APSWREIS

Andhra Pradesh Social Welfare Residential Educational Institutions Society

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Hob'ble Chief Minister of Andhra Pradesh

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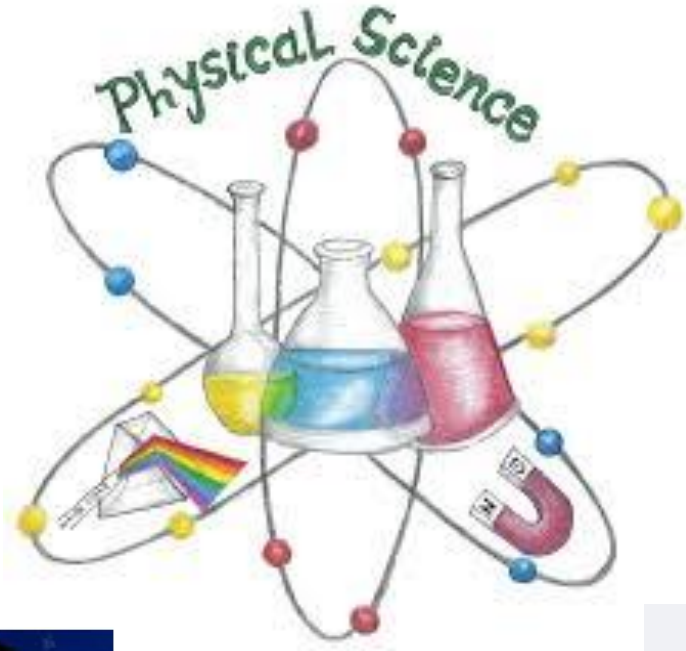
Hon'ble Minister for Social Welfare

SSC STUDY MATERIAL



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ANDHRA PRADESH SOCIALWELFARE RESIDENTIAL EDUCATIONAL INSTITUTIONS SOCIETY

STUDY MATERIAL

SSC

PHYSICAL SCIENCE

Prepared By:-

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Sl. No	Name of the Chapter	Chapter Wise Weightage Marks	Page No.
1	Heat	5 ½	
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5	Human Eye and Colourful world	5 ½	
6	Structure of Atom	6	
7	Classification of elements, Periodic Table	5 ½	
8	Chemical Bonding	5 ½	
9	Current Electricity	6	
10	Electromagnetism	5 ½	
11	Metallurgy	5 ½	
12	Carbon and its Compounds	6	

WEIGHTAGE TABLE – ACADEMIC STANDARDS

Academic Standard	% of Weight age	Marks
AS 1	40 %	20
AS 2	10 %	05
AS 3	15 %	08
AS 4	15 %	07
AS 5	10 %	05
AS 6	10 %	05
TOTAL	100 %	50

WEIGHTAGE TABLE – QUESTON TYPE

Sl. No	Questions Type	No. of Questions	Allotted Marks	Total Marks	Percentage
1	Objective Type	12	½	6	12
2	Very Short Answer Questions	8	1	8	16
3	Short Answer Questions	8	2	16	24
4	Essay Type Questions & Answers	5	4	20	40
		33		50	100 %

1. HEAT

Key concepts

- Heat:-

Heat is a form of energy. It flows from a hotter body to a colder body.
Units of heat: CGS system – Joule (J)
SI system – calorie (Cal)

- Calorie:-

The amount of heat required to raise the temperature of 1gm of water by 1^{o}c is called calorie.
1 calorie = 4.186 Joules

- Thermal equilibrium:-

When two bodies are placed in thermal contact, heat energy, will be transferred from the 'hotter body' to the 'colder body'. The state of thermal equilibrium denotes a state of a body where it neither receives nor gives out heat energy. If A and B systems are in thermal contact and they are individually in thermal equilibrium with C, then A, B and C are also in thermal equilibrium.

- Temperature:-

Temperature is the degree of hotness or coldness.
The SI unit of temperature is Kelvin
O°C=273k
Temperature in Kelvin = 273 + t^{o}c

- Absolute temperature:-

Temperature measured in Kelvin scale is called "absolute temperature"

- Temperature and Kinetic energy:-

Increase in temperature means increase in Kinetic energy of the substance.
The average Kinetic energy of the molecules is directly proportional to the absolute temperature.

- Specific heat (S):-

Specific heat of a substance is the amount of heat energy required to raise the temperature of unit mass of the substance.
Specific heat S= $\frac{Q}{m\,\Delta T}$
Units:- CGS system – Cal/g-^{o}C
SI system – J/kg-K
Specific heat depends on nature of the material.
If the specific heat of substance is high, the rate of raise (fall) in temperature is low for same quantity of heat supplied.

- Principle of method of mixtures:-

Net heat lost by the hot body=Net heat gained by the cold body
Determination of specific heat of a given solid (lead shots) by the formula
Sl = $\frac{[\,m_1\,Sc+(m_{2-}\,m_1)S_w\,](\,T_{3-}\,T_1)}{(m_{3-}\,m_2\,)\,(\,T_{2-}\,T_3\,)}$

- Evaporation:-

The process of leaving of molecules from the surface of a liquid at any temperature is called evaporation. It is cooling process.
Water in wet clothes, spirit in the dish disappears due to evaporation. It depends on surface area, temperature, wind speed and humidity.

- Condensation:-

The phase changes from gas to liquid is called “condensation”
It is a warming process.
We get dew on the surface of a cold soft drink bottle kept in air due to condensation.

- Humidity:-

The amount of water vapour present in air is called “humidity”

- Dew:-

The water droplets condensed on such (Ex: grass) surfaces are known as dew.
Dew forms during winter seasons

- Fog:-

The water droplets condensed on the dust particles in the air keep floating in the air is called “Fog”

- Boiling :-

Boiling is a process in which the liquid phase changes to gaseous phase at a constant temperature at a given pressure.
The boiling point of water is 100°C (or) 373k

- Melting:-

The process of converting solid into a liquid is called “Melting”
The melting point of ice=O^0C

- Latent heat of fusion:-

The heat energy required to convert 1gm of solid completely in to liquid at a constant temperature is called “Latent heat of fusion” (L)
L= $\frac{Q}{m}$
Units: - CGS system – cal /gm
SI System – J/kg
Latent heat of fusion of ice = 80 cal/gm

- Latent heat of vaporization : -

The heat energy required to change 1gm of liquid to gas at constant temperature is called “Latent heat of Vaporization (L)”
L= $\frac{Q}{m}$
Units: - CGS system – cal /gm
SI System – J/kg
Latent heat of Vaporization of water = 540 cal/gm

- Freezing:-

The process in which a substance in liquid phase changes to solid phase by losing some of its energy is called “Freezing”
Freezing of water takes place at 0^OC.
Water expands on freezing.

½ Mark question & Answers:

1. “Net heat lost = Net heat gained”. Name the principle involved in this statement?

A. Principle of method of mixtures

2. What is the SI unit of specific heat?

A. J/Kg-K

3. How can we call the water vapour present in the air?

A. Humidity

4. Choose the suitable answers of section-B with section-A?

Section-A		Section-B
(i)	Latent heat of fusion of ice	(P) 540 Cal/g
(ii)	Melting point of ice	(Q) 80 Cal/g
(iii)	Boiling point of water	(R) O°C
		(S) 100°C

A. (i)-P, (ii)-R, (iii)-S B. (i)-R, (ii)-Q, (iii)-S
C. (i)-P, (ii)-Q, (iii)-S D. (i)-Q, (ii)-R, (iii)-S A. [D]

5. Define temperature?
A. The degree of coldness or hotness is called temperature.
6. Find the specific heat of a substance, when its mass is 'm' and the required heat is 'Q' to raise one degree Celsius?
A. $S=\frac{Q}{m\Delta T}$
7. 1 Calorie is equal to how many joules?
A. 4.18 J
8. Which phenomenon is the evaporation?
A. Surface phenomenon
9. Convert 546k in to Celsius scale?
A. t°=C546-273=273°C
10.

	1	2	3	4
A	30°C	50°C	-273k	27°C
B	30k	30°C	O°C	300k

In which case A and B are in thermal equilibrium
A. Case 4, Because 27^0C = 300K
11

Substance	Specific heat (Cal/g°C)
Water	1
Mercury	0.033
Copper	0.095

Among the above substances, for which substance the rate of rise in temperature is low if same quantity of heat is supplied?
A. Water, Because water has high specific heat.
12 Equal amount of spirit is taken in a cup and a saucer. After some time is no spirit in the saucer and same amount of the spirit is there in the cup. What do you conclude from this?
A Rate of evaporation is directly proportional to surface area.
13 Which form of energy flows from hot body to cold body?
A Heat
14 Which phenomenon is phase change from gas to liquid?
A Condensation
15 Which process takes place at constant temperature among evaporation and boiling?
A Boiling
16 Statement X: A samosa is cool outside but inside curry is hot due to its high specific heat values.
Statement Y: All substances have same specific heat values
(A) Both X and Y are true
(B) X is true but Y is false
(C) X is false but Y is true
(D) Both X and Y are false
A B
17. The temperature readings of Bangalore and Mumbai at 12 PM today

Bangalore	Mumbai
30°C	313K

Which city is hot ?
A) Mumbai is hot?

18 If two substances present in two different containers have same temperature then choose the correct statement from the following?
A (A)They are in thermal equilibrium
(B) Both contain same amount of heat

(C) The amount of heat present in them depends on their individual masses and specific heats.

(D) If we add 100 ml water to both substances after some time they get same temperature

A [A, C]

- Answer 19, 20 questions with the following information.
  "when heat is supplied the matter changes from one state to another state"

19 The heat energy supplied to a substance during melting is known as ____

A [Latent heat of fusion]

20 During the process of vaporisation, what happens to the temperature?

[A. temperature remains constant]

21 Which of the following has the units J/Kg-K, J/Kg respectively?

(A) Heat, Specific heat (B) Specific heat, latent heat

(B) Temperature, latent heat (D) Heat, latent heat

A.[B]

1 MARK QUESTION AND ANSWERS

1. Distinguish between heat and temperature.

A. Heat is a form of energy which flows from hot body to cold body. Temperature is the degree of hotness or coldness

2. Siva noted the temperature of a substance on an activity as 30°C. Express it in Kelvin.

A. Temperature in Kelvin = 273 + Temperature in Celsius degree

30°C= 273+30= 303k

3. What happens to the water when wet clothes dry?

A. Water in the wet clothes disappears due to evaporation.

4. Why does ice floats on water?

A. Ice floats on water because the density of ice is less than the density of water.

5. When we clean the floor of our house with a wet cloth the floor dries up after some time. What happens to the water on the floor?

A. The water on the floor is escaped as water vapour due to evaporation and mixed with surrounding air.

6. Why samosa appears to be cool outside but it is hot when we eat? Or Write an application of the specific heat capacity in daily life.

A. Because the curry inside the samosa contains ingredients has higher specific heat values.

7. Why water is used as moderator in a nuclear reactor?

A. Because water has greater specific heat values.

8. How much heat energy is absorbed when 1 gram of ice at -5°C is converted to ice at o^0c?

A. Q= msΔT

=1X0.5 X [0-(-5)]

Q= 2.5 Cal

9. On what factors does the rate of evaporation depends?

A. Surface area of the liquid, temperature, wind speed, humidity.

10. In an experiment regarding melting of ice, during the process what is the main observation you have noticed?

A. Temperature remains constant until total ice melts in to water

11. A, B, C are in thermal equilibrium. If the temperature of A is 40^oC then what is the temperature of C?

A. The temperature of C is 40^0C since they are in the thermal equilibrium.

12. What happens to water kept in a refrigerator?

A. Water converts to ice by losing its internal energy.

13. Why do pigs toil in mud in hot summer days?

A. To cool its body by the process of evaporation.

14. How much energy is transferred when 1g of boiling water at 100^0C condense to water at 100^0C.

A. Energy transferred = mX L_{water}.

= 1X540 =540 cal.

15. Why water melon is cool for a long time after removing it from refrigerator?

A) Because water melon contains large percentage of water and water has greater specific heat.

2 MARKS QUESTIONS AND ANSWERS:

1. Distinguish between evaporation and condensation

A. Evaporation is phase change from liquid to gas. It is a cooling process.

Condensation is phase change from gas to liquid. It is a warming process.

2. What would be the final temperature of a mixture of 50g of water at 20^0C temperature and 50g of water at 10^0C temperature?

A) Given m_1 = 50g, m_2 = 50g

$T_1=20^0C$, $T_2=40^0C$

Final temperature of the mixture

$$T= \frac{m1\,T1+m2T2}{(m1+m2)}$$

$$= \frac{(50X20 +50X\ 40)}{50+50}$$

$= \frac{1000+2000}{100} = \frac{3000}{100}$

$= 30^0c$

3. Why do we get dew on the surface of a cold soft drink bottle kept in open air?

Or

What is condensation? Give an example?

A)

i. Air contains water molecules in the form of vapour.
ii. The molecules of water in air, during their motion, strike the surface of the bottle which is cool.
iii. So they lose their kinetic energy and lowers their temperature.
iv. Hence they are converted into water droplets due to condensation.

4. Temperatures of two cities at different time are given as follows:

Time → City ↓	At 6 AM	At 11: 30 AM	AT 06.00 PM
A	- 3^0C	300 K	5^0C
B	271 K	27^0C	270 K

On the basis of the above table, answer the following questions?

i. In which city the morning temperature at $6^{o'}$clock is relatively high?
ii. At what time, both cities are having the equal temperature?

I. City B
II. At 11:30 AM

5. Your friend is asked to differentiate between evaporation and boiling. What questions could you ask to make him to the difference between evaporation and boiling?

i. Does evaporation occurs at constant temperature ?
ii. Does boiling take place at any temperature ?
iii. Which of the process among evaporation and boiling is surface phenomenon ?
iv. Which of the process among evaporation and boiling is cooling process ?

Note:- Write any related Questions.

6. Answer the following questions by using the data given in the table.

Substance	Specific heat (Cal/g - ^{0}C
Copper	0.095
Iron	0.115ss
Aluminium	0.21
Water	1.00

1. What is the SI Unit of specific heat?
2. Which substance used as bottom of the cooking vessels? Why?
3. Calculate the amount of heat required to raise the temperature of 1 gram of water through 1^0C?
4. Depending on the above the table what are the factors effecting he specific heat?

i. J/kg-K

ii. Copper because of its low specific heat
iii. I Cal
iv. Nature of substance

7. Application of nail polish is a cooling process. Explain?
   1. Nail polish contains alcohol/spirit which evaporates faster.
   2. Evaporation is a cooling process. So we feel cool.
8. Give the reason to get sweat while we are doing work?
   1. When we do work the water in the sweat glands starts evaporating
   2. This evaporation cools the body.
9. Why do we feel warm after the bath? Explain with the basis of the concept involving in this?
   1. The numbers of water vapour molecules per unit volume in the bathroom is greater than the number of vapour molecules per unit volume outside the bathroom.
   2. When we try to dry ourselves with a towel the vapour molecules surrounding us condense on our skin.
   3. Condensation is a warming process, hence we feel warm.
10. In early morning during winter you might have noticed that water droplets form on window panes, flowers grass etc., how are these water droplets formed?
    1. During winter season weather cools rapidly.
    2. The water vapour molecules touch the surfaces, gets cooled and lost its energy.
    3. Then water vapour condenses on the surface and water drops formed.
    4. This is called dew.

4 MARKS QUESTION AND ANSWERS:

1. Write the difference between evaporation and boiling?

   A)

EVAPORATION	BOILING
1. The process of escaping of molecules from the surface of a liquid at any temperature is called evaporation 2. It takes place at any temperature. 3. It is a cooling process 4. It is a surface phenomenon	1. The process in which the liquid phase changes to gaseous phase at a constant temperature is called boiling. 2. It occurs at constant temperature 3. It is not a cooling process 4. It is a bulk phenomenon.

2. Write the factors that effect the process of evaporation. Explain with suitable examples.

   A) Rate of evaporation depends on the following factors

   i. Temperature:-

   Example:- Clothes dry very fast in summer when compare to winter season as temperature is more.

   ii. Surface area:-

   Example :- The water kept in dish evaporates faster than in a cup due to its more surface area.

   iii. Wind Speed:-

Example:- Water in wet clothes are kept under fan evaporates faster than in normal conditions due to wind speed.

iv. Humidity:-

Example:- Water in wet clothes evaporates faster in dry atmosphere than in wet atmospheres in which humidity is more.

3. Observe the table and answer the following questions

Substance↓/Specific heat →	Cal /g-^{0}C	J/ Kg–K
Lead	0.031	130
Mercury	0.033	139
Copper	0.095	399
Aluminium	0.21	882
Kerosene	0.5	2100
Water	1.0	4180

a. How much heat energy is required to raise 1^{0}C of water of 1 gram?
b. Which substance has the lowest specific heat and which has the highest specific heat among all given in the table?
c. Convert 1 Cal / g – ^{0}C into J/Kg-K
d. Which metal is slowly heated up among all given in the tables?

A)

a) 1 Cal
b) Lowest is lead and highest is water
c) 4.180 X10^3 J/Kg –K
d) Aluminium

4. How is the evaporation useful to the animals which have no sweat glands?
   1) Dogs do not have sweat glands on their skin and they do not have sweating facility
   2) When dogs pant, the water molecules present on the tongue and in the mouth starts to evaporate.
   3) Evaporation is the cooling phenomenon.
   4) This helps to cool the interior parts of the dogs body.

4) Explain the procedure of finding specific heat of solid experimentally?

A) Aim:- To find the specific heat of given solid.

Apparatus:- Calorimeter, thermometer, Stirrer, Water, Steam heater, Wooden box and lead shots.

Procedure:-

1. Let the mass of the calorimeter along with stirrer is 'm_1' gm.
2. One third of the volume of the calorimeter is filled with water and its mass is 'm_2' gm
3. The temperature of the calorimeter is noted ($T°_1$ C)
4. The heated lead pieces of mass (m_3 gm) and temperature (T_2 °C) are quickly transferred in to calorimeter with minimum loss of heat.
5. Contents in the calorimeter are stirred and then resultant temperature ($T°_3$ C) is noted.
6. Let the specific heats of the calorimeter, lead shots and water are Sc, Sl and Sw respectively.
7. According to the Principle of method of mixtures

heat lost by the solid = Heat gained by the calorimeter + Heat gained by the water.

$(m_3 - m_2)Sl\ (T_2-T_3) = m_1\ Sc\ (T_3-T_1) + (m_2 - m_1)\ Sw\ (T_3-T_1)$

$(m_3 - m_2)Sl\ (T_2-T_3) = [\ m_1\ Sc\ (m_2 - m_1)\ Sw]\ (T_3-T_1)$

$$Sl = \frac{[\ m_1\ Sc\ (m_2 - m_1)\ Sw]\ (T_3-T_1)}{(m_3 - m_2)\ (T_2-T_3)}$$

By using the above formula we can calculate the specific heat of the solids [lead shots] experimentally

5. Explain the process of "Melting" and latent heat of fusion?
   Procedure:-

A)

1) Take small ice cubes in a beaker. Insert the thermometer into ice cubes in the beaker.
2) Observe the reading of the thermometer.
3) Now start heating the beaker keeping it on a burner.
4) We will observe that the temperature of the ice at the beginning is equal to or below O^0C
5) If the temperature of ice is below O^0C, it goes melting, you will notice no change in temperature though there is supply of heat continuously.
6) The heat energy supplied to ice is to change the phase of ice from solid to liquid without raising the temperature, this process is called melting.
7) The heat energy required to convert 1gm of solid completely into liquid at a constant temperature is called latent heat of fusion.

6. Suggest an experiment to prove that the rate of evaporation of liquid depends on the surface are and vapour already present in surrounding air?
   A) Surface area:-

   Take a test tube and a saucer pour 1 ml spirit in a test tube and an equal amount of spirit in a saucer. Put them under the sun. we observe that the volume of spirit is less in saucer than in test tube. Thus the spirit in the saucer evaporates faster because of its surface.

   Vapour already present the surrounding air:-

   Take two china dishes pour 100 ml of spirit in both dishes keep one on outside of the class and one in the class room. After some time, we can observe the volume of spirit kept at outside in less than that of in the class room. That is evaporation is more at outside of the classroom because of less humidity outside.

7. Answer these.
   a) How much energy is transferred when 1 gm of steam at 100^0C condenses to boiling water at 100^0C?
   b) How much energy is transferred when 1 gm of water at 100^0C cools to water at 0^0C
   c) How much energy is transferred when 1 gm of water at O^0C freezes to ice at O^0C?
   d) How much energy is transferred when 1gm of steam at 100^0C turns to ice at 0^0C?

A)

A. Latent heat of vaporisation of water L= 540 cal /gm when 1 gm of steam at 100^0C, Condenses to 1 gm of water at 100^0C
   Amount of energy transferred $Q_1 = mL = 540$ Cal

B. When 1 gm of boiling water at 100^0C cools to water at O^0C, let amount of energy transferred
   $Q_2 = m \times S \triangle X \quad T$
   $Q_2 = 1 \times 1 \times (100 - 0)$
   $Q_2 = 100$ Cal

C. Latent heat of fusion of ice (L= 80Cal/gm). Let the amount of energy transferred when 1gm of water at O^0C freezes into ice at O^0C = Q_3
   $Q_3 = mL = 80$ Cal

D. When 1 gm of steam at 100^0C turns in to 1 gm of ice at O^0C the amount of energy transferred
   Now $Q = Q_1 + Q_2 + Q_3$
   $Q = 540 + 100 + 80$
   $Q = 720$ Cal

∴ **T**otal amount of energy transferred = 720 Cal

8. Write the principles of methods of mixtures. What would be the final temperature of a mixture 60 gm of water at 50^0C and 50 gm of water at 70^0C?
   [Latent hat of fusion of ice is 80 Cal /gm]

A) Principle of method of mixtures:- when two or more bodies at different temperatures are brought into thermal contact, the net neat lost by the hot bodies is equal to net heat gained by the cold bodies until they attain thermal equilibrium

Net heat lost = Net heat gained

$m_1 = 60$gm $\quad T_1 = 50^0$C

m2 = 50 gm $\quad T_2 = 70^0$C

Resultant temperature $\quad T = \frac{m1\ T1+m2T2}{(m1+m2)}$

$= \frac{60\ X50+50X70}{60+50}$

$= \frac{3000+3500}{110}$

Resultant temperature $= 59.09^0$C

2. Acids, Bases and Salts

Key Concepts:

- **Indicators:** The substances or solutions used to detect the nature of a given solution for acidity or basicity are called indicators.
- **Acid:** Acid is sour to taste and turns blue litmus to red.
  Ex: HCl, H_2SO_4, Lemon juice etc,.
- **Base:** Base is soapy to touch and turns red litmus to blue.
  Ex: NaOH, $Mg(OH)_2$, tooth paste, etc,.
- **Neutralization:** The reaction of an acid with a base to give a salt and water is known as neutralization.
- **Strong Acid:** An acid which produces more H_3O^+ ions in aqueous solution is called strong Acid.
  Ex: HCl
- **Strong base:** A base which produces more OH^- ions in aqueous solutions is called strong base.
  Ex: NaOH.
- **Alkali:** The base which is soluble in water is called alkali.
- **Universal indicator:** Universal indicator is a mixture of several indicators. It shows different colours of different concentrations of hydrogen ions in a solution.
- **P^H Scale:** A scale for measuring hydrogen ion concentration in a solution is called P^H scale.
- **Water of Crystallization:** Water of crystallization is the fixed number of water molecules present in one formula unit of a salt.
- **Olfactory indicators:** The substances whose odour changes in acidic or basic media are called olfactory indicators.
- **Dilution:** The process of mixing acid or base with water to decrease the concentration of ions per unit volume is called dilution.
- **Weak acid:** An acid which produces fewer H_3O^+ ions in aqueous solution is called weak acid.
  Ex: CH_3COOH.
- **Weak base:** A base which produces fewer OH^- ions in aqueous solution is called weak base.
  Ex: NH_4OH.
- **Acid rain:** When P^H of rain water is less than 5.6. It is called acid rain.
- **Salt:** A substance which is formed as a result of the neutralization reaction between an acid and a base.
- **Common Salt:** Sodium Chloride Salt (NaCl).
- **Antacid:** A mild base used to get rid of pain and irritation caused due to acid in the stomach.
- **Tooth decay:** Corrosion of tooth due to acid caused by degradation of sugar and food particles remaining in the mouth.

