production?
Ans :
* Mono cropping
* Mixed cropping

10. Define - Seed bank.
Ans :
* Seed bank is a place where seeds are stored in order to preserve genetic diversity.

11. What are the techniques used for controlling micro organisms?
Ans :
* Bio - Predators
* Bio - Pesticides
* Bio - Repellants
* Bio - Fertilizers

12. What are Bio-fertilizers? Give two examples.
Ans :
* Bio-fertilizers are organisms which can bring about soil nutrient enrichment.
* Eg : Cyanobacteria, fungi.

13. Give examples for Nitrogen fixing bacteria.
Ans :
a) Free-living Cyanobacteria :
* Anabaena, Nostoc

b) Symbiotic bacteria:
* Rhizobium

14. What do you mean by Effective Microorganisms (EM) technology?
Ans :
* The culture of different effective microbes used in nutrient recycling, plant protection, soil health and fertility enrichment.

15. Name few Effective Microorganisms.
Ans :
* Nitrogen fixers
* Phosphate stabilizers
* Lactic acid bacteria
* Yeast

16. What is role of Agriculture Research Institution?
Ans :
* They formulate the agricultural practices based on recent research.
* They inform the farmers through media.

17. What is Lichen? Mention its significance.
Ans :
* Lichen is a combination of an alga and a fungus, which live together in symbiotic association.
* It is a bio-indicator of climate change and air pollution effect.

18. What are - Seed balls?
Ans :
* Seed balls are a mixture of soil, compost and plant seeds.

19. Define - Legumes.
Ans :
* The fruits of leguminous plants are called Legumes.
* Eg. : Peas, beans.

20. Name the Botanic Garden in Kolkata.
Ans :
* Acharya Jagadish Chandra Bose Indian Botanic Garden, earlier called as Royal Botanic Garden.

21. What is fumigation?
Ans :
* Chemicals vapours sprayed to minimize pests and insects in godowns.

22. What is the objective of FCI?
Ans :
* The objective of FCI is to distribute food grains throughout the country for public distribution system (PDS)

23. How are the food grains stored?
Ans :
* Food grains are stored in Mudbins, Jute bags and Silos.

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24. Differentiate threshing and winnowing.
Ans :

Threshing	Winnowing
* Process of separating the grains from their chaffs or pods.	* Process of separating the grains

25. What do you mean by Integrated weed management?
Ans :
* Weed control methods which includes mechanical, biological, cultural and chemical methods.

V. Answer in detail.
1. Write a note on hoe.
Ans : Hoe :
* It is a simple agricultural tool which is used to till the land, remove weeds and dig up soil.
* It has a long wooden rod with a bent iron plate at one end.
* The other end may be attached to an animal.

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2. Classify crops based on the utility.
Ans :
Food crops :
* Paddy and maize are cultivated for human consumption.

Fodder crops :
* These are useful for livestock consumption.
* E.g. Sorghum, millets

Fibre crops :
* These crops are used for cordage and textile.
* E.g. Cotton and hemp

Oil crops :
* Oil crops are useful in a large scale for consumption or industrial uses.
* E.g. Ground nut and sesame.

Ornamental crops :
* These are utilized for landscape gardening.
* E.g- Croton and Bougainvillea.

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3. What is transplanting? Mention its significance.
Ans :
✶ Transplanting is removal of an actively growing seedling from one place (usually nursery bed) and planting it in the main field for further growth till harvest.
✶ Transplanting makes use of pre- grown plants, seedlings or vegetative propagated clones.

4. What are advantages of crop rotation?
Ans :
✶ Crop rotation lead to greater production.
✶ Maintains soil productivity.
✶ Maintains better balance of nutrients in the soil.
✶ Less weed problems.

5. Give an account of heirloom seed.
Ans :
✶ Heirlooms are also called organic seeds.
✶ It is the seed of plant that is cultivated and passed to many generations.
✶ They are produced from open pollinated plants.
✶ They are harvested, dried, stored and replanted in following season.