½ Mark Questions:

1. The incorrect statement about acids is
   a. They give H^+ ions in water
   b. They are sour to taste
   c. They turn blue litmus to red
   d. They give pink colour with phenolphthalein.

Ans: - 'D'

2. Which of the following precautions is to be taken for dilution of concentrated acids?
   a. Add water to acid
   b. Add acid to water
   c. Both (A) and (B) correct.
   d. Add acid to base.

Ans: - 'B'

3. A student added a few drops of universal indicator to a given colour less sample and he observed the sample turns to red.
   What is the nature of the Sample?

Ans: - The nature of the sample is acidic.

4. Ravi added acid to the metal it liberates a gas. Guess which gas is liberated?

Ans : - Hydrogen (H_2) gas is liberated.

5. Ramu and Ravi went to a marriage. They ate spicy food. After one hour Ramu suffered with indigestion.

   What would be the medicine you suggest?

Ans : - Antacid.

6. Sunitha dipped a litmus paper in a solution of P^H - 14. The litmus paper did not change its colour.
   What type of Litmus she used?

Ans : - Sunitha used blue litmus paper.

7. $2\,HCl + X \text{-----} \rightarrow Mgcl_2 + 2H_2O$ this reaction takes place in stomach. What would be 'X '?

Ans : - 'X' Antacid – $Mg(OH)_2$.

8. **Assertion (A):** Onion, vanilla essence can be used as olfactory indicators.
   Reason(R): Some substances change their odour in acidic (or) basic media.
   a. Both 'A' and 'R' are correct and 'R' justifies 'A'
   b. Both 'A' and 'R' are correct but 'R' does not justifies 'A'
   c. 'A' is correct but 'R' is incorrect
   d. Both are incorrect.

Ans : - 'A'

9. **Ramu** : All metal oxides are acidic in nature

   Ravi: metal oxides are basic in nature

Which statement is correct?

Ans : - Ravi's statement is correct.

10. Geetha mother stored pickles in a metal vessel. Geetha told her not to store pickle in a metal vessel. Guess the reason?

Ans: Pickles contain acids which react with metal and form poisonous substances.

11. What is the colour of anhydrous copper sulphate?

Ans :- White.

12. Match the following

(i)	Acid	a) $P^H>7$
(ii)	Base	b) $P^H=7$
(iii)	Neutral Salt	c) $P^H<7$

(a) i – a ii – b iii – c
(b) i – c ii – a iii – b
(c) i – b ii – c iii – a
(d) i – c ii – b iii – a

Ans: - (b) I – c ii – a iii – b

13. Who am I?

I give different smell in acid and base solution.

Ans: - Olfactory indicators.

14. Which salt is used in the manufacture of borax?

Ans: - Washing Soda.

15. What type of reaction takes place in stomach, when an antacid tablet is consumed?

Ans : - Neutralization.

16. Which of the following substance gives yellow colour with methyl orange indicator?
(A) NaOH (B) CH_3COOH (C) HCl (D) H_2SO_4

Ans : - 'A'.

17. Which one of the following is not a property of an acid?
A. Acids are sour to taste.
B. Acids react with metal and liberate hydrogen gas.
C. All Acids are strong.
D. Acids produce H^+ ions in water.

Ans : - 'C'.

18. **Assertion (A):** Zn, Mg react with acids and liberate hydrogen gas.
Reason (R): More reactive metals react with acids and liberate hydrogen gas.
(A) A and R are correct, R is correct explanation of 'A'

(B) A and R are correct, R is not correct explanation of 'A'
(C) A is correct and 'R' is incorrect
(D) 'A' is incorrect and R is correct.

Ans : - 'A'

19. Who introduced P^H scale?

Ans : - Sorensen.

20. Arrange in descending order of P^H value.
(i) Weak acid (ii) weak base (iii) Strong acid (iv) Strong base

Ans : - Strong base > Week base > week acid > Strong acid

21. Identify the mismatched pair.
A. NaOH – Methyl Orange – yellow
B. KOH – Phenolphthalein – Pink
C. H_2SO_4 – Red litmus – blue

Ans : - 'C'

22. Write the formula for Bleaching Powder?

(Or)

A sanitary worker uses a white chemical having strong smell of chlorine gas to

Disinfect the water tank. Write its Chemical Formula.

Ans: $CaOCl_2$.

1 Mark Questions:

1. Write the molecular formula of common salt, baking soda which are widely used at home.

Ans : - Common Salt – Sodium chloride – NaCl

Baking Soda – Sodium hydrogen carbonate – $NaHCO_3$

2. 'X' is a substance which gives red colour with methyl orange solution and gives H_2 gas with Zinc pieces. What would be 'X'?

Ans : - 'X' is an acid.

3. Which chemical substance is used by doctors as a plaster for supporting broken bones? Write its chemical formula.

Ans : - Plaster of Paris - $CaSO_4$ ½ H_2O.

4. Why does pure acetic acid not conduct electricity?

Ans : - (1) Pure acetic acid does not dissociate enough to be able to conduct electricity.

(2) By adding water the equilibrium shifts to the right. So that more ions are formed and solution conducts electricity.

5. What precaution to be taken while diluting the conc.acid?

Ans : - Conc. Acid should be added to water. But not water to the acid.

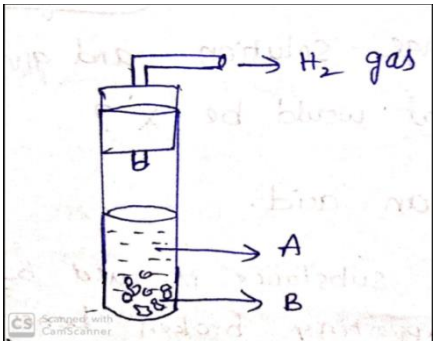
6. What is P^H Scale?

Ans : - A Scale for measuring hydrogen ion concentration in a solution is called P^HScale.

7. A Teacher gave two solutions to the student to identify acid and base. What material does the student require to perform an activity?

Ans : - Test tube, holder, blue litmus paper, methyl orange.

8. Label the parts in the given figure.



Ans : - A = HCl A = Acid

(or)

B = Zn B = Metal

9. By drinking the contaminated water people got sickness. Which chemical substance would be added to the drinking water? Write its formula.

Ans : - Bleaching powder should be added to drinking water to kill the germs.

Molecular Formula – $CaOCl_2$.

10. What is neutralization reaction?

Ans : - The Reaction of an acid with a base to give a salt and water is known as a neutralization reaction.

Acid + Base ---→ Salt + Water

Ex: HCl + NaOH ----→NaCl + H_20

11. Why does not distilled water conduct electricity?

Ans : - (i)Water consists H_3O^+ and OH^- ions.

(ii) In distilled water the concentration of both H_3O^+ and OH^- is same. Hence they do not form as ions.

So distilled water does not conduct electricity.

12. Write two uses of baking soda?

Ans : - (i) Baking soda (Sodium hydrogen carbonate) is used for faster cooking.

(ii)It is used in soda – acid and fire extinguishers.

13. What is water of crystallization?

Ans : - Water of crystallization is the fixed number of water molecules present in one formula unit of salt.

14. Fresh milk has a P^H of 6. Explain why the P^H change as it turns in to curd.

Ans : - (i) Fresh milk has a P^H of 6. Hence it is a weak acid.

(ii) To turn the milk as curd, we have to add yeast in the form of some curd. The fermentation takes place. During this process, the P^H decreases and set as curd.

15. Which substance / tool is used to test the gases H_2 and Co_2?

Ans : - (i) A burning candle or a match stick with flame is used to test H_2 gas. Burning match stick puts off with a pop sound.

(ii) Lime water [$Ca(OH)_2$] is used to test CO_2 gas. If CO_2 gas passes through lime water it turns to milky.

2 Marks questions:

1. Plaster of Paris should be stored in a moisture – Proof container. Explain why?

Ans: - 1.Plaster of Paris should be stored in a moisture – proof container because the presence of moisture or water can cause its slow setting by bringing about its hydration.

2. This will make the plaster of Paris use less after sometime.

2. Why does tooth decay start when the P^H of mouth is lower than 5.5?

Ans: - (1) Tooth decay starts when the P^H of the mouth is lower than 5.5.

(2) Tooth enamel, made of calcium phosphate is the hardest substance in the body.

(3) It does not dissolve in water, but it is corroded when the P^H in the mouth is below 5.5.

(4) Bacteria present in the mouth produces acids by degradation of sugar and food particles remaining in the mouth.

3. Observe the information given in the table and answer the questions given below.

Substance	Blue Litmus	Red Litmus
A	Red	No change
B	No change	Blue
C	No change	No change

(i) Which one of them may be the neutral salt among A, B, C?
(ii) What happens when some drops of phenolphthalein are added to the substance 'B'?

Ans: - (i) 'C' substance is neutral.

(ii)If phenolphthalein is added to the substance 'B' it turns to pink colour.

4. Mounica observed that the dry HCl gas did not turn the dry blue litmus paper in to red colour.
Jahnavi explained the reason to mounica by asking her some questions. What would be those questions?

Ans: - 1. When does an acid dissociate in to H^+ ions?

2. What will happen if there is no water mixed in the dry HCl?

5. What is baking powder? How does it make the cake soft and spongy?

Ans: - 1. Baking powder is a mixture of baking soda and mild edible acid such as tartaric acid.

2. When baking powder is heated or mixed in water then $NaHCO_3$ reacts with tartaric acid to evolve carbon di-oxide gas.

$NaHCO_3 + H^+ \rightarrow CO_2 + H_2O$ + Sodium salt of acid.

3. Carbon di-oxide produced during the reaction causes bread or cake to rise to make them soft and spongy.

6. Write the reaction of metal hydrogen carbonates with Acids?

Ans: - Acids react with metal hydrogen carbonates to form salt, water and liberate carbon di oxide gas.

Metal hydrogen carbonate + acid → Salt + carbon di oxide+ water.

Ex: -$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2\uparrow$

7. Substance A: It is produced by non-metallic oxide.
   Substance B: It produces OH^- ions in aqueous solution.
   1. Which substance can turn blue litmus to red? Why?
   2. How do you prepare substance 'B'?

Ans: - 1. Substance 'A' can turn blue litmus to red. Because non-metallic oxide produces acids.

2. Substance 'B' is a base. Base can be prepared from metallic oxides.

8. .

Substances	A	B	C	D
P^H value	10	13	2	6

(i) Which of the above substance is a strong acid?
(ii) Which of the above substances which can form salt with basic nature?

Ans: - (i) 'C' Substance is a strong acid.

(ii)Substance 'B' is a strong base.

Substance 'D' is a weak acid.

Strong base + weak acid ---→ Basic nature of salt + Water.

Hence 'B' and 'C' can form salt with basic nature.

9. How does the flow of acid rain into a river make the survival of aquatic life in a river difficult?

Ans: - 1) Acid rains are combination of carbonic acid, sulphuric acid and nitric acid with rain water.

2) If the P^H of rain water is less than 5.6, it is called acid rain.

3) When acid rains flows in to rivers. It lowers the P^H of river water.

4) Due to less P^H the river water becomes acidic and hence the aquatic life in such rivers becomes difficult.

10. While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?

Ans: - 1. The process of dissolving an acid or a base in water is an exothermic process.

2. Care must be taken while mixing concentrated acid with water.
3. Acid must always be added slowly to water with constant stirring.
4. If water is added to a concentrated acid. The generated heat may cause the mixture splash out and cause burns.
5. The glass container may also break due to excessive local heating.

Hence it is recommended that the acid should be added to water and not water to the acid.

4 Mark Questions:

1. How do you verify that Hydrogen gas evolves when acid reacts with metal? How do you test the gas?

   (or)

   Show that acids produce hydrogen gas when react with metals.

   (or)

   What are the material / substance required to produce hydrogen gas in your lab? Write the process.

Ans: - **Aim:** To show that acid produce hydrogen gas when reacted with metals.

Material required: Test tube, delivery tube glass trough candle, stand, soap water, match box, dil.HCl and Zinc granules.

Procedure: (i) Set the apparatus as shown in the figure.

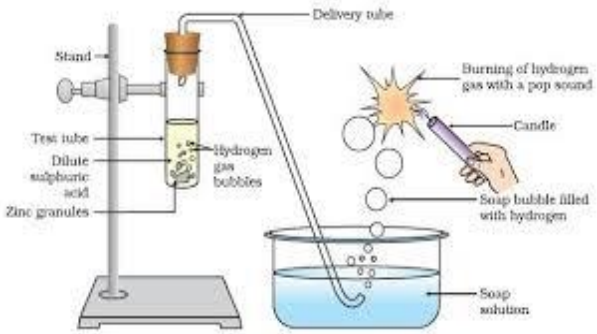
(ii) Take about 10 ml of dil. HCl in a test tube and add few Zinc granules to it.
(iii) We observe that a gas is evolved from the zinc granules.
(iv) Pass the gas being evolved through the soap water.
(v) Bring a burning candle near to a gas filled with bubble.
(vi) The candle turns off with pop sound.
(vii) This indicates that the gas evolved is Hydrogen.

$$2HCl + Zn \dashrightarrow ZnCl_2 + H_2\uparrow$$

Repeat this experiment with H_2SO_4, HNO_3, Etc.,

From this experiment we conclude that hydrogen gas is produced

when acid reacts with metals.



2. Compounds such as alcohols and glucose contain hydrogen but are not categorized as acids.Describe an activity to prove it.

Ans: - **Apparatus:** Beaker, 230 V AC plug, Blub, connecting wires, 2 graphite rods,

glucose solution, alcohol solution and HCl Solution.

Procedure:

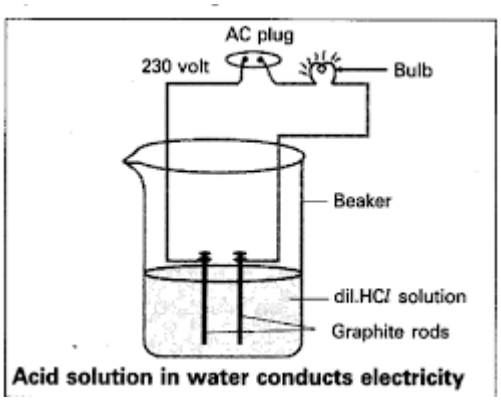
(i) Connect two different coloured electrical wires to graphite rods separately in a 100ml beaker and connect free ends of the wires to 230 V AC plug and complete the circuit by connecting a bulb to one ofthe wires as shown in the figure.

(ii) Prepare solutions of HCl, glucose and alcohol in three different beakers. Now pour some dilute HCl in the beaker and switch on the current. Repeat the activity with glucose and alcohol solutions separately.

Observation: The bulb glows only in acid solution but not in glucose and alcohol solutions. Glowing of bulb indicates that there is flow of electric current through the solution.

Conclusion: Acids produce hydrogen ions ($H^{+)}$ in solutions which are responsible for their acidic properties. In glucose and alcohol solution the bulb did not glow. Indicating the absence of H^+ ions inthere solutions.

So Alcohol and glucose solutions are not categorized as acids though they contain Hydrogen.



Acid solution in water conducts electricity

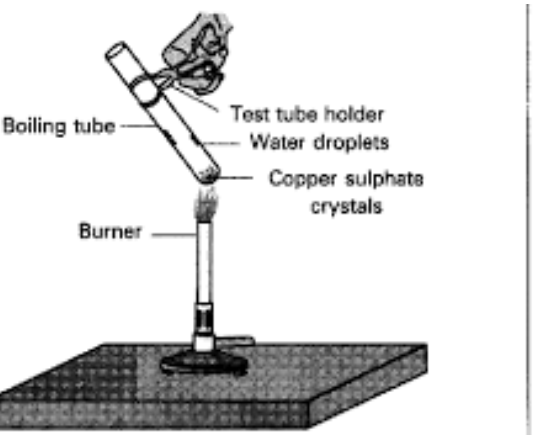
3. What is meant by "Water of crystallization" of a substance? Describe an activity to show the water of crystallization?

Ans: - **Water of Crystallization:** - Water of crystallization is the fixed number of water molecules present in one formula unit of salt.

Activity:

1. Take a few crystals of copper sulphate in dry test tube.
2. Heat the dry crystals strongly over the flame of a Bunsen burner for some time.
3. The water present in the crystals are evaporated and the blue colour of salt turns to white.
4. We can observe the tiny water drop lets forms on the side walls of the test tube.
   $CuSO_4\ 5H_2O \rightarrow CuSO_4 + 5H_2O$
5. Now cool the test tube and add 2-3 drops of water to the sample of anhydrous copper sulphate.

6. We observe that the blue colour of copper sulphate crystals is restored.



Removing water of crystallisation

4. Give two important uses of washing soda and baking soda.

(or)

Write the chemical formulae for washing soda and baking soda and give their uses.

Ans: - **Uses of Washing Soda (Na_2CO_3):**

1. It is used in glass, soap and paper industries.
2. It is used in the manufacture of sodium compound such as borax.
3. Sodium Carbonate can be used as a cleaning agent for domestic purpose.
4. It is used for removing the permanent hardness of the water.

Uses of Baking Soda ($NaHCo_3$):

1. It is used to prepare baking powder.
2. It is used as an antacid to neutralize the acidity in the stomach.
3. It is used in soda acid, fire extinguishers.
4. It is used as a mild antiseptic.

5. Observe the following P^H values of solution and answer the following questions.

Solution	Distilled Water	Coffee	Milk	Blood	Sodium Carbonate (Na_2CO_3)	Milk of Magnesia $Mg(OH)_2$
P_H Values	7	5	6.5	7.3	13	10.5

1. Which solutions are basic in nature?
2. Which solutions are acidic in nature?
3. Which is suitable to use an antacid?
4. Which Solution is neutral?

Ans: - 1. Blood, Sodium carbonate, milk of magnesia are basic in nature.

2. Coffee and Milk are acidic in nature.

3. Milk of magnesia. $Mg(OH)_2$.

4. Distilled water.

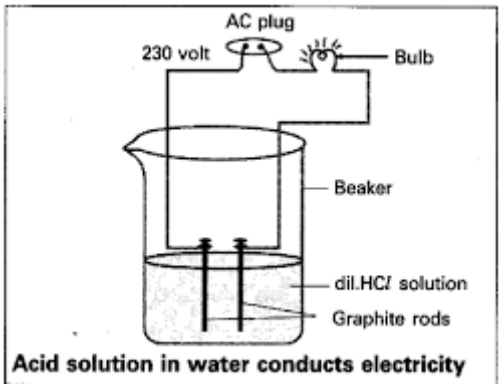
Diagram:

6. Draw a diagram of arrangement of apparatus of acid solution in water conduct electricity.

(or)

Draw a neat diagram showing how does dilute HCl solution conduct electricity.

Ans: -



Acid solution in water conducts electricity

3. RERACTION OF LIGHT AT PLANE SURFACES

Key concepts:-

Refraction of light:-

- The process of changing speed at an interface when light travels from one medium to another resulting in a change in direction is called refraction of light.
- The refraction depends up on the speed of light in the medium.
- Speed of light is different in different media.
- When light ray is travelling from rarer to denser medium it bends towards the normal to decrease its speed, so we get $i \geq r$.
- When light ray is travelling from denser to rarer medium it bends away from the normal to increase its speed, so we get $i \leq r$.

Refractive index :-

The ratio of speed of light in vaccum to the speed of light in that medium is defined as refractive index ' n ' It is called absolute refractive index.

Absolute refractive index = $\frac{Speed\ of\ light\ in\ vaccum}{Speed\ of\ light\ in\ medium}$

$$n = \frac{C}{V}$$

It has no units.

It gives the idea of how fast the light travels in a medium.

It depends on nature of material and wavelength of light is used.

Material medium	Refractive index
Air	1.003
Benzene	1.50

Relative refractive index:- It is defined as the ratio of sped of light in first medium to the speed of light in second medium.

Relative refractive index n_{21} = $\frac{Speed\ of\ light\ in\ first\ medium}{Speed\ of\ light\ in\ second\ medium}$

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

Relative refractive index n_{21}=$\frac{Speed\ of\ light\ in\ second\ medium}{Speed\ of\ light\ in\ first\ medium}$

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

Principle of reversibility of light $=n_{12}= \frac{1}{n_{21}}$

Snell's slaw:-

$n_1 \sin i = n_2 \sin r$

n_1 –Speed of light in first medium

n_2 –Speed of light in second medium

i= angle of incidence, r- angle of refraction.

The laws of refraction:-

1. The incident ray, the refractive ray and the normal to interface of two transparent media at the point of incidence lie in the same plane.

2. During refraction, light follows snell's slaw.

Conditions for no refraction:-

1. When angle of incidence is 0^0 then it suffers no refraction.

2. If the refractive indices of both optical media are equal then it suffers no refraction.

Refraction through a glass slab:- When a light ray enters from air (rarer medium) to glass slab (denser medium) so it bends towards normal and travel inside the glass in a straight line path and reaches the other surface and suffers another refraction.

Refractive index of glass slab= $\frac{Thinkness\ of\ the\ glass\ slab}{Thinkness\ of\ \ glass\ slab-\ vertical\ shift}$

Critical angle:- (C)

The angle of incidence at which the light ray propagating from denser to rarer medium grazes along interface is called critical angle.

Sinc = $\frac{1}{n_{12}}$

Total internal reflection:- The phenomenon due to which a ray of light, while travelling from an optically denser medium to optically rarer medium gets reflected in to the optically denser medium, at the surface of separation is called total internal reflection.

Conditions for total internal reflection:-

1. Rays of light must travel from an optically denser medium to optically rarer medium.

2. The angle of incidence should be greater than in the critical angle.

Applications of total internal reflection :-

1. Mirages :- Mirage is an optical illusion where it appears that water is collected on the ground or road at a distant place but when we get there, the ground or road is dry.

2. Optical fibres:- Total internal reflection is the basic principle for working of optical fibre. An optical fibre is very thin fibre made of glass or plastic having radius about a micrometer (10^{-6} m)

3. REFRACTION OF LIGHT AT PLANE SURFACES

½ Marks Question and Answers

1. What is the Speed of light in vaccum ?

A. 3 X 10^8 m/s

2. Ravi wrote snell's law as $\frac{n_1}{n_2} = \frac{Sini}{Sinr}$ and Rani wrote it as $\frac{n_1}{n_2} = \frac{Sinr}{Sini}$
Who is correct ?
A. Rani is correct

3.What is the unit of refractive index?
A No units.

4. Write the relation between radius of curvature (R) and focal length (f).
A. R=2f

5. What do we call the angle of incidence, for which the angle of refraction is 90^0 ?
A. Critical angle

6. Choose the correct answer
Mirage is an example of

(a) Irregular reflection
(b) Scattering of light
(c) Dispersion of light
(d) Total internal reflection

A (d)

7. If ' t ' is the thickness of a glass slab and ' V ' is the vertical shift write the formula for refractive index ' n '

A. $n=\frac{t}{t-v}$

8. How light pipe is formed ?
A. bunch of optical thin fibres form a light pipe.

9. Match the following

1. snell's slaw	[ ]	(A) used in communication
2. Mirage	[ ]	(B) n=c/v
3. Refractive index	[ ]	(C) Sinc = $1/n_{12}$
4. Critical angel	[ ]	(D) Total internal reflection
5. Optical fibres	[ ]	(E) n, Sini = n_2 sinr

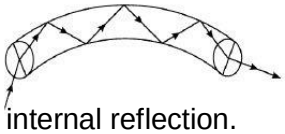
A) 1-A, 2-B, 3-C, 4-D, 5-E, B) 1-C, 2-A, 3-E, 4-B, 5-D,
C) 1-D, 2-B, 3-A, 4-C, 5-E, D) 1-E, 2-D, 3-B, 4-C, 5-A,
Ans. (D)

10. Assertion (A):- Refractive index of glass is greater than refractive index of water.

Reason (R):- For a given light, denser is the medium lesser will be the speed.

(a) Both A and R are true and R is correct explanation of A
(b) Both A and R are true R is not correct explanation of A
(c) A is correct R is incorrect
(d) A is incorrect and R is correct
A. a

11. what is the Principle involved in working of the following device.



A. Total internal reflection.

12. What is the angle of deviation produced by the glass slab ?
A. 0^0

13. When light ray travels from denser medium to rarer medium, the relation between 'r' and 'i' is
(A) r = i (B) r > i (C) r< i (D) r $\geq$ i
A. D

14. Assertion (A):- The light ray gets refraction at the interface of the two media
Reason (R):- Speed of light changes when light changes when light ray propagates from one medium to another medium.

(A) A and R are true and R supports A
(B) A and R are true and but R does not support A
(C) A is true but R is false
(D) A is false but R is true

A. A

15. Match the following and select Correct option

Group- A	Group-B
(a) Reflection	(1) Diamond
(b) Refraction	(2) Mirror
(c) Total internal reflection	(3) Stars

(A) a-2, b-3, c-1 (B) a-1, b-2, c-3 (C)a-3, b-1, c-2 (D) a-2, b-1, c-3

A. A

16.

S.No.	Angle of incidence (i)	Angle of refraction ®	Sini	Sinr	$\frac{Sini}{Sinr}$
1	30^0	19^028^1	$Sini30^0$	$sin19^028^1$	1.5
2	40^0	25^022^1	$Sin40^0$	$sin25^022^1$	1.5
3	50^0	30^043^1	$Sini50^0$	$sin30^043^1$	1.5

Which of the following statements are correct ?

(i) □i and □r values are different
(ii) sini and sinr are different
(iii) The ratio of $\frac{Sini}{Sinr}$ is constant.

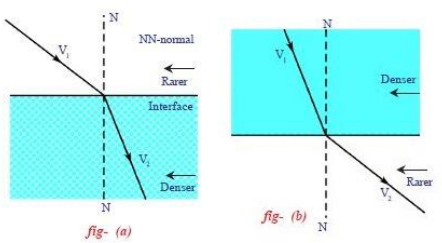
(iv) The constant values 1.5 is the refractive index of the denser medium with respect to rarer medium.
(A) i and ii (B) ii and iii (C) iii and iv (D) All are correct
A . D

Observe the following table

Material Medium	Refractive index
Water	1.33
Kerosene	1.44
Benzene	1.50

Answer the 17, 18 questions with the help of the above table.
17) Find the speed of light in Benzene
A) Speed of light in benzene =v=$\frac{c}{n}$ = $\frac{3X10^8}{1.5}$
= $2X10^8$m/s
18) Write the relative refractive index of kerosene with water.
Relative refractive index of kerosene with water = $\frac{1.44}{1.33}$ = 1.08

Observe the following ray diagrams



Answer the 18 and 19 questions
18) What shows fig-(a) diagram
A) A light ray passes through rarer medium to denser medium
19) What shows fig-(b) diagram
A) A light ray passes through denser medium to rarer medium
20) On what factors does the refractive index of a medium depend?
A) 1) Nature of material.
2) Wavelength of light is used.

1 Mark Question and Answers

1. Speed of light in a diamond is 1,24,000 Km/s. Find the refractive index of diamond if the speed of light in air is 3,00,000 km/s.

Speed of light in diamond = 1,24,000 km/s
Speed of light in air = 3,00,000 km/s
Refractive index of diamond= $\frac{\text{Speed of light in air}}{Speed\ of\ light\ in\ diamond}$

$= \frac{3,00,000}{1,24,000}$

$= 2.42$

2. Calculate the refractive index of water relative to glass, if refractive index of glass relative to water is 9/8.
A) Refractive index of glass relative to water is = 9/8

Refractive index of water to glass $= \frac{\text{Speed of light in water}}{Speed\ of\ light\ in\ air}$
$= \frac{\text{Speed of light in air}}{Speed\ of\ light\ in\ diamond}$
$= \frac{8}{9}$

3) On which factors refractive index depends ?
A) 1) Nature of material 2) Wavelength of incident light.
4) Why does the light ray deviate in refraction?
A) Due to change of light velocity light ray deviate at the boundary separating media.
5) Write any one application of multiple refractions ?
A) Stars appear twinkling
6) Name the phenomenon involved in the function of optical fibre.
A) Total internal reflection.
7) Mention the conditions for the total internal reflection of light ray.
1. Ray should travel from denser to rarer medium.
2. The angle of incidence in the denser medium should be greater than critical angle.
8) When is lateral shift zero?
At normal incidence.
9) Name the colour of light for which critical angle is minimum and maximum.
A) Violet→ minimum
Red→Maximum
10) Why dispersion of light cannot be observed in a glass slab?
A) Glass slab is identical to two inverted prisms. The dispersed light from first is prism by inverted by second prism in to white light.
11) Can you take a photo of mirage ?
A) Yes, mirages are the images of real objects.
12) Write any two questions about the 'Formation of mirages'
A) 1. How do the mirages form?
2. At what situations do mirages form?
13) A ray of light travelling in air enters into water. What will happen?
A) It bends towards the normal.

2 Marks Question and Answers

1. Give the reason that a diamond shine more than a glass piece cut to the same shape.

A) 1. Diamond exhibits the property of total internal reflection due to its high refractive index and low critical angle.

2. So, diamond shines more than a glass piece cut to the same shape.

2. By observing the following table, answer the following questions?

Material	Ice	Water	Benzene	Carbon disulphide
Refractive index	1.31	1.33	1.5	1.63

i)In which material speed of light is high?

a) Ice

ii) In which material speed of light is low?

a) Carbon disulphide

3. What is meant by refraction ? Give some examples of daily life observations of refraction.

A) Refraction of light:-The process of changing speed at an interface when light ray travels from one medium to another medium, resulting in changes in direction is called refraction of light.

Ex:- 1.A coin kept at the bottom of a vessel filled with water appears to be raised.

2. A lemon kept in a glass of water appears to be bigger than its original size.

4. The absolute refractive index of water is $\frac{4}{3}$. What is the critical angle of it?

A) Refractive index of water $=\frac{4}{3}$

Critical angle of water with respect to air=?

$$\text{Sinc}=\frac{1}{n}$$

$$C= \text{Sin}^{-1}\left(\frac{3}{4}\right) = \sin^{-1}(0.75)$$

$$C=48.5^0$$

5. Determine the refractive index of benzene if the critical angle of it is 42^o.

A) Critical angle of benzene $=42^o$

Refractive index of benzene=?

$$n=\frac{1}{sinc}$$

$$n=\frac{1}{sinc\ 42^0} = 1.51$$

6. What is the image of the boy standing at shore to the person swimming in water ?

A) The boy appears to be taller.

7. In what case a light ray does not deviate at interface of two media?

A) i) When the light ray is incident normally on a boundary separating two media no refraction takes place and the ray will media no refraction takes places and the ray will pass un deviated.

ii) If the refractive indices of the two media are equal, ray passes undeviated from the boundary.

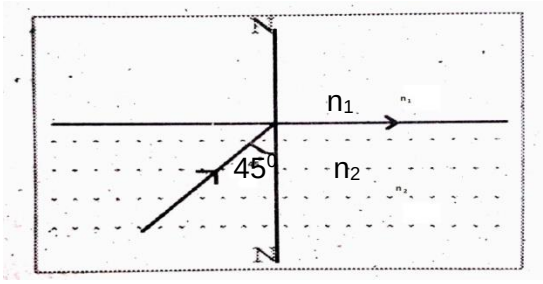
8. Fermat's Principle is useful to draw ray diagrams Explain.

A) 1. Fermat's principle says that light selects the shortest path to travel.

2. This is the basic reason for the straight line propagation of light.

3. using this principle, we can draw ray diagram to trace the image formed by mirrors to understand reflection and refraction.

9. Look at the picture



(a) What is the value of critical angle.

(b) Find the refractive index of denser medium with respect to rarer medium.

A) a) Critical angle C=45^0

' b) Refractive index of denser medium with respect to rarer medium =n_{21}

$$n_{21}=\frac{1}{Sinc}=\frac{1}{Sin45^0}=\frac{1}{(\frac{1}{\sqrt{2}})}=\sqrt{2}=1.414$$

10. The refractive index of glass is 1.5 " what is the meaning of this statement ?

A) The speed of light in glass in $\frac{2}{3}$ of speed of light in vacuum ($3x10^8$ m/s) and is equal to $2x10^8$ m/s

11. Why the shooter aims the gun to apparent position of the fish instead of real position? (or) why is difficult to shoot a fish swimming in water.

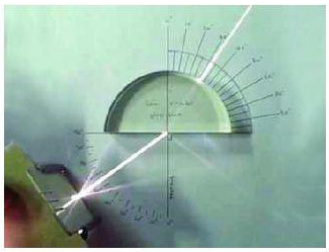
A) Due to refraction of light it is difficult to shoot a fish swimming in water

Reason:- The light rays cohering from the fish towards shooter, bend at water air interface. So shooter sees only image of the fish, but not actual fish.

4 Marks Question and Answers

1) Explain the relation between angle of incident and angle of refraction with an experiment.

A) Aim :- To verify the relation between angle of incidence and angle of refraction.



Materials required:- A plank, white chart, protector, semi circular glass disc, pencil and laser light

Procedure:-

1. Take a drawing sheet on a cardboard and mark angles from 0^0 to 90^0 using a protector (On both sides of MM line).
2. Place a semicircular glass disc so that its diameter coincides with the line " M M".
3. Send a laser light along a line which makes 15^0 with NN.
4. Let it is an incident angle.
5. Measure its corresponding angle of refraction by observing light coming from outside of the glass slab.
6. Repeat this experiment with various values of angle of incidence, refraction and note in the table.
7.

S.No.	i	R	Sini	Sinr	$\frac{sini}{sinr}$

8. From the above table we observe that $\frac{sini}{sinr}$ is a constant.

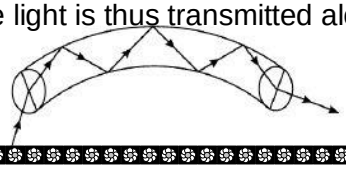
2) While doing heart operation Ravi observed that a thin pipe is passed to observe internal parts on a computer screen. He comes to know it was an optical fibre. How does the optical fibre works.

A) Optical fibres:-

1. Total internal reflection is the basic principle behind working of optical fibre.
2. An optical fibre is a very thin fibre made of a glass or plastic having radius about a light pipe.

Working:- 1.Because of small radius of the fibre, light goes into makes a nearly glancing incidence on the wall.

2. The angle of incidence is greater than the critical angle and hence total internal reflection takes place.
3. The light is thus transmitted along the fibre.



Optical fibre

Uses:-
1. These are used in endoscopy to see the internal organs of our body.
2. These are used in transmitting communication signals through light pipes.
3. These are used in photometric sensors for measuring blood flow in the heart.

3) What is meant by total internal reflection Explain with examples.

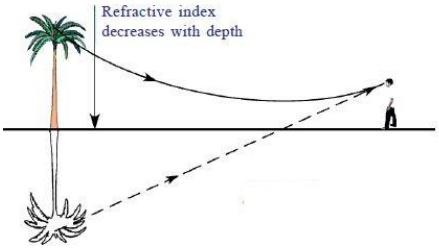
A) Total internal reflection:- When the angle of incidence is greater than critical angle, the light ray gets reflected in to the denser medium at the interface i.e., light never enter the rarer medium. This phenomenon is called total internal reflection.

Examples:-
1) Mirages:- Mirage is an optical illusion where it appears that water has collected on the road at a distant place but when we get there, we don't find any water.

2) Brilliance of diamonds:- Total internal reflection is the main reason for brilliance of diamonds. The critical angle of a diamond is very low (24.4^0). So if a light ray enters a diamond it is very likely to undergo total internal reflection which makes the diamond shine.

4) Some times during the hot summer at noon time on road it appear that there is water on the road but there would be really no water. What do you call this phenomenon? Explain why it happens.

A) Mirage
Explanation:-
1. During a hot summer day, air just above the road surface is very hot and the air at higher altitude is very cool.
2. It means that the temperature decreases with height.
3. As a result density of air increases with height.
4. We know that refractive index of air increases with density.
5. Thus the refractive index of air increases with height.
6. So, the cooler air at the top has greater refractive index than hotter air just above the road.
7. Light travels faster through the thinner hot air than through the denser cool air above it.
8. When the light from tall objects such as tree or from the sky passes through a medium just above the road, whose refractive index decreases towards the ground.
9. When the light falls from tall object, it suffers refraction and takes a curved path because of total internal reflection.
10. This appears to the observer as if the ray is reflected from the ground.
11. Hence we feel the illusion of water being present on road which is the virtual image of the sky (mirage) and an inverted image of tree on the road.



5) How can you find lateral shift using glass slab?
A) Aim:- To understand lateral shift of light rays through a glass slab.

Materials required :- Plank, Chart paper, Clamps, scale, pencil, thin glass slab and pins.

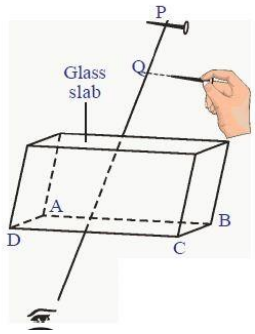
Procedure:-
1. Place a piece of chart on a plank and clamp it.

2. Place a glass slab in the middle of the paper, Draw broader line along the edges of the slab by using a pencil, name it as A,B,C,D.
3.Draw a normal line to AB at midpoint “O” Draw an incident ray to the normal with an incident angle <i.
4.On the incident ray fix the pins at Pand Q and looking in to the other side fix another two points R, S such that they appear in a straight line.

Observation:- The angles of incidence and emergence are equal [∠i = ∠e]
Conclusion :-
1. The incident and emergent rays [PQ, RS] are parallel.
2. Measure the distance between the parallel rays [PQ, RS] . This distance is called lateral shift.

6) Derive a relation between thickness of a glass slab, vertical shift and refractive index of glass slab by an experiment.

1. Let us take a glass slab,
2. Measure the thickness of the slab.
3. Take a white chart and fix it on table, take the slab and place it in the middle of the chart.
4. Draw its boundary. Remove the slab from its place.
5. The lines from a rectangle. Name the vertices as A, B,C ,D.



6. Draw a perpendicular to the longer line AB of the rectangle at any point on it.
7. Place slab again in the rectangle ABCD.
8. Take a pin place at a point p in such a way that its length is parallel to the AB on the perpendicular line at a distance of 15cm from the slab.
9. Now take another pin and by looking at the first pin from the other side of the slab try to place the pin so that it forms a straight line with the first pin.
10. Remove the slab and observe the positions of the pins.
11. Draw a perpendicular line from the second pin to the line on which first pin is placed. Call the intersection point Q.
12. Find the distance between P and Q. This distance is called vertical shift.
13. Do the same activity for another distance of the pin from the slab.
14. You will get the same vertical shift.
15. We could see a formula to find out refractive index of the glass.

∴Refractive index = $\frac{Thickness\ of\ the\ glass\ slab}{Thickness\ of\ the\ glass\ slab - Vertical\ Shift}$

4. Refraction of light at curved surfaces

Key concepts:-

Refraction :- Passing of light from one medium to another suffering some deviation.

➔ In reflection light travels into same medium after touching mirror.

➔ Refraction is phenomenon, due to which of light deviates from its path, at the separation of two media due to change of speed at interface.

➔In general mirror reflects light.

➔ Lens refracts the light.

Types of lens :-

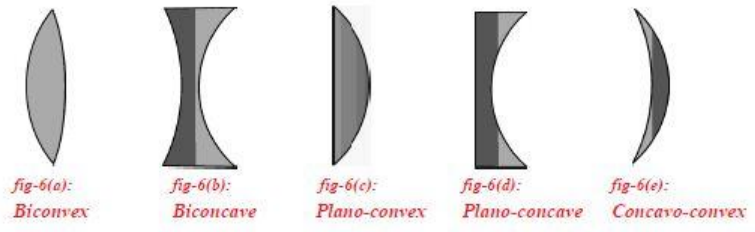


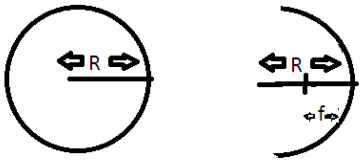
fig-6(a): Biconvex fig-6(b): Biconcave fig-6(c): Plano-convex fig-6(d): Plano-concave fig-6(e): Concavo-convex

➔ The above lens have curved surfaces, there are certain points and distances regarding lens.

- ❖ Points:- (i) Centre of curvature (ii) Focal point (iii) Pole.

C=Centre of curvature
F= Focal point.
P= Pole.

Distances:- (i) Radius of curvature (R)
(ii) Focal length (f)



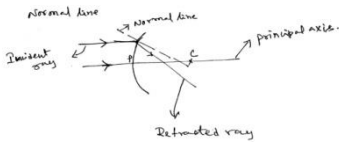
R= Radius of curvature is distance between the pole and the centre of curvature.

f =It is half of the distance between the pole and centre of curvature.

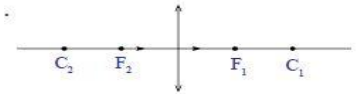
Principal axis:- The line that joins the centre of curvature and the pole is called principal axis.

➔ Well known example for curved surface, a glass tumbler filled with water.

- ➔ Normal line:- If we draw a line pendicular to the point of incidence for a ray, it becomes normal line
- ➔ Diagram:-



- ➔ According to Snell's law ray travelling along the normal drawn to the surface does not deviate.
- ➔ Ray travelling along the Principal Axis does not deviate.
- ➔ Diagram:



- ➔ Rays passing through 'C' (Centre of curvature) also does not deviate.
- ➔ Rays passing parallel to principal axis passes through focal point.

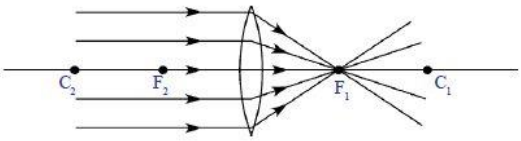


fig-8(a)

- ➔ Ray passing through Focus passes parallel to principal axis after refraction.

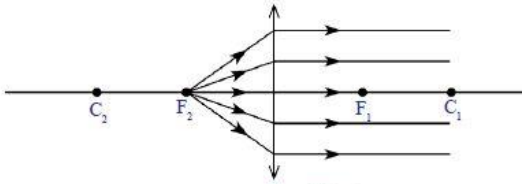


fig-11(a)

- ➔ Ray passing through pole also does not deviate

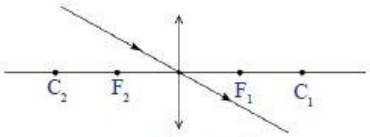


fig-10(a)

- ➔ For Ray diagrams we represent lens with following symbols.

Convex lens 

Concave lens 

Rules to draw ray diagrams :-

- ➔ We consider two rays from the object.
- ➔ Extend both rays to intersect at a point, this point gives position of image.
- ➔ Draw a normal line from point of intersection to the principal axis, length of this represent the size of the images.

Ray diagrams:- Ray diagrams represent the image formation by convex/concave lens for various positions by the object.

1. Object at infinite distance:- the rays falling on the lens from an object at infinite distance pass parallel to principal axis. They converge at focal point so point image formed focal point.

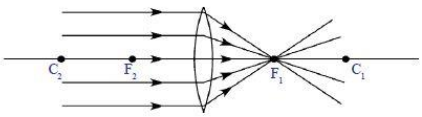


fig-8(a)

2. Object beyond 'C_2':-

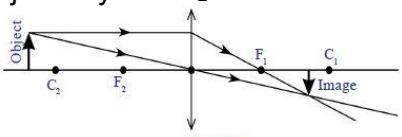


fig-13

- Image is formed in between F_1 and C_1
- Diminished and inverted image
- Real image.