6. Expand the following
a) NPK b) IARI c) ICAR d) KVK e) EM f) FCI
Ans :
a) NPK - Nitrogen Phosphorus Potassium.
b) IARI - Indian Agricultural Research Institute.
c) ICAR - Indian Council of Agricultural Research.
d) KVK - Krishi Vigyan Kendra.
e) EM - Effective Microorganism.
f) FCI - Food Corporation of India.

Activity : 1
Mention few examples for Kharif, Rabi and Zaid crops cultivated in your area.

Kharif	Rabi	Zaid

Ans :

S.No.	Type of crops	Examples
1.	Kharif crops	Paddy, Maize, Soyabean, Groundnut, Cotton
2.	Rabi crops	Wheat, Gram, Pea, Mustard, Linseed.
3.	Zaid crops	Muskmelon, Watermelon, Cucumber.

Activity : 2- Student Activity

Activity : 3

Find out the irrigation system followed in your area. Also, debate on the advantages and disadvantages of modern irrigation systems like sprinkler system and drip system.

Ans :

* Irrigation followed in our traditional method.
* Wells, Canals are sources of water.

Irrigation system	Advantages	Disadvantages
Sprinkler system	* Sprinkles water over crop * Even distribution	* High cost * Water is wasted.
Drip system	* Water is released drop by drop at root zone	* Tubes or hose get clogged.

Activity : 4

Visit a food storage godown in your area and know about the methods followed to preserve the food. Also discuss in the class room about the importance of preserving and protecting food grains.

Ans :

Importance of preserving and protecting food grains :

* Supply of the products has to be maintained by proper storage.
* Before storing, harvested grains should be made free from moisture.
* Any moisture in the stored grains will lead to the growth of microorganism.
* They need to be dried in the sun before storing.
* Silos and granaries are used for storage of grains on large scale.
* Fumigation is the process of spraying chemical vapours to minimize pest and insects in godowns.

Activity : 5

Take some seeds of the fruits you eat and mix it with compost. Add some clay with them and roll them into small balls. Allow them to dry under the sun for two or three days. Take these balls and drop them in dry and arid areas. This will help new plants to grow. You can throw those balls while you are travelling. This will help grow plants in areas where there is no plant cover.

Ans : Seed balls :

* Seed balls are a mixture of soil, compost and plant seeds.
* These balls are thrown into land areas. With the monsoon set in, these planted seed balls will germinate into seedling.
* Making seed ball is a step towards conserving the natural ecosystems.
* Seed balls are prepared by non-government organization and enthusiastic school children to grow tree for ecosystem restoration.
* The concept of seed ball has potential to increase tree cover and also to improve the awareness among the people about conserving plants.

Activity : 6

Visit a Krishi Vigyan Kendra in your area with your teacher. Find out the activities carried out in those centres.

Ans : Responsibility of KVK

* Each KVK operates a small farm to test new technologies, such as seed varieties or innovative farming methods developed by ICAR institutes.
* This allows new technologies to be tested at the local level before being transferred to farmers.
* It also organizes programs to show the efficacy of new technologies on farmer's fields.
* KVKs organise workshops to discuss modern farming techniques with groups of farmers.
* KVKs provide advisory service to the farmers about weather and market pricing through radio and mobile phones.
* It focuses on crops and cultivation methods to the local climate and industry.
* It also facilitates rapport between the institution and the local community.

Activity : 7

Take a leguminous plant like pea and find out if there are any nodes. Rhizobium bacteria live in such nodes.

Ans :

* Leguminous plants have symbiotic relation with the Rhizobium bacteria found in the root nodules of these plants.
* These plants have the ability to fix atmospheric nitrogen in their roots with the help of these bacteria.
* The fruits of this plant are called legumes.
* Examples of legumes include alfalfa, clover, peas, beans,lentils, lupins, mesquite, carob, soy, and peanuts.
* These plants are used in crop rotation to replenish soil nitrogen.