3. Object at ' C_2' :-

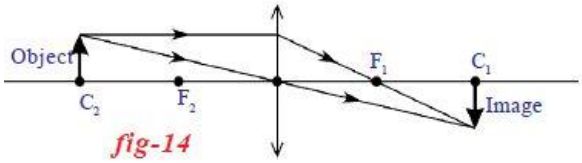


fig-14

- Same size image
- Inverted image.
- Real image at 'C_1' on other side of lens

4. Object between 'C_2' and 'F_2' :-

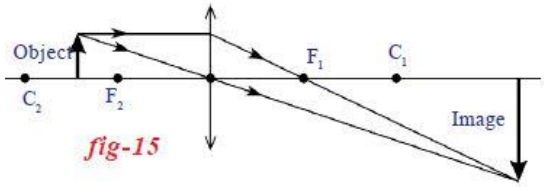


fig-15

- *Magnified image*
- Real image
- Formed beyond C_1 on other side

5. Object located at F_2:-

When object is at F image will be at infinite distance because after refraction the rays pass parallel .

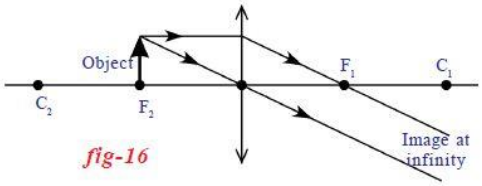


fig-16

6. Object between F and C

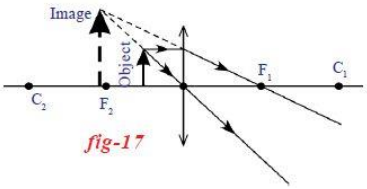


fig-17

- Virtual image
- Magnified image.
- Between F and 2 F same side of lens .

Lens formula:- $\frac{1}{V} - \frac{1}{u} = \frac{1}{f}$

u= Object distance

v= Image distance

f= focal length

Lens maker's formula :-

$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

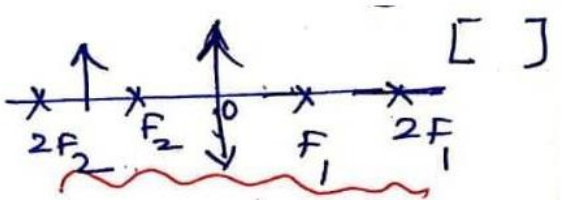
Where n = Refractive index of lens

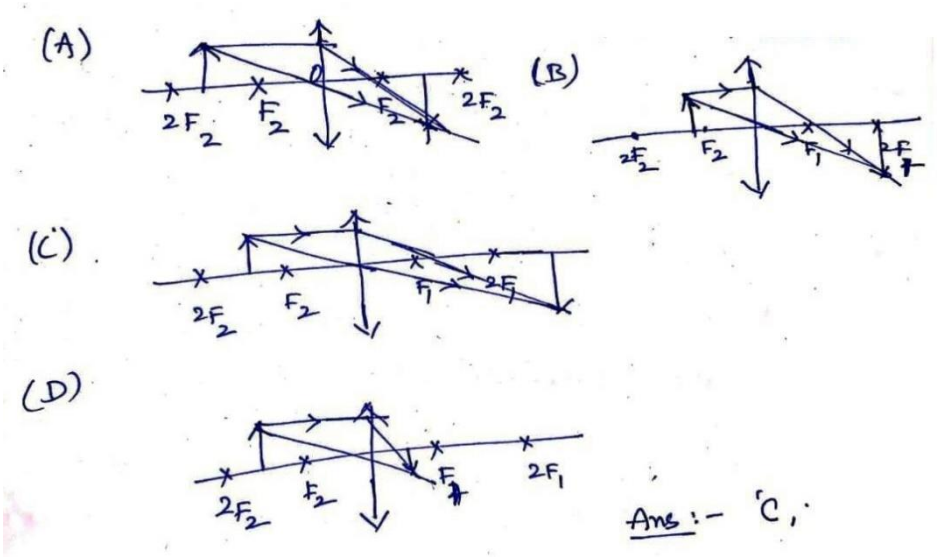
R_1 & R_2 = radii of Spherical surfaces

f = focal length

½ Marks Questions

1. The complete ray diagram for





Ans :- 'C'

2) Assertion (A): A person standing on the land appears taller than his actual height to a fish inside a pond

Reason (R) :- Light bends away from the normal as it enters air from water. Which of following is correct? Explain.

(A) Both A, and R are true and R is the correct Explanation of A.
(B) Both A and R are correct and R is not correct Explanation of A.
(C) A, is true but R is false.
(D) A is false but R is true.

Ans:- A

3) The focal length of lens_____ in water Ans:- Increase.

4) Focal length of the Plano – convex lens is _____, when its radius of curvature is R and n, is refractive index of lens? Ans:- f=$\frac{R}{(n-1)}$

5) In lab activity of determination focal length of biconvex lens using UV method, Ravi mentioned the following materials required, which one of them is not necessary.
(A) V- Stand (B) Convex lens (C) mirror (D) Screen.

Ans:- C

6) Which of the following lens act as converging lens? ( )
(A) Bi-convex lens (B) Plano- convex lens (C) Concave convex (D) All the above Ans:- D

7) Which one of the following materials cannot be used to make lens.
(A)Water (B) Glass (C) Plastic (D) Clay Ans:- D

8) In order to get a virtual image, where should an object be placed in front of a convex lens?

Ans:- Between P and F.

9) Observe the flow chart and identify X

Lens formula	→	$\frac{1}{f}=\frac{1}{V}-\frac{1}{u}$
Len's makers formula	→	X

Ans:- $\frac{1}{f}$= (n-1) ($\frac{1}{R1}$ - $\frac{1}{R2}$)

10) Which of the following statements is / are correct ?
(a) When the incident ray strikes normally at the point of incidence it does not deviate from its path.
(b) If the refractive indices of two media are equal the ray does not deviate from its path.

Ans:- Both a and b, correct

11) Match the following correctly.
(1) Bi - Convex
(2) Bi – Concave

Ans:- 1 → P
2→R

1 Mark Questions

1) What is the reason for refraction of light?
Ans:- The incident light ray changes its direction (deviate) at the interface separating the two media due to change its speed.

2) What is use of meter scale in the experiment of determination of focal length (f) of a biconvex lens by U-V method?

Ans:- to measure object distance (u) and image distance (v)

3) Can a virtual image be photographed by a camera?
Yes, a virtual image can be photographed by a camera.
Ex:- We are able to photograph the virtual images formed by plane mirror.

4)Suppose you are inside the water in swimming pool your friend standing on the edge, do you find your friend taller (or) shorter than his actual height why?

Ans:- My friend appears to be taller.
Reason:- The light rays from my friend travelling from rarer to denser medium, these rays bends towards normal line. So apparent image of my friend appears to be taller due to refraction.

5) My friend is doing an activity i.e., he is trying to burn a paper using a convex lens, he is trying to capture bright spot as small as possible, what is that bright spot?

Ans:- Image of sun

6) What are factors that influence refractive index of a medium ?
Ans:- (i) Nature of Material of medium. (ii) Wave length of light

7) What is the relationship between focal length (f) and radius of curvature (R) ?
Ans:- The radius of curvature will be twice the distance of focal length (R = 2f)

8) Mention the characteristics of image formed by a convex lens when the object lies between F_1 and $2F_1$?
Ans:-When object lies between F_1 and $2F_1$ image is real, magnified beyond $2F_2$

9) In order to get magnified, virtual image of an object , by a convex lens where do the object should kept?

Ans:- Between P and F

10) What are the symbols used to denote bi convex and bi-concave lens?

Ans:- Bi Convex lens - 

Bi Concave sens – 

11) write formula for image formation by curved surfaces
Ans: Formula: $\frac{n2}{V} - \frac{n1}{u} = \frac{n2-n1}{R}$ where n_1 = refractive index of the first medium
n_2 = refractive index of second medium
u = object distance
v = image distance
R = Radius of curvature

02 Marks Question

1) A Convex lens is made up of there different materials as shown in figure How many images does it forms ?

Ans:- As lens is made up of thee different materials, it forms three images.

2) A man wants to get a picture of zebra, he photographed a white donkey after fitting a glass with black stripes on the lens of his camera, what photo will he get? Explain?
Ans:- 1) Photographer will get a picture of white donkey only, because every part of lens forms an image, so if we cover lens with stripes still it forms a complete image.
2) However the intensity of the image will be reduced.

3) What is the focal length of bi concave lens kept in air with two spherical surfaces of radii R_1 =30 cm R_2=60cm refractive index of lens is n=1.5

Ans:- Using sign convention we get R_1 = -30 cm
R_2=60cm
n=1.5
Substituting in lens maker,s formula.

$\frac{1}{f}$= (n-1) ($\frac{1}{R_1} - \frac{1}{R_2}$)
= (1.5-1) ($\frac{1}{-30}$ - $\frac{1}{60}$) = $\frac{1}{-40}$

- F= -40 cm

4) The following table shows that the object distance (u) in cms and image distance (v) in cms in an activity to find the focal length of a convex lens in U –V method Now find the value of $\bar{X}$.

U	30	60
V	30	X

Ans:- $\frac{1}{f} = \frac{1}{V} - \frac{1}{u}$ ➔ $\frac{1}{30} - \frac{1}{(-30)} = \frac{1}{30} + \frac{1}{30} = \frac{2}{30} = \frac{1}{15}$

∴ f= 15 cms.

$\frac{1}{f}$ = 1/v- 1/u ➔ $\frac{1}{30} - \frac{1}{(15)} = \frac{1}{v} + \frac{1}{(-60)}$

∴ $\frac{1}{V} = \frac{1}{15} - \frac{1}{60}$ ➔ $\frac{1}{V} - \frac{4-1}{60} = \frac{3}{60} = \frac{1}{20}$

V= 20 cm

5) Collect the information about the lenses are available in an optical shop. Find out how the focal length of a lens may be determined by a given power of lens.

Ans:- 1) Optical shop has different types of lenses with different powers.

2) The relationship between power of level and focal length (f) is

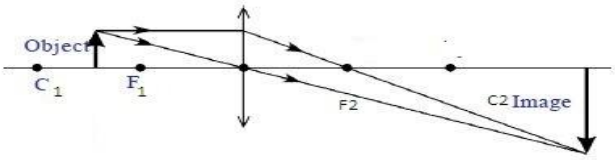
$$P = \frac{1}{f}$$

So focal length of lens can calculated from power of lens f = 1/P

3) Units for power of lens in diapters (D)

4) The value of power of lens is +Ve for convex lens, negative for Concave lens.

6) In the given diagram discuss the image properties.



Ans:- (i) The object is in between ' C_1' and ' F_1"

(ii) The image is formed beyond C_2 on other side.

(iii) The image is real inverted and magnified.

7) In which position of object before a convex lens we get image at infinity? Why?

And:- If the object lies at F before a Convex lens we get image at infinite, because after refraction the rays travel parallel.

8) Write lens makes formula, and explain terms in it.

Ans:- lens maker,s formula

$$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

R_1 and R_2 are radii of curvature

n= Refractive index

f= focal length

9) Two converging lens are to be placed in the path of parallel rays so that the rays remain parallel after passing through both lenses. How should the lenses be arranged ?

Ans:-

1) A parallel beam of light when passed through a convex lens, they will converge at focal point of the lens.

2) Light rays from focal point after passing through another convex lens, travel parallel to principal axis of both lenses.

3) So, the two lenses are arranged on a common principal axis such that their focal point coincides with each other.

10) state differences between real image and virtual image

Ans: Real image:a)A real image is formed due to converging of light rays

b) real image can be formed on screen

Virtual image : a)A virtual image is formed due diverging of light rays

b) virtual image cannot be formed on screen.

4 Marks Questions

1) How do you find the focal length of a lens experimentally (U-V method), you have a lens, suggest an experiment to find out the focal length of lens.

Ans:- Aim:- To find focal length of given lens.

Apparatus :- Object (Candle), Convex lens, V-Stand, Screen, meter scale.

Procedure:- (1) Take a V- Stand and place it on a long table at the middle.

2) Place a convex lens on the V- Stand

3) Light the candle and place it at a long distance along the principal axis.

4) Adjust the screen which is on the other side of lens to get on image on it.

5) Measure the distance of image from the stand of lens (v) and also measure the distance of the candle (u) from the lens.

6) Repeat the experiment for various object distances like 50 cm, 40 cm, 60 cm and measure the image distance (v) in all cases, table the values.

Sl.No.	Object distance (U) cm	Image distance (V) cm	Focal length (f) f= uv/u-v

7) From the above table f= uv/u-v is constant

8) In this way we can find the focal length of given lens

2) Draw the ray diagrams for a convex lens when the object is placed at

a) At C b) between F and C

write image characteristics

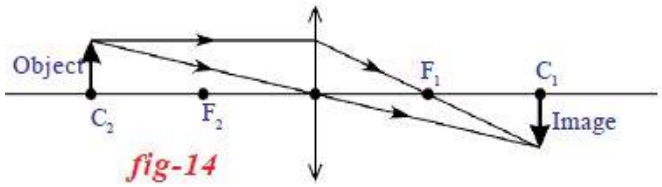


fig-14

image characteristics:-

- Real inverted image
- Same size
- At ‘C, on other side of lens.

b) Ray diagram for convex lens when object between F and C

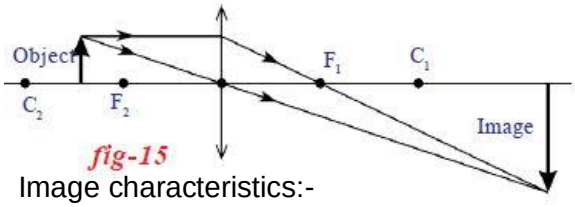


fig-15

Image characteristics:-

- Real inverted image
- Magnified image
- Image formed beyond C on other side

3) A symmetric converging lens is used in an experiment and the observations are tabled.

Object distance	Image distance
10cm	30cm
20cm	60cm
30cm	30cm
60cm	20cm
45cm	22.5cm

Now answer the questions based on data given above.

(i) What is radius of curvature of lens?
(ii) Object distance 20cm image distance in 60 cm find focal length.
(iii) What is the object distance when a virtual image is formed at a distance of 30 cm
(iv) For what distance of object image is formed at infinite distance?

Ans:- (i) Object distance and image distance are equal at 30 cm
(ii) Lens formula $\frac{1}{f} = \frac{1}{V} - \frac{1}{u}$
V= 60 cm. u= -20 cm

$$\frac{1}{f} = \frac{1}{60} - (-\frac{1}{20})$$

$$\frac{1}{f} = \frac{1}{60} + \frac{1}{20} = \frac{1+3}{60} = \frac{4}{60} = \frac{1}{15}$$

Focal length (f) = 15 cm .
(iii) When object is placed in between P & F , virtual image is formed. So from the given table object distance is 10 cm, the virtual image is formed at the distance of 30 cm.
(iv) When object is placed at F image is formed at infinity. So if object is placed at 15 cm, image is formed at infinite distance.

4) Collect the information about lenses used by Galileo in his telescope.
Ans:-
1. The original design of Galilean telescope came in 1609 by Galileo Galilee.
2. IT used a convergent (Plano – concave) eye piece lens.
3. A Galilean telescope, because the design has no intermediary, image of the object formed at focus of the objective lens
4. Objective lens, towards object is convex lens of large focal length.
5. Image acts as Virtual object for eyepiece lens.
6. Eyepiece lens forms the final erect, magnified image.
7. Galileo's telescope magnifies image of object, about 30 times of size of original object.

5) How do you verify experimentally tht focal length of a convex lens is increased when it kept in water.

Ans:- Aim :- To verify change in focal length of lens when it is dipped in water.
Apparatus: - Convex lens of known focal length, circular lens holder, tall cylindrical glass tumbler, black stone, water.
Procedure:- 1) Take a cylindrical glass tumbler whose height is much greater than the focal length of lens and fill it with water.
2) Keep a black stone at the bottom of vessel.
3) Now dip the lens into water using circular lens holder such that it is at a distance which is less than (or) equal to focal length of lens in air.
4) Now see through lens to have view of the stone.
5) Increase the height of lens till you are not able to see the stone's image.
6) When the lens is dipped to a height which is greater than focal length of lens in air we are able to see the image. Showing that focal length of lens is increased in water.
7) So, we can conclude that the focal length of lens depends on surrounding medium.

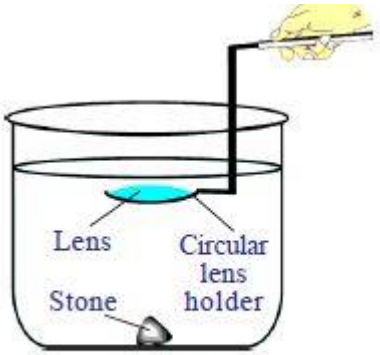


fig-20

6) An object is placed at the following distances from a convex lens of focal length 10cm
a) 8cm b)15cm c)20cm d)25cm
which position of the object will produce……..…
1) A diminished ,real and inverted image?
2) A magnified ,real and inverted image?
3) A Magnified ,virtual and erect image?
4) An image of same size as the object?
Justify your answer in each case?

Ans:1) At 25 cm (d)
Reason: object should be placed beyond C.
2) At 15cm
Reason: object placed between centre of curvature and focal point
3) At 8cm
Reason :object placed between focal point and optic centre
4) At 20cm
Reason: Object placed at the centre of curvature

5. Human Eye and Colourful World

Key concepts:

- **Least distance of distinct vision:** The least distance of the object from the eye, that one can see the object comfortably and distinctly is known as least distance of distinct vision.
  This distance for normal human being is about 25 cm.
- **Angle of vision:** The maximum angle at which we are able to see the whole object is called angle of vision. The angle of vision for a healthy human being is about 60^0.
- **Accommodation of eye lens:** The ability of eye lens to change its focal length is called "accommodation of eye lens".
- **Myopia:** The defect in which people cannot see objects beyond far point are called "Myopia" or "near sightedness".
- **Hypermetropia:** The defect in which people cannot see objects situated before near point is called "Hypermetropia" or "far sightedness".
- **Presbyopia:** Presbyopia is a vision defect indicating that the power of accommodation of eye usually decreases with ageing.
- **Power of lens:** The reciprocal of focal length is called Power of lens.

$$P = \frac{1}{f(in\ m)}$$

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

The unit of power is Dioptre (D)

- **Prism**: A Prism is a transparent medium separated from surrounding medium by atleast two plane surfaces which are inclined at a certain angle in such a way that light incident on one of the plane surfaces emerges from the other plane surface.
- **Angle of minimum deviation (D):** The angle of deviation for which the angle of incidence (i_1) is equal to the angle of emergence (i_2) is known as angle of minimum deviation (D).
- **Dispersion**: The splitting of white light in to different colours (VIBGYOR) is called dispersion.
- **Scattering:** The process of re – emission of absorbed light in all directions with different intensities by atoms or molecules is called scattering.
- **Eye Lens**: Eye lens is the central part of the eye that facilitates the image formation.
- **Far Point**: The point of minimum distance at which eye lens can form a clear image on the retina is called "far point".
- **Near Point**: The point of minimum distance at which eye lens can form a clear image on the retina is called near point.
- Refractive index of Prism: Refractive index of Prism.

$$n = \frac{sin\left(\frac{A+D}{2}\right)}{sin\left(\frac{A}{2}\right)}$$

½ Mark Questions:

1. What do we call the maximum angle at which we are able to see the whole object?

Ans: - Angle of vision.

2. What is the value of angle of vision of a healthy person?

Ans: - 60^0.

3. What is the value of least distance of distinct vision of a healthy person?

Ans: - 25 cm.

4. How much distance is there between eye lens and retina?

   (Or)

   What is the image distance of eye lens?

Ans:- 2.5 Cm

5. What do we call the process of adjusting focal length of eye lens?

Ans: - Accommodation of eye lens.

6. What type of image is formed by eye lens on retina?
   A) Real, erected, enlarged
   B) Real, inverted, diminished
   C) Virtual, erected, diminished
   D) Virtual, erected, enlarged.

Ans: - B.

7. Match the following with suitable lens to correct given eye defect.

P. Myopia	X. bi - convex lens
Q. Hypermetropia	Y. bi- focal lens
R. Presbiopia	z. bi- concave lens.

A) PZ, QX, RY B) PZ, QY, RX C) PY, QX, RZ D) PY, QZ, RX

Ans: - PZ, QX, RY.

8. **Statement P:** Myopia can be corrected by using a biconcave lens.
   Statement Q: For a bi concave lens power value is positive choose the correct option.
   A) P is false, Q is true
   B) P is true, Q is false
   C) Both P, Q are true
   D) Both P, Q are false

Ans: - B.

9. **Statement** X: The focal length of eye lens is less than 2.5 cm for people suffering from Myopia.

   Statement Y: The focal length of eye lens is less than 2.27 cm for people suffering from hypermetropia. choose the correct option.

   A) Both X and Y are true.
   B) Both X and Y are false.
   C) 'X' is true and y is false.
   D) 'X' is true and 'Y' is false.

Ans: - C.

10. After testing the eyes of a child. The optician has prescribed the following lenses for his spectacles.
    Left eye: + 2.00D Right eye: + 2.25D
    The child is suffering from which defect of vision?

Ans: - Hypermetropia (Or) Far.sightedness.

11. Doctor advised to use 2D lens. What is its focal length?

Ans: - P = 2D

f = ?

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

$2D = \frac{100}{f(in\ cm)}$

$f = \frac{100}{2}$ = 50 cm.

12. If the focal length of a lens is 2m. Then what is its power?

Ans: - **f = 2m**

P =?

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

$P = \frac{1}{2}$= 0.5D

13. What do we call the light phenomenon that splitting of white light in to different colours(VIBGYOR)?

Ans: - Dispersion of light.

14. During refraction of light which character of the light does not change?

Ans: - Frequency.

15. Jame is suffering from long sight.
Purna: James! Use biconcave lens.
Srinu: James! Use biconvex lens.
Who has given correct advice to James

Ans: - Srinu.

16. **Assertion (A):** Blue colour of the sky appears due to scattering of light.
Reason (R): Blue colour has shortest wavelength among all colours of white light.
Choose the correct option among the following.
A. Both A and R are true and R is correct explanation to 'A'
B. Both A and 'R' are true and R is not correct explanation to 'A'
C. 'A' is true but 'R' is false
D. Both 'A' and 'R' are false.

Ans: - C). 'A' is true but 'R' is false.

17. **Assertion (A):** The image distance of the eye lens is fixed

Reason (R): The focal length of the eye lens is fixed.

A) Both 'A' and 'R' are correct and 'R' supports 'A'
B) Both 'A' and 'R' are correct and 'R' does not support 'A'
C) 'A' is wrong but 'R' is correct.
D) 'A' is correct but 'R' is wrong.

Ans: - D.

18. **Assertion (A):** Eye lens forms a real image on the retina
Reason (R): Eye lens is a bi – convex lens with flexible focal length.
A) Both 'A' and 'R' are correct and 'R' supports 'A'
B) Both 'A' and 'R' are correct and 'R' does not support 'A'
C) 'A' is wrong but 'R' is correct.
D) 'A' is correct but 'R' is wrong

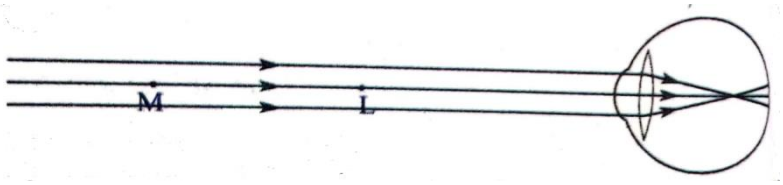
Ans: - A

19. What are the scattering Centre's in blue colour of the Sky?

Ans: - N_2, O_2 molecules.

20. What do we call the phenomenon of re emission of absorbed light in all directions with different intensities by atoms or molecules?

Ans: - Scattering of the light.

21. 

See figure. Parallel rays of light fall on eye and they converge in front of the retina. It represents which type of eye defect? To correct it which type of lens should be used?

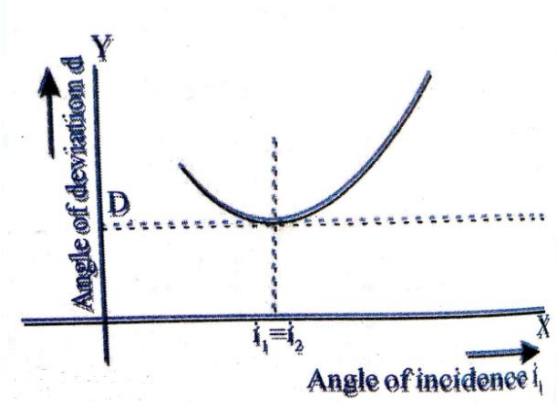
Ans: - Myopia.

It is corrected by using bi -concave lens.

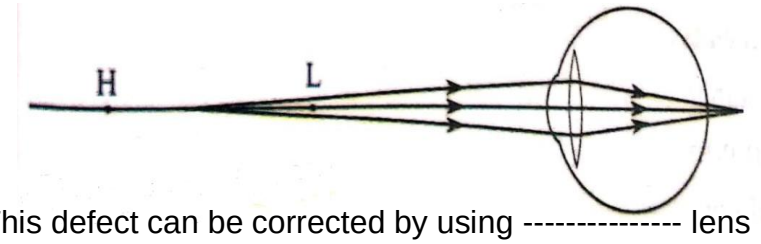
22. What is the unit of power of lens?

Ans: - Dioptre.

23. In the given figure what is “D”?



Ans: - Angle of minimum deviation.

24. 

This defect can be corrected by using ---------- lens

A) Bi- convex lens B) Bi-concave lens C)Bi-focal focal lens D) Plane mirror

Ans: - A

25. What type of lens do you suggest to correct the eye defect Presbyopia?

Ans: - Bi- focal lens.

1 Mark Questions:

1. What is power of lens? Mention its unit.

Ans: - The reciprocal of focal length is called power of lens.

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

Dioptore is the unit of power of lens.

2. What is dispersion?

Ans: - The splitting of white light in to different colours(VIBGYOR) is called

Dispersion.

3. Seetha can see nearby objects clearly but not able to see distant objects clearly.
   (i) What is her eye defect?
   (ii) Which lens do you suggest to correct her eye defect?

Ans: - (i) Myopia.

(ii)Bi -concave lens.

4. Raju can see the letters on the black board when he sits on last bench but not able to read the text book.
   (i) What is his eye defect?
   (ii) Which lens do you suggest to correct his eye defect?

Ans; - (i) Hypermetropia.

(ii)Bi-convex lens.

5. What is presbyopia?

Ans: - Presbyopia is a vision defect indicating that the power of accommodation of the

eye is usually decreasing with ageing.

6. Light of two colours ‘A’ and ‘B’ pass through a glass prism. ‘A’ deviates more than ‘B’ from its path of incidence. Which colour has a higher speed in the prism?

Ans: - ‘B’ colour has a higher speed in the prism.

[Explanation: Given ‘A’ deviates more than ‘B’. Hence ‘B’ colour wavelength is

more.

$V = \nu\lambda$

Speed of the wave increases with increases in wavelength of light.]

7. For which colours, is the refractive index ‘n’ of a prism material (i) minimum (ii) maximum

Ans: - The refractive index ‘n’ is minimum for red colour and maximum for violet colour.

8. The sky appears dark instead of blue to an astronaut. Why?

Ans: - The sky appears dark instead of blue to an astronaut because there is no atmosphere in the Outer Space that can scatter the sunlight. As the sunlight is not scattered, no scattered light reach the eyes of the astronauts and the sky appears black to them.

9. What are the phenomena of light responsible for the formation of rainbow in the sky?

(Or)

What are the light phenomenons are behind the formation of rainbow?

Ans: - Refraction, dispersion and total internal reflection.

10. Name the part of the eye.
    (a) That controls the amount of light entering in to the eye.
    (b) That has real, inverted image of the object formed on it.

Ans: - (a) Iris

(b)Retina

11. The ciliary muscles of a normal eye are in their

    (i) Most relaxed (ii) Most contracted state.

In which of the above two cases is the focal length of the eye lens more?

Ans: - Ciliary muscles are in most relaxed the focal length of eye lens has maximum value.

12. What is the scattering of light?

Ans: - The process of re-emission of absorbed light in all directions with different intensities by atoms or molecules is called scattering of light.

13. Match the items in List – 1 with List – 2.

List – 1		List – 2
(a) Blue colour of sky	[ ]	(i) Dispersion
(b) Raman effect	[ ]	(ii) Total Internal Reflection
(c) Rainbow	[ ]	(iii) Scattering
(d) Shining of diamond	[ ]	(iv) Scattering of light by gasses and liquids

Ans: - a- iii, b – iv, c - i, d – ii.

14. Observe the following table and Write which lens has more power?

Type of lens	A	B	C
Focal length (cm)	30	20	10

Ans: - 'C'

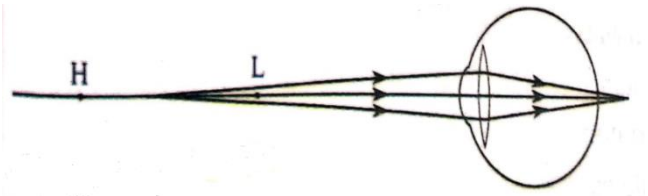
Explanation [P = $\frac{100}{f\ (in\ cm)}$

For A P = $\frac{100}{30}$ = 3.3 D

For B P = $\frac{100}{20}$ = 5 D

For C P = $\frac{100}{10}$ = 10 D]

15. What are L and H in the following figure?



Ans: - L = Least distance of distinct vision.

H = near point.

2 Mark Questions:

1. A prism with an angle A = 60^0 produces an angle of minimum deviation of 30^0. Find the refractive index of material of the prism.

Ans: - Given angle of prism A = 60^0

Angle of minimum deviation D = 30^0

Refractive index of material of the Prism.

$$n = \frac{sin\left(\frac{A+D}{2}\right)}{sin\left(\frac{A}{2}\right)}$$

$$n = \frac{sin\left(\frac{60^0+30^0}{2}\right)}{sin\left(\frac{60^0}{2}\right)}$$

$$n = \frac{\sin 45^0}{\sin 30^\circ}$$

$$n = \frac{1/\sqrt{2}}{1/2}$$

$$n = \frac{2}{\sqrt{2}}$$

$$n = \sqrt{2}$$

$$n = 1.414$$

2. When Raju, a ten years old boy, saw rainbow in the sky, So many doubts raised in his mind. Guess those doubts and ask some questions.

Ans: - (1) What colours are there in rainbow?

(2) Why can't we recognize all colours in a rainbow?

(3) What are the light phenomenabehind the formation of rainbow?

(4) What is actual shape of rainbow? (or) any related questions.

3. What is the reason for appearance of the red colour of sun during sunrise and at sunset?

Ans: - 1. The light from sun needs to travel long distance in atmosphere during sunrise and sunset.

2. In the morning and evening during sunrise and sunset except red light all colours scatter more and vanish before they reach us.

3. Since Scattering of red light is very small it reaches us.

4. As a result sun appears red in colour during Sunrise and Sunset.

4. Explain briefly the reason for the blue colour of the Sky?

Ans: - 1. The reason behind blue colour of the sky is scattering of the light.

2. Our atmosphere contains different types of molecules and atoms including N_2 and O_2.

3. The size of these molecules are comparable to the wavelength of blue light.

4. These molecules act as scattering centres for scattering of blue ligt.

5. Sky appears in different colours at different times of a day. Ask some questions expressing your doubts?

Ans: - 1. Which phenomenon is the reason for the blue of the sky?

2. Why does the sky sometimes appear white?

3. What is the reason for the red colour of sun during sunrise and at sunset?

4. Why sun does not appear red during non-hours?

6. How do you appreciate the working of the ciliary muscle in the eye?

(OR)

Explain the accommodation eye lens?

Ans: - 1. The ciliary muscle is helpful to change its focal length by changing the radius of curvature of the eye lens.

2. When the eye is focused on a distant object, the ciliary muscles are relaxed so that the focal length of the eye lens has its maximum value as a result use see the object clearly.

3. When the eye is focused on a closer object the ciliary muscles are strained and focal length of ey- lens decreases and we see the object clearly.

4. This process of adjusting the focal length is called “accommodation”.

5. So we appreciate the working of ciliary muscles in the eye.

7. Kishore uses Spectacles. When you look at him through his spectacles the size of eyes appear bigger than the original size of eyes.
   a) What type of lens is used by him?
   b) Name the eye defect he is suffering from.

Ans: - a) Convex lens

b) He is suffering from hypermetropia.

8. A short sighted person cannot see clearly beyond 5m. Calculate the power of lens required to correct his vision.

Ans: - Given image distance v = - 5m

u = α

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

$$\frac{1}{f} = \frac{1}{-5} - \frac{1}{\alpha}$$

f = - 5m

$$P = \frac{1}{f} = \frac{1}{-5} = -0.2\ D$$

Power of lens is – 0.2D.

9. An old man was unable to see both nearer as well as far objects clearly. Then
   (i) What was the defect in the vision of the old man?
   (ii) Which lens can be used to clear vision of nearer and far off objects?

Ans: - (i) The old man suffers from presbyopia

(ii)Bi-focal lens is used to correct the vision defect presbyopia.

10. Write a formula to find the refractive index of the material of the prism and explain the terms?

Ans: - Refractive index of the material of a prism

$$n = \frac{sin\left(\frac{A+D}{2}\right)}{sin\left(\frac{A}{2}\right)}$$

Here, A = Angle of prism

D = Angle of minimum deviation.

4 Marks Questions:

1. A student can read the text book but not able to see distant object clearly. What is his defect? How do you correct it? Explain.

(Or)

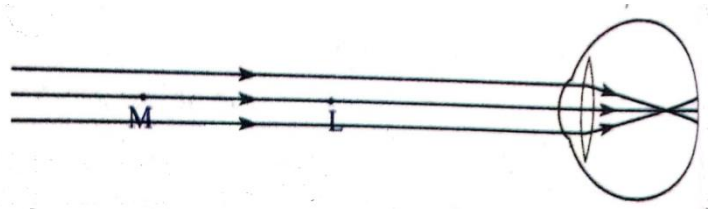
What is eye defect myopia? How do you correct myopia? Explain using figures.

Ans: - **Myopia:**

Some people cannot see objects at long distances but can see nearby objects clearly. This type of defect in vision is called 'Myopia' or 'near sightedness'.

Cause of Myopia:

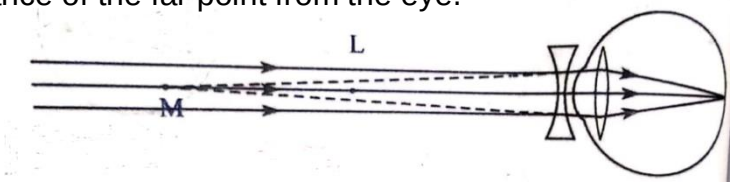
For the people of myopia, the maximum focal length of eye lens is less than 2.5 cm so that the rays coming from distant object after refraction through the eye lens form an image before the retina as shown in figure.



The point of maximum distance at which the eye lens can form an image on the retina is called far point (M). The eye lens can form clear image on the retina when an object is placed between far point (M) and point of least distance of distinct vision (L).

Correction of Myopia:

Myopia is corrected by using a bi- concave lens of focal length equal to the distance of the far point from the eye.



2. Some people can see the distanct objects clearly but cannot see the objects at near distance. What type of vision defect is this? How do you correct it? Explain with diagrams.

(Or)

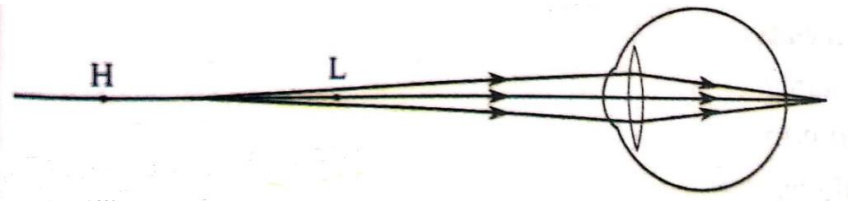
What is eye defect hypermetropia? Explain how do you correct it with neat diagrams.

Ans: - **Hypermetropia:**

Some people can see the distant objects clearly but cannot see objects at near distances. This type of vision defect is called 'hypermetropia' or Far sightedness.

Cause of Hypermetropia:

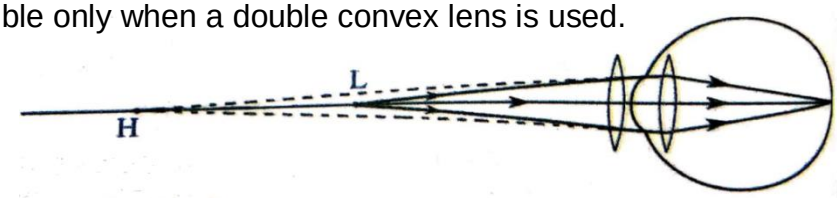
The minimum focal length of eye for the person of hypermetropia is greater than 2.27 cm. In such cases the rays coming from a nearby objects, after refraction at eye lens forms an image beyond the retina as shown in fig



The point of minimum distance at which the eye lens can form an image on the retina is called near point. Eye lens can form a clear image on the retina when any object is placed beyond near point.

Correction of Hypermetropia:

To correct the defect of hypermetropia, we need to use a lens which forms an image of an object beyond near point at H, when the object is between H and L. This is possible only when a double convex lens is used.



3. Geetha cannot see the objects clearly farther than 2 meters
   (i) What is her eye defect?
   (ii) Which lens do you suggest to correct her eye defect?
   (iii) What is the focal length of that lens?
   (iv) Find the power of that lens.

Ans: - (i) Myopia

(ii)Bi- concave lens

(iii) Distance to far point D = 2m = 200 cm

Focal length of bi- concave lens f = - D= - 200 cm

(iv) Power of lens P = $\frac{100}{f}$

$= \frac{100}{-200}$

= - 0.5D

4. Near point of a person suffering with some eye defect is 100 cm.
   (i) What is his eye defect?
   (ii) Which lens do you suggest to correct his eye defect?
   (iii) What is the focal length of that lens?
   (iv) Find the power of that lens.

Ans: - (i) Hypermetropia

(ii)Bi- Convex lens

(iii)Distance to near point d = 100 cm

Focal length of bi- convex lens f = $\frac{25d}{d-25}$

f = $\frac{25(100)}{100-25} = \frac{25\ X\ 100}{75}$

f = $\frac{100}{3}$

f = 33.33 cm

(iv)Power of lens P = $\frac{100}{f}$

$= \frac{100}{\frac{100}{3}} = 100\ X\ \frac{3}{100}$

P = 3D

5. Name the phenomenon that can be produced by using metal tray, mirror and water. Write the experimental procedure for getting this phenomenon.

(Or)

Suggest an experiment to produce a rainbow in your class room and explain the procedure.

(Or)

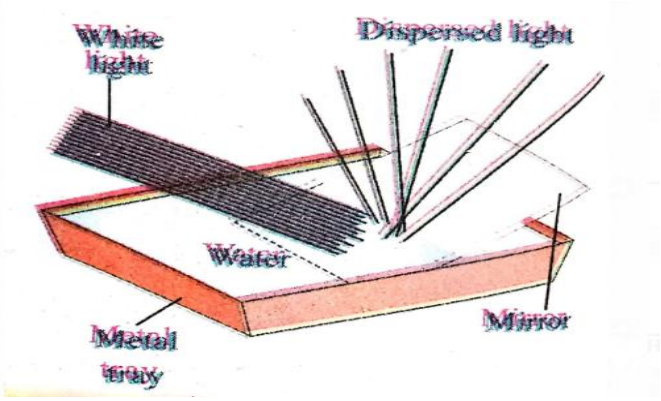
Explain an activity for the formation of an artificial rainbow.

Ans:-**Formation of a rainbow in a class room:**

Material required: Metal tray, water, plane mirror, white card board sheet.

Procedure:

(i) Take a metal tray and fill it with water.
(ii) Place a mirror in the water such that it makes an angle to the water surface.
(iii) Now focus white light (Sun rays) on the mirror through the water.
(iv) We can observe colours on white card board sheet kept above the water surface.



Conclusion: Splitting of white light in to different colours is called dispersion of light.

6. Explain the formation of rainbow?

Ans: - Formation of a rainbow:

1. Rainbow is formed due to dispersion of the sunlight by millions of tiny water droplets.
2. When refraction, the white light is dispersed into its spectrum of colours, violet being deviated the most and red the least.
3. Reaching the opposite side of the drop, each colour is reflected back in to the drop because of total internal reflection.
4. At the second refraction, the angle between red and violet rays further increases when compared to the angle between those at first refraction.
5. Hence we see a rainbow of an angle between 40^0 and 42^0.

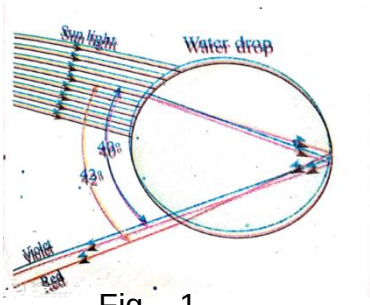


Fig – 1

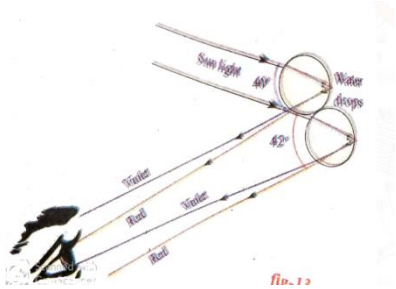


Fig - 2

7. Write the experimental procedure in finding the refractive index of material of a prism.

Ans: - **Aim:**To find the refractive index of the prism.

Material required: Prism, piece of white chart, pencil, pins, scale and protractor.

Procedure:1. Place the prism on the white chart and draw the boundary lines by using a pencil.

2. Remove the prism and name the vertices as P, Q and R.

3. Measure the angle of the prism (A = 60^0) and noted in the book.

4. Now fix two pins vertically on the line at points A and B as shown in the fig.

5. Place the prism on paper and observe the pins from the other side of the prism and fix another two pins such that AB and CD appear to lie along the straightline.

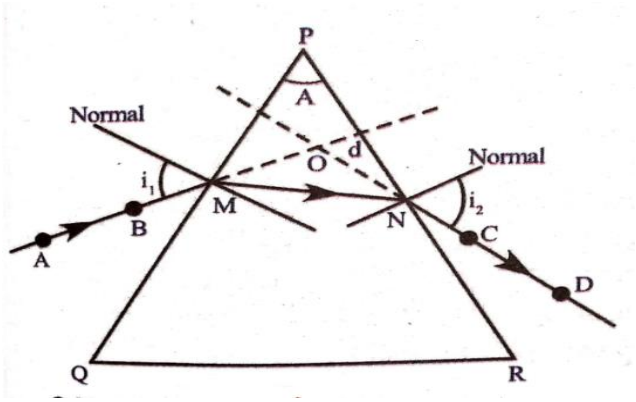
6. If we extend the incident ray and emergent ray they are intersect at a point. This is called angle of deviation (D).

7. Repeat the process for different angles of incidence and measure Corresponding angle of deviations and noted in table.

Angle of Incidence (i_1)	Angle of emergence (i_2)	Angle of deviation (d)

8.The refractive index of prism is calculated by using the formula.

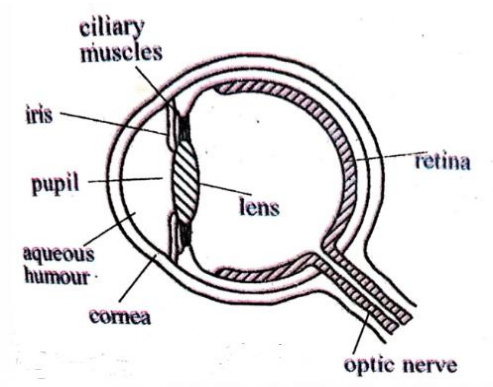
$$n = \frac{\sin\left(\frac{A+D}{2}\right)}{\sin\left(\frac{A}{2}\right)}$$



Diagrams:

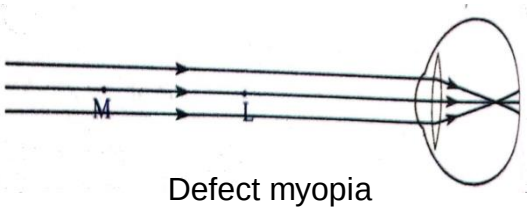
1. Draw the structure of human eye and its parts?

Ans: -

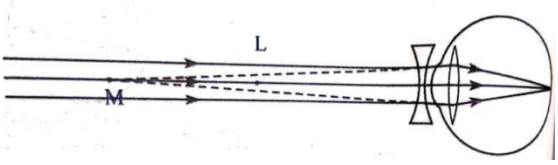


Human eye

2. Draw the diagram showing the eye defect myopia and correction with suitable lens.



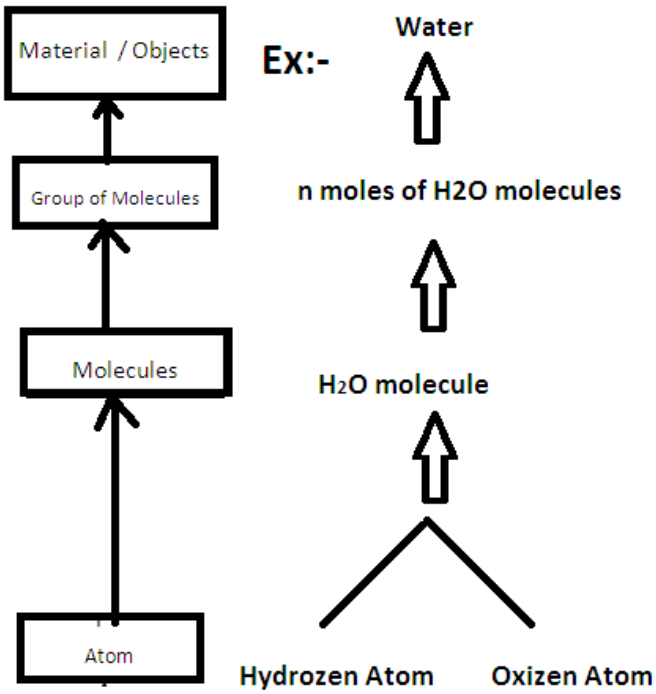
Defect myopia



Corrected myopia

6. STRUCTURE OF ATOM

Key concept:-



Learning about Atom is nothing but microscopic study about materials, In learning structure of Atoms following terms should be remembered.

- **WAVES**:- A wave is a vibrations of a medium that moves from one point to another carrying the energy but not the medium itself with it.
- **Spectrum**:- Spectrum is a group of wavelengths or frequencies.
- **Line spectrum** :- Each element emits its own characteristic colour corresponding to certain discrete wavelengths of light and is called line spectrum.
- **Orbital:**- The region of space around the nucleus where the probability of finding the electron is minimum is called an orbital .
- **Sub- shell**:- Sommerfeld added elliptical orbits to Bohr's orbits . These elliptical orbits are known as sub-shell.
- **Electronic configuration :-** The distribution of electrons in shells sub-shells and orbital in an atom is known as electronic configuration.
- **The Pauli's exclusion principle**:- According to Pauli' exclusion principle no two electrons of the same atom can have all four quantum numbers the same.
- **Hund's rule** :- According to Hund's rule electron pairing in orbitals starts only when all available empty orbitals of the same energy are singly occupied.

- **Electromagnetic Spectrum** :- The entire range of electromagnetic wave frequencies is known as the electromagnetic spectrum.

- **Wave lengeth**:- The wavelengeth of wave is the distance from one wave peak to the next.

- **Frequency :**- The frequency (γ) of a wave is the number of wave peaks that pass by a given point per unit time.

- **Visible spectrum**:- The range of wavelengeths covering red colour to violet color is called is called the visible spectrum.

- **Plank's Equation** :- $E = h\gamma$

- **Plank's contant**:- $h = 6.626 \times 10^{-34}$ Js

½ Marks –

1. What is the angular momentum quantum number (l) for n = 1 ?

A. l = n-1
l = o

2. What is the maximum number of electrons that can be accommodated in the L –shell of an atom?

A. 8 electrons

3. Out of 3d and 4s which has more (n+l) value?

A. 3d [(n+l) value for 3d = 3+2 =5, (n+l) value for 4s = 4+0 = 4]

4. The set of quantum number of an electron are given by n=2, l=1, m_l =0, m_s = - ½ write its configuration in nl^x method ?

A. $2p^1$

5. Among 3p, 4s, 3d, 4p orbitals which one has the least energy?

A. 3p

6. Match the items in list-1 with list- 2

List-1		List-2
(a) Quantum theory	[ ]	(i) sommerfeld
(b) Quantum mechanical model of an atom	[ ]	(ii) Moeller
(c) Elliptical orbits	[ ]	(iii) Max plank
(d) Relative energy of orbitals	[ ]	(iv) Ervin Schrödinger

A. (a) iii (b) iv (c) i (d) ii

7. Choose the correct option

Group -1		Group -2
(1) Size and energy of main shell	[ ]	(a) l
(2) Shape of sub- shell	[ ]	(b) m_s
(3) Orientation of orbital's in space	[ ]	(c) n
(4) Direction of spin of electron	[ ]	(d) m_l

(A) 1-b, 2-d, 3-a, 4-c (B) 1-c, 2-a, 3-d, 4-b
(C) 1-b, 2-a, 3-c, 4-d (D) 1-c, 2-d, 3-a, 4-b

A. (B)

8. An electron in an atom has the following quantum numbers

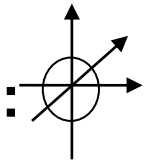
n	l	m_l	m_s
2	0	0	+ 1/2

To which orbital it belongs to ?

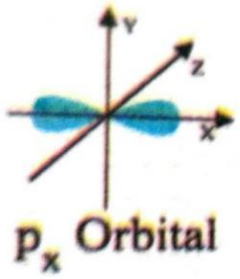
A. $2S^1$

9. What is the shape of 'd' orbital?

A. Double- dumbell shape.

10. S – orbital  :: P- orbital : _____

A.



11. Assertion (A) : Rainbow is an example of a continuous spectrum.
Reason (R): In a rainbow the colours spreading continuously and the intensity of each colour varies from one point to the other.

(a) 'A' and 'R' are correct and 'R' supports 'A'
(b) 'A' is correct but 'R' is incorrect
(c) 'A' is correct but 'R' is not supports 'A'
(d) Both 'A' and 'R' are incorrect.

A. (a)

12. Assertion (A) : The energy of an electron in an atom is quantized
    Reasons (R): Electrons in an atom occupy stationary orbits.
    (a) 'A' and is correct but R' is incorrect
    (b) 'R' is correct but 'A' is incorrect
    (c) 'A' and 'R' are correct and 'R' supports 'A'
    (d) Both 'A' and 'R' are incorrect.
    A. (c) 'A' and 'R' are correct and 'R' supports 'A'

13. Pavan observed street lamps glowing yellow in colour which element responsible for this yellow light?
A. Sodium vapours produce yellow light in street lamp.
14. Write the relation between frequency (γ) wavelength (λ) and speed of light (c)
    A. C = $\gamma\lambda$

15. In VIBGYOR which colour has highest wavelength ?
A. Red colour
16. Which of the following statement is wrong ?
    a. Electromagnetic waves causes magnetic and eclectic fields.
    b. Light does not propagate in vacuum
    c. Electric and magnetic fields are perpendicular to each other.
    d. All electromagnetic radiations travel with same speed.

    A. (b) Light does not propagate in vacuum

17. Which electronic shell is at a higher energy level K or L?
A. 'L' shell , Because it is away from the nucleus than K- shell.

18. Who introduced elliptical orbits?
A. Sommerfeld.

19. What is the shape of the orbital if the angular momentum quantum number l=1?
A. If l=1 it is the P-orbital the shape of the orbital is dumbell shape.

20. What happens when you heat an iron rod in a flame?
A. If we heat the iron rod in a flame first it turns red and then orange , yellow , blue.

1 Marks :-

1. $E = h\gamma$

(a) Which is the plank's constant in this equation?
(b) What is its value?

A. (a) 'h' is the plank's constant

(b) 'h' value is 6.626×10^{-34} Js

2. What is absorption spectrum?

A. The spectrum formed by the absorption of energy when electron jumps from lower energy level to higher energy level is called absorption spectrum.It contains dark lines on bright background

3. What is emission spectrum?

A. Emission spectrum is the spectrum of frequencies of electromagnetic radiation due to an atoms electron making transition form a high energy state to low energy state.

4. The wavelength of a radio wave is 1.0 m . Find its frequency.

A. Wavelength λ = 1.0 m $\quad$ c= 3×10^8 m/ sec

Frequency γ = ?

We know that $C = \gamma\lambda$

$$\gamma = \frac{C}{\lambda} = \frac{3 \times 10^8}{1m} = 3 \times 10^8 \text{ Hz}$$

5. Write the four quantum numbers for $1S^1$ electron ?

A. The four quantum numbers for $1S^1$ electron are

n	l	m_l	m_s
1	0	0	+ 1/2

6. Which rule is violated in the electronic configuration $1s^0\ 2s^2\ 2p^4$?

A. Aufbau principle is violated in this electronic configuration.

7. What are degenerate orbitals?

A. The orbitals which are having same energy are called degenerate orbitals.

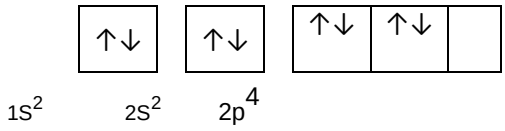
8. What is meant by an electromagnetic spectrum? Give an example of visible spectrum in nature?

A. Electromagnetic spectrum:- The entire range of electromagnetic wave frequencies is known as the electromagnetic spectrum

Example:- Formation of rainbow.

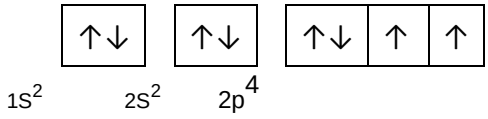
9. Following orbital diagram shows the electronic configuration of Oxygen atom

0 (Z=8) =



Which rule does not support this?

A. Hund's rule. Because degenerate orbitals are filled by one electron after pairing takes place . Correct electron configuration of oxygen is



10. Write the electronic configuration of chromium?

A. Cr (z= 24) = $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $4s^1$ $3d^5$

(or)

[Ar] $4s^1$ $3d^5$

11. If we put strontium chloride and hydrochloric acid paste into a non luminous flame, what would be the colour it produces?

A. Strontium chloride produces crimson red flame.

12. Fill the table with suitable number

A.

l	Sub-shell	No of degenerate orbitals
0	S	
	P	3
2	D	
	F	

l	Sub-shell	No of degenerate orbitals
0	s	1
1	p	3
2	d	5
3	f	7

13. How many maximum number of electrons that can be accommodated in 'N' principle energy shell?

A. For N shell n= 4

The maximum no of electrons accommodated in a shell is $2n^2$

A maximum of 32 electrons can be filled in N shell.

14. If l=2 then what is the minimum and maximum values for m_l ?

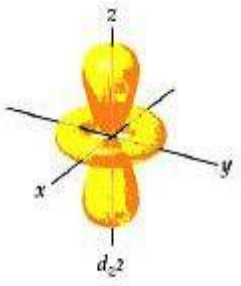
A. If l=2 m_l = (2l+1) = 5 values -3, -2, -1 , 0 1,2,3 .

Hence minimum value is -3

Maximum value is + 3

15. Draw dz^2 orbital ?

A. fig



2 Marks questions:-

1. No two electrons of the same atom can have all the four quantum numbers same

Read the above information ad answer the following questions?

(a) What are four quantum numbers?

(b) Who proposed this principle?

A. (a) Principal quantum number (n) the angular momentum quantum number (l) , magnetic quantum number (m_l) spin quantum number (m_s)

(b) Pauli

2. What is nl^x method ? How it is useful? (or)

What is the short hand notation of the electronic configuration of the elements ? Explain the terms in it?

A. (1) The short hand notation of electronic configuration is nl^x

(2) It gives the information as shown below

n = Principle quantum number

l= Angular momentum quantum number

x= Number of electrons in orbital

(3) nl^x method is used to write the electronic configuration of an atom

(4) It is used to find the positions of electrons around the nucleus in an atom.

3. Write four quantum number for the differentiating electron of sodium (Na) atom?

A. (1) The atomic number of sodium (Na) is 11

(2) Electronic configuration is $1s^2\ 2s^2\ 2p^6\ 3s^1$

(3) The differentiating electron is $3s^1$ orbital

(4) The four quantum number are

n	l	m_l	m_s
3	0	0	+ 1/2

4. What information does the electronic configuration of an atom provide?

A. The arrangement of electrons in shells sub-shells and orbitals of an atom is called electronic configuration .

The electronic configuration of an element gives:-

(1) Valency of the element

(2) The position of an electron in the space of atom

(3) Which group and period does the element belongs to

(4) Reactivity of an element

(5) Metallic character of an element.

5. Draw a neat diagram of electromagnetic wave?

A.

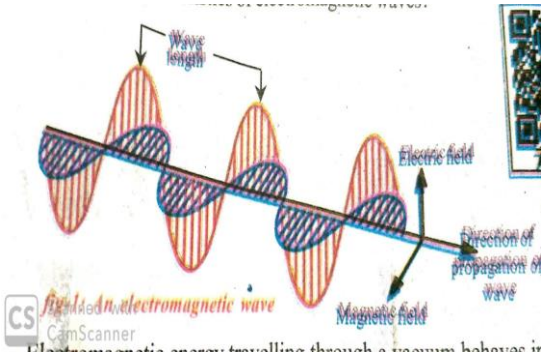


fig: An electromagnetic wave

6. Rainbow is an example for continuous spectrum explain?

A. 1, Rainbow is a spectrum of different colours (VIBGYOR) with different wavelengths.

2. These colours are continuously distributed.

3. There is no sharp boundaries in between colours .

So, rainbow is a continuous spectrum.

7. (i) An electron in an atom has the following set of four quantum numbers to which orbital it belongs to ?

n	l	m_l	m_s
2	0	0	+ 1/2

(ii) Write the four quantum number for $2P^1$

A. (i) Electron belongs to $2S^1$ orbital

(ii)

n	L	m_l	m_s
2	1	- 1	+ 1/2

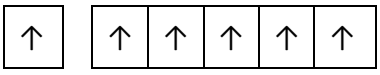
8. The electronic configuration of an atom is as follows $1S^2$ $2S^2$ $2P^2$
   (1) Write the name of an element?
   (2) What is valence shell?

A. (1) The element is carbon
   (2) The valence shell is L ($2S^2$ $2P^2$)

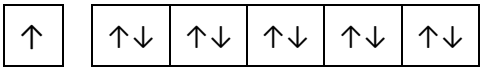
9. Why there are exemptions in writing the electronic configurations of chromium and copper ?

A. (1) Elements which have half filled or completely filled orbitals have greater stability.
   (2) So in chromium and copper the electrons in 4S and 3d redistributes their energies to attain stability by acquiring half-filled and completely filled d - orbital's.

   (3)Hence the actual electronic configuration of chromium and copper are as follows.

Cr (Z=24) [Ar] $_{18}$ $4s^1$ $3d^5$ – Half  filled

$4s^1$ 3d

Cr (2=29) [Ar] $_{18}$ $4s^1$ $3d^{10}$ –  completely filled

4s 3d

4 Marks:-

1. In an atom the number of electrons in M- shell is equal to the number of electrons in the K and L- shell . Answer the following questions.
   (a) Which is the outermost shell?
   (b) How many electrons are there in its outermost shell ?
   (c) What is the atomic number of an element?
   (d) Write the electronic configuration of the element?

A. (a) N- shell
   (b) 2 electrons
   (c) Atomic number 22
   (d) Electronic configuration of an element is $1S^2$ $2S^2$ $2P^6$ $3S^2$ $3P^6$ $4S^2$ $3d^2$

2. Explain the significance of three quantum numbers in predicting the positions of an electron in an atom? (or)

Explain about the four quantum numbers

A. Each electron in an atom is described by a set of three quantum numbers n, l, m_l

These numbers indicate the probability of finding the electron in the space around the nucleus.

1. Principal quantum number(n) :-

a. It was introduced by Neil's Bohr.
b. It is denoted by the letter 'n'
c. The number of electrons in a shell is limited to $2n^2$ is n= 1,2,3 … etc.,
d. The shells are denoted by the letters K,L,M,N …etc
e. Principle quantum number gives the size and energy of the main shell

Shells	K	L	M	N	O
n	1	2	3	4	5

2.Angular – momentum quantum number (l):-

a. It was introduced by sommerfeld
b. It is denoted by the letter 'l'
c. 'l' has integer values from 'o' to (n-1) for each value of 'n'
d. Each 'l' value represents one sub-shell
e. 'l' value gives the shape of the sub-shell
f. Sub-shells are denote by the letters s,p,d,f… etc.,

L	0	1	2	3
Sub –shell	s	p	d	f

3 Magnetic quantum number (m_l) :-

(a) It was introduced by Lande
(b) It is denoted by the letter 'm_l'
(c) It has integer values between – l to +l including zero.
(d) For a given 'l' value the magnetic quantum number has (2l+1) integer values of m_l
(e) It gives the information about the orientation of orbital in the presence of magnetic field.

Orbitals in the presence of magnetic field.

Ex:- The orientation of 'p'- orbitals are p_x, p_y, p_z

4. Spin quantum number (m_s) :-

(a) It was introduced by Ulenbeck and Goudsmith .

(b) It is denoted by the letter m_s

(c) This quantum number refers to the two possible orientation of the spin of an electron . One clockwise (↑) and the other antilock wise (↓) spin.

(d) The spin notation of the electrons are represented by +½ and – ½.

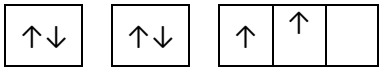
3. Explain Hund's rule with an example? (or)
Electron pairing takes place only after all the available degenerate orbitals are occupied by one electron each …
Which rule state like this ? Explain with one example?

A. **Hund's rule**:- Hund's rule states that electron pairing takes place only after all the available degenerate orbitals are occupied by one electron each.

Example :-

1. Consider a carbon atom (Z=6) . It has six electrons .
2. The first electron goes into the 1s orbital of the K- shell
3. The second electron will be paired up with the first in the same 'ls' orbital.
4. Similarly the 3rd and 4th electrons occupy the '2s' orbital of the 'L' shell.
5. The fifth electron goes into one of the three '2p' orbital's of the L- shell, let it be $2p_x$
6. Since the three p- orbitals are degenerate , ($2p_x$, $2p_y$, $2p_z$) the 6th electron goes into $2p_y$ or $2p_z$ but not in $2p_x$.
7. Thus the electronic configuration of carbon can be written as

$1S^2\ \ 2s^2\ \ 2p_x^1\ \ 2p_y^1$ (or)



$1s^2$ $2s^2$ $2p_x^1$ $2p_y^1$ $2p_z^1$

4. State and explain with one example of Aufbau Principle?

A. **Aufbau Principle**:-

(1) According to this principle , the electron occupies the orbital having the lowest energy.

(2) The energy of the orbital was calculated by the formula (n+l)

Where n = Principle quantum number.
l = Angular momentum quantum number.

Example :-

Case (1) :-

1. Consider the Hydrogen atom. It has only one electron.
2. The electron enters the 'ls' orbital which has the lowest energy.
3. In terms of the quantum number, the incoming electrons go to an orbital whose (n+l) is less.

Case (2) :-

1. If two orbital's have the same (n+l) value , the orbital having lower 'n' values will be occupied .
2. For example the atomic number of the scandium is 21.
3. Twenty electrons can be accommodated is 1s, 2s, 2p, 3s, 3p and 4s orbitals.
4. The last electron can enter in to either 3d or 4p orbital .
5. The (n+l) value for these orbitals are

Orbital	(n+l) value
3d	3+2 = 5
4p	4+1= 5

6. Both the orbitals have same (n+l) value. But for '3d' orbital the 'n' value is less (n=3) compare to the 'n' value of 4p (n=4).
7. Therefore the electron occupies the 3d orbital.
8. Thus the electronic configuration of the Sc is [Ar] $4S^2$ $3d^1$

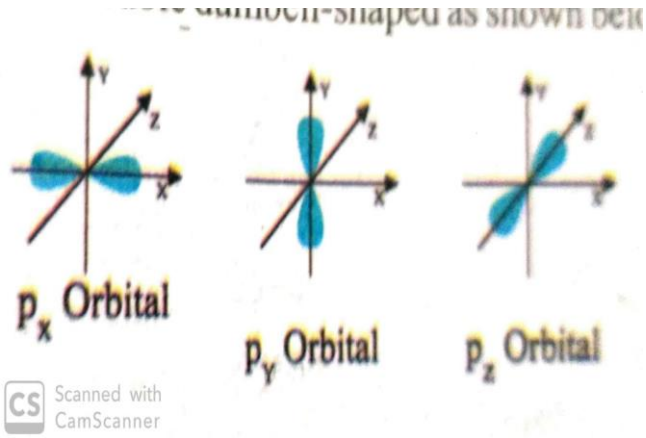
5. Draw the shape of s, p and d orbital diagrams

(or)

Draw the shapes of orbital which are indicated by l=0,1,2

s- orbital is in spherical shape.

'p' orbital is in dumbell shape



'd' orbital is in double dumbell shape

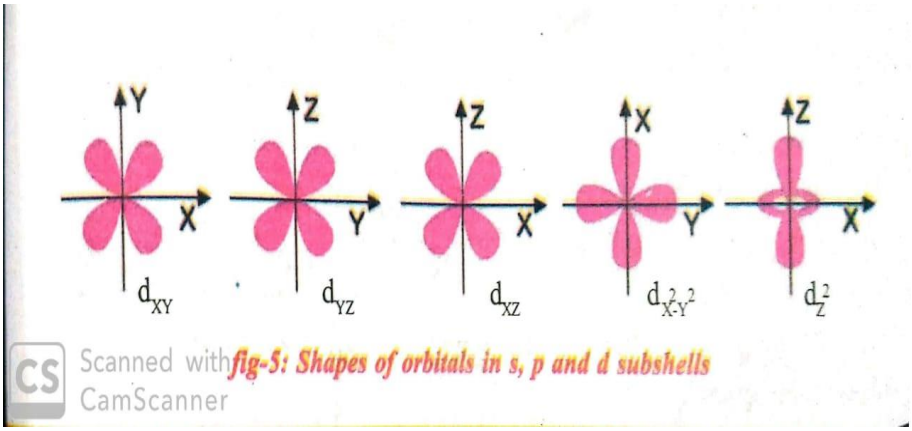
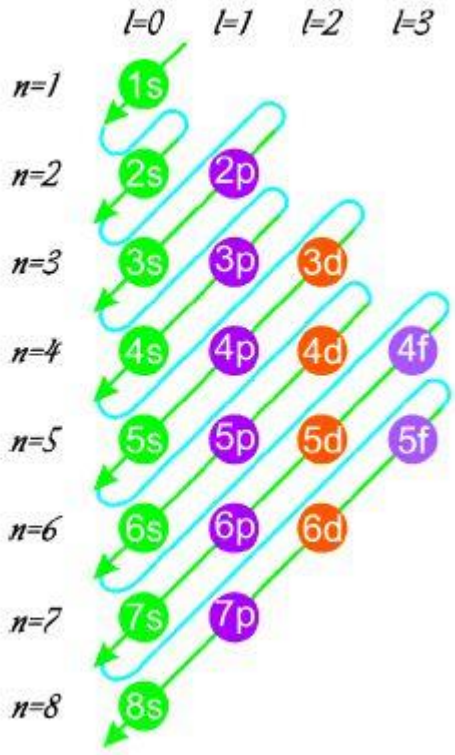


fig-5: Shapes of orbitals in s, p and d subshells

6. Draw the diagram of chart showing the increasing order of energy levels of various orbitals.



7. CLASSIFICATION OF ELEMENTS – PERIODIC TABLE

THE PERIODIC TABLE

Key Concepts:-

Elements :- Robert Boyle defined and element as any substance that cannot be disintegrated into a further simple substance. By now, we have nearly 115 elements.

Doberenier :- Dobernier was the first chemist to classify elements. Law of triad:- A group of three elements in which atomic weights of middle element is the average of first and third elements with similar chemical properties.

Ex:- 1)Li, Na, K, 2) Cl, Br, I

It is failed in classifying elements of very low mass or for very high mass

Newland's Octave law:- When elements are arranged in the increasing order of their atomic weights the properties of every eighth element are similar to the first element, after the discovery of noble gases, their classification has no importance since the properties of the eighth element are no longer similar to the first element.

Mendeleeff's periodic law:- The physical and chemical properties of the elements are a function of their atomic weights.

Mendeleeff arranged the elements in 8 groups and 7 periods

Moseley's periodic law:- The properties of the elements are periodic functions of their atomic numbers.

Modern periodic table:- Modern periodic law states that the physical and chemical properties of elements are the periodic function of the electronic configurations of their atoms . It has 18 groups and 7 periods.

Elements with similar chemical properties and which have similar outer hall configuration in their atoms are kept in the same group.

The elements are classified into s, p.d and f block elements, First period contains 2 elements, 2^{nd} and 3^{rd} period contains 8 elements each, 4^{th} and 5^{th} period contains 18 elements each 6^{th} period contains 32 elements and 7^{th} period is incomplete period. Metals are kept at left side and non metals are kept at the right side of the

Periodic Properties of elements and their trends in groups and periods: -

Periodic property	Trends in	
	Groups (From top to bottom)	Periods (From left to right)
Atomic radius	Increasing	Decreasing
Ionization energy	Decreasing	Increasing
Electro positivity	Increasing	Decreasing
Electro negativity	Decreasing	Increasing
Electron affinity	Decreasing	Increasing
Metallic nature	Increasing	Decreasing
Non metallic nature	Decreasing	Increasing

½ Mark Questions

1. How many elements are present in the 2nd period of periodic table ?

Ans: 8 elements.

2. Electron configuration of an atom is 2, 8,7 To which of the following elements would it be chemically similar.

(A) Nitrogen (Z=7) (B) Fluorine (Z=9) (C)phosphorous (Z=15) (D) Argon (Z=18)

Ans: B Fluorine

3.Which of the following is the most active metal

(A) Lithium (B) sodium (C) potassium (D) Rubidium

A. (D) Rubidium

4. What is the most electro negative element is periodic table.

A. Fluorine

5. The properties of the elements on the modern periodic table depend on ?

A. Electronic configuration.

6. 4 f elements are called_____

A. Lanthanides.

7. Ionization potential is expressed in _____

A. e.v (or) K.cal/mole(or) K.J/mole

8. Match the following

(a) eka boron [ ] (x) Germanium

(b) eka Aluminium [ ] (y) scandium

(c) eka silicon [ ] (z) Gallium

A. a-x, b-y, c-z B. a-x, b-z, c-y C. a-y, b-z, c-x, D. a-z, b-y, c-x

Ans. a-x, b-y, c-z

9. On moving from left to right in a modern periodic table How does the atomic size vary ?

A. Decreases

10. Assertion (A): In a group from top to bottom the atomic size is increasing.

Reason ®: in the group from top to bottom the atomic number increases.

A) A and R are correct

B) A and R correct. The R is the correct explanation of A

C) A is correct and the R is wrong.

D) A is false and the R is correct.

A. A and R correct. The R is the correct explanation of A.

11. X is an element with valancy 3 where as Y is an element with valance 2 ? Pridict the formula of compound that may be formed between X and Y.

A. X_2Y_3

12. How many number of elements are present in the first period of the periodic table.

A. 2 Elements.

13. A neutral element consists 12 elctrons, name the element?

A. Magnesium (Mg)

14. Cl, Cl^-, Which is stable

A. Cl^-

15. Which of the following is not correct.

A) Dobereiner - Triad theory

B) New lands - Octave theory

C) Mendeleff - Atomic number

D) Mosley - Modern periodic law

A. C) Mendeleff - Atomic number

1 Mark Questions

1. Give two examples f Dobereiner's Law of traids?

A. (i) Li, Na, k (ii) Ca,Sr, Ba,

2. According to which law atomic weight of middle element is average of first and third in a group of three elements.

A. Dobereiner's Law of traids.

3. Which one between Na and Na ion which would have more size ? Why?

A. Na has more size than Na ion. Because Na has 11 electrons and Na ion has only 10 electrons and increase in nuclear attraction.

4. Which atom is bigger in size Ne or Ar ? Why ?

A. Ar is bigger in size than Ne. Because in a group from top to bottom of the atomic size increases.

5. State Mendeleef's periodic Law?

A. The properties of elements are the periodic functions of their atomic weights.

6. Consider 'X' element belongs to third period, first group. Then answer the following.

(a) How many valence electrons are there ? (b) It is either metal or non- metal

A. X-indicates sodium “Na”

(a) Number of valence electrons 1.

(b) It is alkali metal

7. Write the electronic configuration of an element which has atomic number -15? How many valance electrons are there?

(A) Atomic number -15 – $1S^2 2S^2 2P^6 3S^2 3P^3$

Valance electrons = 2+3=5

8. What is the atomic weigh of Se, If S, Se, Te are Dobereiner traids [A.wt of S-32, Te =125]

A. At.Wt of se = $\frac{\text{At.Wt of S+ Te}}{2}$ = $\frac{32+125}{2}$ = 78.5

Atomic weight of se =78.5 u

2 Marks Question

1. Imagine, which one in each of the following Pairs is larger in size relatively with other. Explain

(X), Na,Al (Y) Na, Mg^{+2}

A) (X), Na,Al, Na – Atomic size gradually decreases from left to right in period

(Y) Na, Mg^{+2}

Na – is larger than Mg and Mg is larger than Mg^{+2}

Hence Na is Larger than Mg^{+2}

2.

Element	Group Number	Period Number
Sulphur		
Magnesium		

A.

Element	Group Number	Period Number
Sulphur	VIA	3
Magnesium	IIA	3

3. The electronic configuration of sodium is $1S^2 2S^2 2P^6 3S^1$ what information does it give ?

A)

(i) Its atomic number is 11

(ii) It is S- Block element

(iii) Its Valency is - 1

(iv) It is a metal.

4. Name two elements that you would expect to have chemical properties similar to Mg what is the basis for your choice?

A. Ca and Sr are two elements which are similar to Mg in chemical reactions,. Because they belong to the same group IIA.

5. How does metallic characters change when we move

(i) Down a group (ii) Across a period

A (i) As we go down a group metallic character increases.

(ii) Metallic character decreases from left to right in period.

6. Observe the given table and answer the following questions

S.No.	Electronic Configuration
1	$1S^2 2S^2 2P^6 3S^2 3P^3$
2	$1S^2 2S^2 2P^6 3S^2 3P^6 4S^2$
3	$1S^2 2S^2 2P^6 3S^2 3P^6$

1. Mention the divalent element name?
2. Name the element belongs to 3rd period and VA group?

A) (1) calcium (2) Phosphorus.

7. Second ionization energy is higher than the first ionization energy. Why ?

A)

(i) The energy required to remove an electron from the uni-positive ion of the element is called the 2nd ionization energy.

(ii) The nuclear attraction force on the outer most electron of uni-positive is more than the nuclear attraction force on the outer most electron of neutral atom.

(iii)Hence more energy is required to remove an electron from the outermost shell of uni-positive ion.

(iv) So, second Ionization energy is higher than the first ionization energy.

8) Write down the characteristics of the elements having atomic number 17.

1. Electronic configuration 2. Period number 3. Group number
4. Element family 5. No. of Valence electrons 6. Metal or non metal.

A. 1) $1S^2 2S^2 2P^6 3S^2 3P^5$ 2) 3 3) VIIA (or) 17th 4) Halogen family 5) 7.(6) Non metal

9) Observe the information provided in the table and answer the questions given below it

Element	Na	C	Ca	P	Ti	Ni
Atomic number	11	6	20	15	22	28

i) What are the S-block elements in the table

ii) What are the P-Block and d-block elements in the table

A) (i) S-Block elements : Na, Ca

(ii) P-block elements : C, P

d-block elements : Ti, Ni

10. The element A, B and C are Dobereiner traid. If the atomic weight of element A is 7 and that of element C is 39. Then find the atomic weight of element 'B' ?

A) In Dobereiner Traid

Atomic weight of middle element = Average weight of first and third elements

$$= \frac{7+39}{2}$$

$$= \frac{46}{2}$$

$$= 23$$

Hence atomic weight of element B= 23.

4 Marks Questions

1. Comment on the position of hydrogen in the periodic table?

A) i) The atomic number of hydrogen is 1.

ii) Its electronic configuration is $1S^1$

iii) Hydrogen can lose one electron and behave electropositive ion (H^+) like alkali metals.

iv) Hydrogen can gain one electron and behave electronegative element (H^-) Like halogens.

v) Its properties resemble both Alkali metals and halogens. Because it can lose one electron like alkali metals as well as gain one electron as halogens.

vi) So, it placed at the top of both alkali metals and halogens.

2) How the following atomic properties vary in group from top to bottom ,and in periods from left to right?

i) Atomic radius ii) Ionization Energy iii) Electron affinity iv) Electro negativity

A)

Atomic property	In groups	In periods
Atomic radius	Increases	decreases
Ionization energy	decreases	Increases
Electron affinity	decreases	Increases
Electro negativity	decreases	Increases

3. What is ionization energy? What are the factors that influence the of ionization energy?

A) Ionization energy: The energy required to remove an electro from the outer mot shell of a neutral gaseous atom is called ionization energy of an element, it depends on the following factors.

1) Nuclear charge: Nuclear charge increases, ionization energy increases.

2) Screening effect : more the screening effect, less the ionization energy.

3) penetrating power of the orbitals: If orbital's have less penetrating power then the ionization energy is less. The penetrating power of orbitals is like this 4s> 4p < 4d>4s

4) Stable configuration: The elements having half filled or completely filled orbital's by electrons have more stability. More stability possesses more ionization energy.

5) Atomic radius: As the atomic radius increases ionization energy decreases.

4) Limitations of Mendelef's periodic table ? How could the modern periodic table over came the limitations of mendelecf's table?

A) Limitations of Mendelef's periodic table"-

1) The Position of Hydrogen in the table is not certain

2) Certain elements of higher atomic weights precede those with lower atomic weight.

Ex:- Te precedes I

3) Elements with dissimilar properties were dissimilar properties were placed in same group as sub group A and Sub group.

4)Elements with similar properties were separated.

Rectification of demerits of mendeleef's periodic table by modern periodic table:

1) Mosley proposed a periodic table based on atomic numbers. This arrangement eliminated the problem of anomalous series.
2) Hydrogen is placed in 1A group according to its atomic number. But it is not included in that group.
3) Dissimilar elements are placed in different groups
4) Metals and Non metals are separated.

5) The arrangement of electrons in different shells of atoms of 18^{th} group elements is given in the table.

Element	Z	Electronic Configuration			
		K	L	M	N
Helium (He)	2	2			
Neon (Ne)	10	2	8		
Argon (A)	18	2	8	8	
Krypton (Kr)	36	2	8	18	8

Answer the following questions

i) What is the general electronic configuration of the above elements excepts He.

ii) What is the valence of Argon

iii) Write Lewis dot structure of Neon

iv) Why the above elements do not take part in bond formation.

A)

i) ns^2np^6

ii) Zero

iii) : Ne :

iv)They have 8 electrons in the outer most shell. So noble gases have stable electronic configuration and do not participate in any chemical reactions.

8 – CHEMICAL BONDING

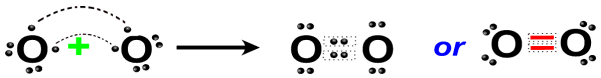
8 Key – Concepts :

- The bond formed between two or more atoms to form a molecule
- Atoms are less stable hence they tend to combine to give molecules. (Except noble gas atoms)
- Molecules are more stable when compared with atoms
- Outer most electronic configuration of elements is main critarian to form chemical bond.
- Atoms having unpaired electrons can form chemical bonds.
- Some atoms form chemical bonds in their excited electronic configuration
- Valency electrons play vital role in forming chemical bonds.
- Valency electrons of atoms are depicted in a short form by lewis symbols or electrons dot structures.

LEWIS SYMBOLS OR LEWIS DOT STRUCTURES:

- The nucleons and inner core electrons are represented with symbol or element
- Valency electrons are represented (outer shell electrons) with dots or cross marks.

Ex: 1. Electrons dot structure of O_2 molecule



Ex:2. Electrons dot structure of Na atom

Na^x or Na•

- It was found that the elements which participate in chemical reactions get octet or ns2 np6 configuration to that of noble gas elements.
- Lewis and Kossel were explained that formation chemical bond with their electronic theory of valency in 1916.
- According to them each and every atom / element tend to get eight electrons around them. (octet)
- Octet rule:- The atoms of elements tend to undergo chemical changes that help to leave their atoms with eight outer – shell electrons.
- "The force of attraction between any two atoms or group of atoms that results a stable entity is called 'Chemical bond'.

Formation of Ionic bond:- Due to mutual transference of electrons from one atom to another, forming oppositely charged ions, and the force between them is ionic bond.

- Charged ions are two types. Positively charged ions are called Cations, negatively charged ions are called anions.
- Ionic bond is also called electrostatic bond, and electrovalent bond.

Cation formation:- When atoms lose electrons they from cations.

Eg: Sodium lose one electrons forms sodium cation.

$Na \rightarrow Na^{+1} + 1e^-$

$Mg \rightarrow Mg^{+2} + 2e^-$

Anion formation:- When atoms gain electrons negative charge ions, anions are formed.

Eg: Chlorine by gaining one electron chloride ion is formed.

$Cl \xrightarrow{+1e^-} Cl^-$

1. **Formation of Nacl from its ions:-** Transfer of electrons between Na and Cl, atoms results in the formation of Na+ and Cl- ions.
   Na + Cl- -→ Na+Cl- or Nacl.
2. **Formation of magnesium chloride ($Mgcl_2$):-**
   Magnesium loses two electrons each chlorine get one electrons forms magnesium chloride

   Mg (g) + Cl2 → MgCl2.

Cation formation: - $Mg \rightarrow Mg^{+2} + 2e^-$

Anion formation : - $Cl2 \xrightarrow{+2e^-} 2\,Cl^-$

2, 8, 7 2, 8, 8

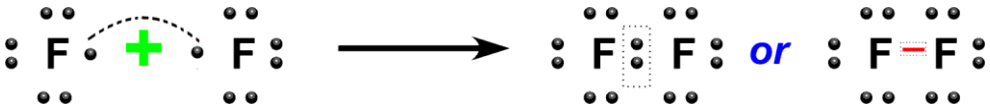
$Mg +2 + 2\,Cl^- \rightarrow Mg\,Cl_2$

Covalent bond:- Mutual sharing electrons between atoms covalent bond is formed.

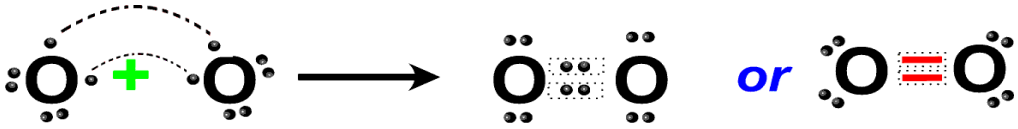
- If two atoms share a pair of electrons between them single covalent bond (Single bond) is formed.
- If two atoms share two pairs of electrons between them double bond is formed.
- If two atoms share three pairs of electrons between them triple bond is formed.

Examples of Covalent bond:

F2 molecule: - Two fluorine atoms share their upaired electrons they form F2 Molecule

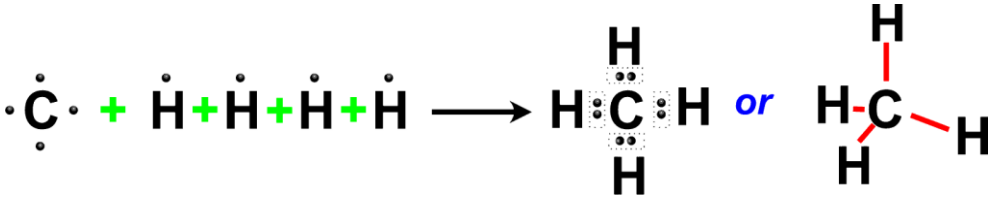


O2 Molecule:- Two oxygen atoms share their unpaired electrons to form O2 molecule.

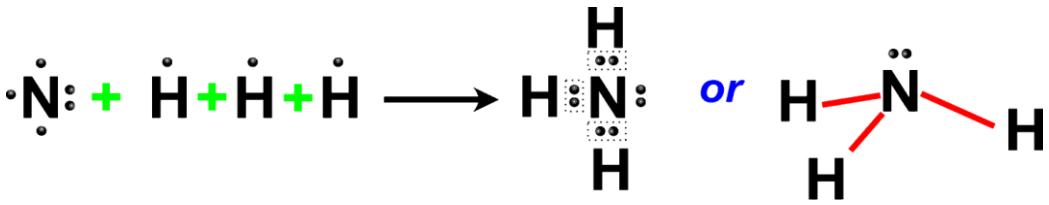


Electron dot structures of methane & ammonia molecules

Methane (CH4) :



Ammonia (NH3):



½ MARK QUESTIONS

1. $ns^2\ np^6$ electronic configuration belongs to which group of elements?

A) Inert gases.

2. Who proposed the electronic theory of valence?

A) Lewis and Kossel

3. Which electrons are most important in forming chemical bonds?

A) Electrons in outer most shell.

4. Name the scientist who proposed VSEPRT?

A) Sidg wick and powell

5. Which of the following is correct?

X: Ionic compounds have high melting points and are good conductors.

Y: Covalent bond is formed due to transference of electrons

A) X: Ionic compounds have high melting points and are good conductors.

6. Which of the following is not a covalent compound H_2O, CH_4, $Mgcl_2$, NH_3.

A) $Mgcl_2$

7. A: The shape of methane molecule is tetrahedron

R: In methane central atom has 4 bond pairs without any lone pair.

a. Both A and R are false.

b. A is true , R is false.

c. Both A and R are true, R is correct explanation of A.

d. Both A and R are true,A is correct explanation of R.

A) C. Both A and R are true, R is correct explanation of A.

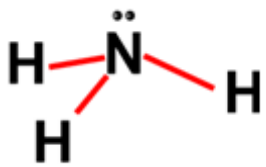
8. What is the shape of CO2 molecule?

A) Linear shape.

9. Give example for polar covalent bond?

A) HCl

10.



Write the name of compound?

A) Ammonia

11. In a sodium chloride crystal, the coordination number of Na is ____

A) 6

12. An element A forms a chloride Acl4. The number of electrons in the valence shell of A.

A) 1 B) 2. C) 3. D) 4

A) D) 4

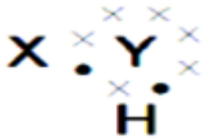
13.The noble gas which does not have octate structure in the outer most shell?

A) Helium (He).

14. In which molecule bond angle is 180°

$Becl_2$, NH_3, H_2O.

A) $Becl_2$.

15. 

In this structure how many valency electrons on Y?

A) 6.

16. Who proposed the electronic theory of valence?

A) Lewis and Kossel

17. Which of the following element is most electronegative.

a. Sodium, b. Magnesium, c. Oxygen, d. Calcium.

A) c. Oxygen.

18. Assertion (A):Nacl formed by the action of cl_2 gas on Na metal is a stable compound.

Reason(R): This is because Na and cl ions acquire octet in Nacl.

(A) A and R both are correct and R is the correct explanation of A.

(B) A and R both are correct but R is the not the correct explanation of A.

(C) A is true but R is false.

(D) A and R both are false.

A) (A) A and R both are correct and R is the correct explanation of A.

19. Match the following and choose the correct answer.

GROUP A	GROUP B
1. $Becl_2$	1. Sp^2
2. $B F_3$	2. SP
3. $N H_3$	3. SP^3

A) 1-a, 2-b, 3-c, B) 1-b, 2-a, 3-c, C) 1-c, 2-a, 3-b, D) 1-b, 2-c, 3-a

A) B) 1-b, 2-a, 3-c,

20. Match the following

GROUP A	GROUP B
1. $N H_3$	a. Linear shape
2. H_2O	b. Pyramidal Shape
3. $Becl_2$	c. “V” Shape

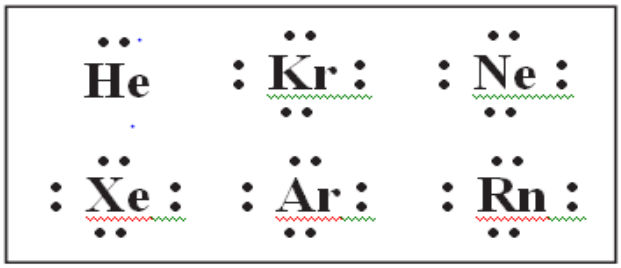
A) 1-b, 2-c, 3-a, B) 1-b, 2-c, 3-a, C)1-a, 2-b, 3-c, D) 1-c, 2-b, 3-a.

Ans: - B) 1-b, 2-c, 3-a,

1 MARK QUESTIONS

1. Draw the lewis dot structure for Noble gases?

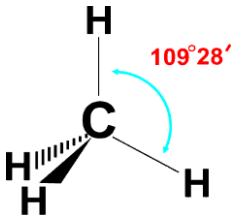
Ans:



2. Show the formation of HCl molecule with Lewis dot structure using the information is given below.

Ans:

3.

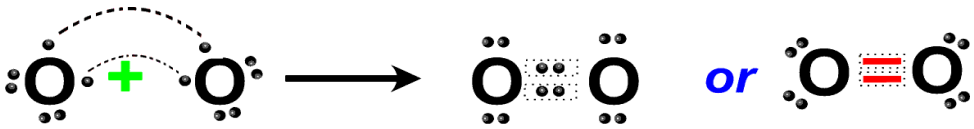


What is the name of compound and write bond angle?

Ans: Methane, $109^0\ 28^1$

4. Represent the formation of 0_2 molecule using lewis notation.

Ans:



5. What is a chemical bond?

A. The attractive force between two atoms in a molecule is called a chemical bond.

6. Write the names of any two compounds which have an ionic bond.

A. Nacl, $MgCl_2$

7. Mention two pairs have same number of electrons.

A. 1. Ne, F^-, 1. Ne, mg+2

8. Write the formula of compound when an element X of group 2 reacts with an element Y of group 17.

A. XY_2

9. Why do some atoms combine while others do not.

A. 1. Atoms which have 8 e^- in their outer shell will not combine

2. Atoms which have more than or less than 8 e^- in their outer shell will combine.

10. Expand **VSEPRT**

A. VSEPRT: Valence shell electron pair repulsion theory.

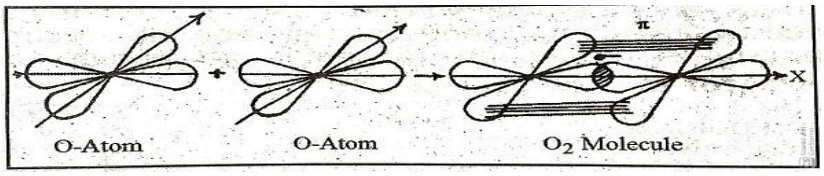
2 MARKS QUESTIONS:

1. Write the difference between ionic and covalent compounds.

Ionic Compound	Covalent compound:
1. They are formed by the transfer of electrons between two atoms. 2. These are highly reactive in polar solvents.	1. These are formed by the mutual sharing of electrons between the atoms. 2. These are less reactive in polar solvents.

2. Draw the diagram to show the formation of oxygen molecule by valence bond theory?

A.



3. Write the electronic Configuration Na^+ and Cl^-?

A. $Na^+ : 1S^2\ 2S^2\ 2p^6$

$Cl^- : 1S^2\ 2S^2\ 2P^6\ 3S^2\ 3P^6$

4. Imagine, which one in each of the following is large in size relatively with other? Explain?

(X) Na, Al (Y) Na, mg^{+2}

A. X) In X, Na is relatively larger than Al

Reason: In a period from left to right the atomic size decreases.

Hence Na is relatively larger than Al

Y) In mg+2 Na is relatively larger than mg+2

Reason: Mg+2 have smaller number of electrons than Na

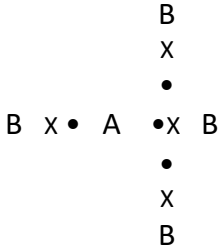
5. How do you appreciate the special nature of Inert gases?

Ans: 1. All the inert gases have octet configuration except Helium.

2. So, they do not participate in any chemical reactions and becomes stable.

3. So, I appreciate the role of the special nature of inert gases.

6. A chemical compound has the following Lewis notation.



A. Write the valence electrons of A

B. Write the valence electrons of B

C. How many covalent bonds are there is in the molecule?

D. What is the name of the molecule which is carbon compound

Ans: A) 4, B) 1, C) 4, D) CH_4

7. Fill the following table.

Compound	Hybridisation	Bond angle
BF_3		
$BeCl_2$		

Ans:

Compound	Hybridisation	Bond angle
BF_3	SP^2	120^0
$BeCl_2$	SP	180^0

8. Pose any two questions to understand the difference between Valency and Valency electrons.

Ans: 1. What is Valency ?

2. How many Valency electrons are there in chlorine atom ?

9. Predict the reasons for low melting point for covalent compounds when compared with ionic compounds.

Ans: In covalent compounds the force of attraction among covalent molecules are weak. Therefore they have low melting Point.

In ionic compounds there exist stronger electrostatic forces of attraction between the oppositely charged ions of the compound. So they have high melting points.

10. What questions do you pose to your teacher in order to understand the concept of hybridization?

Ans: 1. What is hybridization?

2. Who explained about the hybridization first?

3. How many types are there?

4. What are examples of molecules in which hybridization takes place? (or) any related questions.

4 MARKS QUESTIONS

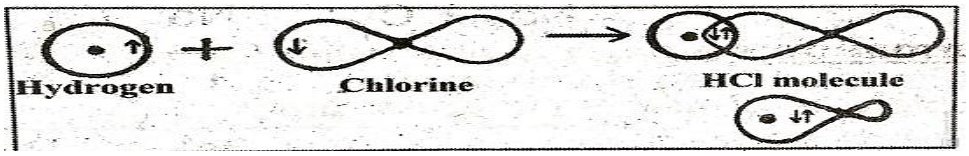
1. How is the HCl molecule formed?

Ans: **Formation of HCl molecule**

1. The atomic number of the hydrogen is 1
2. Its electronic configuration is $1S^1$
3. The atomic number of the chlorine is 17 and its electronic configuration is

$1s^2\,2s^2\,2p^6\,3s^2\;3p_x^{\,2}\,3p_y^{\,2}\,3p_z^{\,1}$

4. Hydrogen has one unpaired electron in 1S orbital and chlorine has one unpaired electron in $3p_z$ orbital
5. The "$1S^1$ orbital of H atom overlaps the $3p_z$ orbital of chlorine atom thus Hcl.

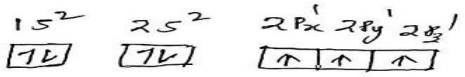


2. Who proposed the valence bond theory? Explain the formation of N_2 molecule by using this theory?

Ans: Valence bond theory was proposed by Linus Pauling.

Formation of N2 molecule:

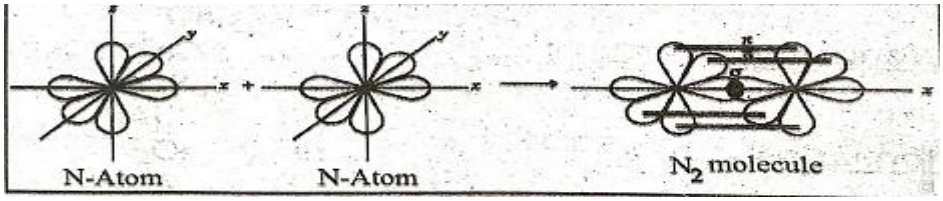
1. The atomic number of Nitrogen is 7
2. Its electronic configuration is



3. Nitrogen has three unpaired electrons in the P-Orbital

4. When two nitrogen atoms approach each other the bond is formed in between two nitrogen atoms by overlapping of the orbitals of one "N" atoms with another "N" atom.

5. Therefore, there is a triple bond between two nitrogen atoms in the N_2 molecule



3. What is hybridization? Explain the formation of the following molecules using hybridization?

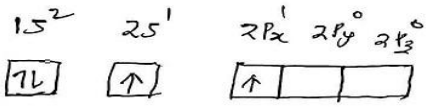
a) $BeCl_2$, b) BF_3

Ans: **Hybridization**: The process of mixing of atomic orbitals of nearly same energy to produce a set of entirely new orbitals of equivalent energy is known as hybridization.

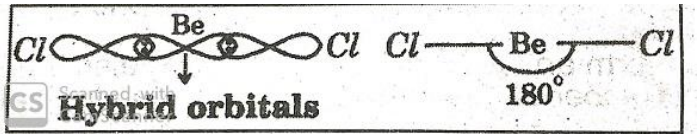
a) Formation of Becl2

1. The atomic number of Be = 4
2. Ground state electronic configuration of Be is

3. Excited state electronic configuration of Be is

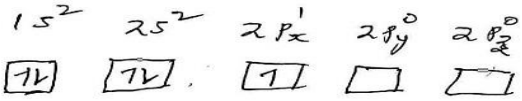


4. Now there is hybridization between one S and P-Orbital and forms two SP- Orbital
5. The overlap with P-Orbital of each two chlorine atoms with two SP – orbitals of beryllium form to sigma (σ) bonds
6. The molecule formed is linear with a bond angle 180^0



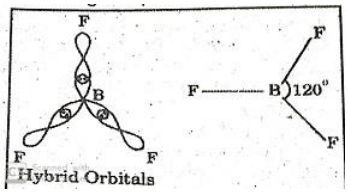
b) Formation of BF3:

1. The atomic number of boron is 5
2. Ground state electronic configuration of B is



3. Excited state electronic configuration of B 15.

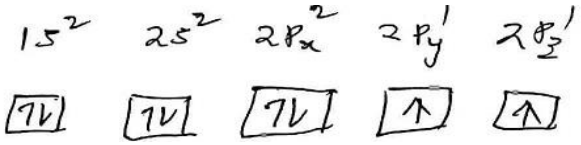
4. Now in the excited state, the three unpaired orbital's on giving rise to three SP^2 hybrid orbital's which are 120^o apart.
5. The three hybrid orbital's overlap with three P-Orbital from three fluorine atoms forming three sigma bonds.
6. The molecule formed is triangular planar.



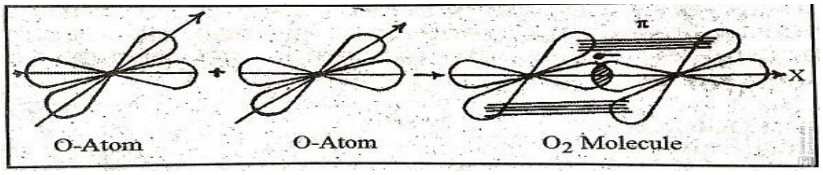
4. Explain the formation of O_2 molecule using the concept of valence bond theory?

Ans: **Formation of O2 Molecule:**

1. The atomic number of oxygen is 8
2. Its electronic configuration is



3. Oxygen has two unpaired electrons in the P-Orbital.
4. When two oxygen atoms approach each other the bond formed between two oxygen atoms by overlapping the P-Orbital of one "O" atom with another "O" atom.
5. Therefore, there is a double bond between tow oxygen atoms in O2 molecule.



9. ELECTRIC CURRENT

KEY CONCEPT :----

- **CHARGE**:- It is an intrinsic property of matter responsible for all electrical phenomena in particular the force of electromagnetic interaction.
- **Electric current**:- The net charge flowing through a cross section of conductor in unit time is known as electric current.
- **Electri power** :- The rate of expending energy (or) doing work in an electrical system.
- **Electric Energy** :- It is the total work done in maintaining an electric current in an electric circuit for a given time $W = I^2 Rt = VIt$.
- **Kirchhoff's first (junction law) Rule:-** The algebraic sum of currents at junction in a circuit is zero.

$$\sum I = 0$$

- **Kirchhoff's second 9 Loop Law) Rule**:- In any closed circuit the algebraic sum of the products of current and resistances of each part of a circuit is equal to the total potential difference in the circuit.

$$\sum IR = \sum V$$

- **Ohm's law :-** At constant temperature the current passing though conductor is directly proportional to potential difference applied across the ends of the conductor.
- **Potential difference :-** It is an amount of work done to bring u it '+' ve charge between two points in an electric field.
- **Resistance** :- Resistance is the property of a conductor by virtue of it, it opposes electric current.
- **Resistivity** :- A Measure of a material ability to oppose the flow of an electric current.

UNITS and SYMBOLS			
	Physical quantity	**Units**	**Symbol**
1	Charge	Coulomb	C
2	Current	Ampere	A
3	Potential difference	Volt	V
4	Electro motive force	Volt	V
5	Resistance	Ohm	Ω
6	Resistivity	Ohm- meter	Ω m
7	Conductance	Ohm $^{-1}$	Ω^{-1}
8	Force	Newton	N
9	Electric power	Watt	W

½ Marks:-

1. The power delivered by a battery of emf 10v is 10w . Then the current delivered by the battery is 1 ampere

A. Power P = V I, $\Rightarrow$ I = $\frac{P}{V}$ $\Rightarrow$ I = $\frac{10}{10}$ = 1 A

2. What is a value of 1KWH in Joules?

A. Watt is a small unit of power . Kilo watt is a bigger u nit of power consumption.

1KW = 1000 W
= 1000 J/S
1 KWH = (1000 J/S) (60 min X 60 sec)
= 1000 x 3600 = 3.6 X 10^6 J

3. Define ohm's Law?

A. At constant temperature the potential difference between the ends of a conductor in a circuit is directly proportional to the flow of current in the circuit .

V α I (or) $\frac{V}{I}$ = constant

4. Find the number of electrons in one coulomb of electric charge?

A. Charge q = ne

.n = $\frac{q}{e}$ = $\frac{1}{1.6 \times 10^{-19}}$.

.n = 6.25 x 10^{18}

5. Find the potential difference required to establish a current of 1.5 amp across a conductor of resistance 1 k Ω?

A. Potential difference

V = IR
= 1.5 x 1 x 10^3
V = 1500 volt

6. What is the maximum resistance which can be made using five resistors each of 1 /5 Ω ?

A. Maximum resistance is obtained when resistors are connected in series combination. The equivalent resistance is

Rs = 5 x 1/5 = Ω

7. What is the resistance of on ideal ammeter and an ideal voltmeter?

A. The resistance of an ideal ammeter is zero. The resistance of an ideal voltmeter is infinite.

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

A. The resistance decreases as the conductor is made thicker.

9. Ampere-second stands for the unit of [b]

A. (a) Power (b) charge (c) emf (d) Energy

10. Give one example of a non-ohmic conductor?

A. Diode.

11. A bulb is marked 5 amp 12v is connected to a 12v source , its power will be [A]

A. [A] 60W [B] 6W [C] 0.6W [D] 0.06W

12. Specific resistance of a wire depends on the Nature of the material of the wire [d]

A. (a) Length (b) Area of cross section (c) Resistance (d) Nature of the material

13. What is the drift velocity of electrons?

A. The average velocity gained by the free electrons of a conductor, with which the electrons get drifted under the influence of an electric field.

14. A :- V – I graph for 'Si" is non linear
R :- Semiconductors are non ohmic [b]

A. [a] Both A,R are true , R is not correct explanation of A.
[b] Both A,R are true , r is correct explanation of A.
[c] A is true , R is false

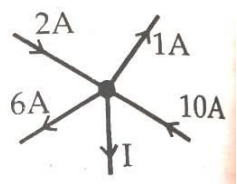
15. Who proposed the junction law os current?

A. Kirchhoff

16. I am an instrument used to measure electric current. I am always connected in series in the circuit. Who am I

A. Ammeter.

17. What is the value of 'I' in the given figure



A. $I_1 + I_2 = I_3 + I_4$

$10 + 2 = I + 7$

$12 = I + 7$

$I = 12 - 7 = 5A$

18. Nichrome is used to make the element of electric heater. Why?

A. Nichromeis used to make the element of electric heater because it is an alloy with high resistivity and high melting point.

1 Marks:-

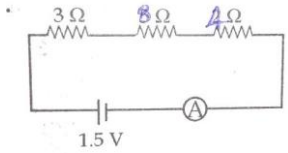
1. Student :- As temperature increases what happens to resistance?
   Teacher :- As temperature increases resistance increases. What is the reason?

A. Number of collisions increases .

2. Match the following :-

1. Resistance	[ ]	a. ohm meter
	[ ]	b. ohm
2. Potential difference		
	[ ]	c. volt
	[ ]	d. ampere

A. 1. [a] 2. [c]

3 

Find the quantity of current in the above circuit?

A. $R = 3 + 8 + 4$
$= 15\ \Omega$
$I = \frac{1.5}{15} = 0.1\ A$

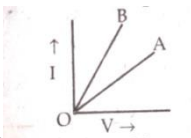
3.

4. Why earthling of electrical appliances is recommended?

A. To protect the user from any accidental electrical shock caused due to leakage of current.

5. Why does a short circuit damage electric wiring and devices connected to it?

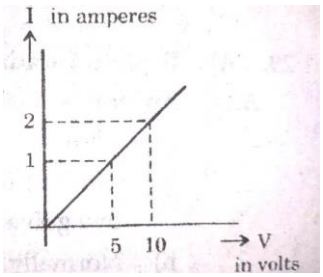
A. During short circuit, zero resistance is offered to current. So huge amount of current flows through the circuit, producing dangerously high amount of heat. This heat burns the wiring and appliances giving rise to fire accident .

6. 

Graph between electric current and potential difference across two conductors 'A' and 'B' is plotted as shown in figure. Which of the conductors has more resistance?

A. Resistance of conductor $= \frac{1}{\text{Slope of graph between V and I}}$

Since, slope of graph between v and I for a conductor A is less than the slope for a conductor B, therefore, conductor A has more resistance than the conductor B.



7. Observe the graph of potential difference (V) drawn between two ends of a conductor and current (I) passing through it.

   Answer the following questions:-
   a. Which law is used to explain the graph?
   b. What is the resistance of the conductor?

A. (a) ohm's Law

b) R = $\frac{V}{I}$ ➔ $\frac{5}{1} = \frac{10}{2}$

→ 5 = 5

→ 5 ohms.

8. Why do we use fuses in house hold circuits?

A. The fuse consists of a thin wire of low melting point. To prevent damages due to over loading. This we can save the house hold wiring and devices by using fuses.

9. What happens if we use a fuse made up of same wire which is used to make the electric circuit?

A. If we use a fuse made up of same wire which is used to make the electric circuit having high melting point, it does not melt when high voltage occurs.
So it cannot protect our electrical appliances from getting damaged due to overloading.

2 Marks:-

1. Why does not a bird get a shock when it stands on a high voltage wire?

A. (1) When the bird stands on a high voltage wire there is no potential difference between the legs of the bird because it stands on a single wire.
(2) So no current passes through the bird. Hence it does not feel any electric shock.

2. Why do we consider tungsten as a suitable material for making the filament of a bulb ?

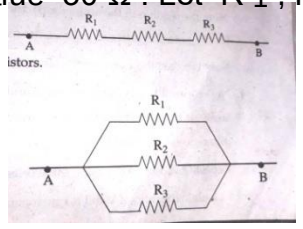
A. Tungsten is a suitable material for making the filament of a bulb, because
   i. Tungsten has high resistance and high melting point
   ii. It can not melt even the temperature is more than 1650^0 c and upto 3410^0C
   While current is passing through a wire it becomes hot and emits light.

3. Why don't we use series arrangement of electrical appliances like bulb, television, fan and others in domestic circuits?

A. Electrical appliances like bulb, television, fan and others have different ratings. If they are connected in series same current flows through all of them which leads to malfunctioning of some appliances and damaging some others. So the appliances are connected in parallel which gives same potential difference and different currents according to their rated values.

4. Suppose that you have three resistors each of value 30 Ω . How many resistors can you obtain by various combinations of three resistors? Draw diagrams in support of your predictions?

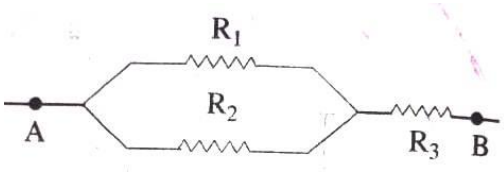
A. Three resistors each of value 30 Ω . Let R_1 , R_2 , R_3 are three resistors. If the three resistors are in series.



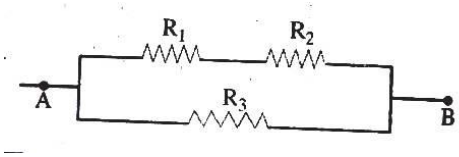
Then the resultant resistance = 90 Ω

If the three resistors are in parallel. Then the resultant resistance = 10 Ω

If the two resistors are in parallel and one resistor is in series then the resultant resistance = 45 Ω



If the two resistors are in series and one is in parallel then the resultant resistance = 20 Ω



5. A wire of length 2m and radius 0.2mm has a resistance of 200 Ω . Fine the resistivity of the material.

A. Length of the wire l = 2m

Radius r = 0.2mm

= 0.2×10^{-3} m

Resistance R = 200 Ω

Cross section area A = πr^2

= $3.14 \times (0.2 \times 10^{-3})^2$

Resistivity of the material þ = $\frac{RA}{l}$

= $\frac{200 \times 3.14 \times 0.2 \times 10^{-9}}{2}$

= $100 \times 3.14 \times 0.2 \times 10^{-9}$

= $3.14 \times 0.2 \times 10^{-7}$

= $3.14 \times 2 \times 10^{-8}$

= 0.628×10^{-7} (or)

= 6.28×10^{-6} ohm meter

6. Silver is a better conductor of electricity than copper. Why do we use copper wire for conduction of electricity?

A. (i) copper has low resistivity. When electricity is passed through copper wires, the power loss in the form of heat is very small .

(ii) Copper is cheaply available than silver.

(iii) Copper has flexibility and resistance to breakage.

7. Two bulbs have ratings 100W, 220V and 60W , 220V. Which one has the greater resistance?

A. Rating of the first bulb = 1000w , 220v

Rating of the second bulb = 60w , 220v

Power P = VI

$= V \cdot \frac{V}{R}$

$P = \frac{V^2}{R} \rightarrow R = \frac{V^2}{P}$

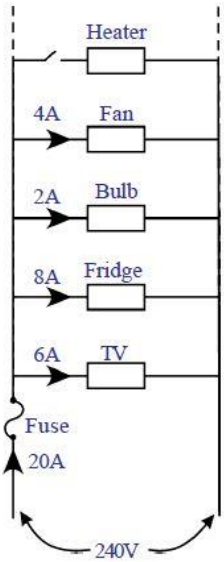
$R_1 = \frac{V_1^2}{P_1} = \frac{220 \times 220}{100} = 22 \times 22 = 484\ \Omega$

$R_2 = \frac{V_2^2}{P_2} = \frac{220 \times 220}{60} = \frac{220 \times 22}{6} = 806.67\Omega$

$\therefore R_2 > R_1$

$\therefore$ Second Bulb has the greater resistance

8. Explain overloading of house hold circuit?



A. (i) Generally observe the values noted on digital meters fixed at our home.
(ii) We will notice the following values on the meter

Potential difference = 240V
Current = 20A

(iii) The maximum current that we draw from the mains is 20A
(iv) When the current drawn from the mains is more than 20A over heating occurs and may cause a fire. This is called overloading .

Example:- In the figure we switch on as heater, the current drawn from the mains exceeds the maximum limit 20A.

9. What do you mean by electric shock? Explain how it takes place?

A. (i) If we touch live wire of 240v which gives 0.0024 A of current that flows through the body, The functioning of organs inside the body gets disturbed. This disturbance inside the body is felt as electric shock.
(ii) If this current reaches 0.07A it affects the functioning of the heart.

10. A house has3 tubes lights of 20 walts each. On an average, all the tube lights are kept on for five hours. Find the energy consumed in 30 days at the rate of 4/- per KWH?

A. Energy consumed by 3 tube lights of 20w each used for 5 hours in a day.

$E = npt$
$= 3x\ 20x\ 5$
$= 300$ wh

Energy consumed in 30days

$$KWH = \frac{\text{Total energy} \times 30}{1000}$$
$$= \frac{300 \times 30}{1000}$$
$= 9$ Kwhs.

Rate per KWH = 4-00rs

Total cost for electrical energy used in 30 days at the rate of Rs. 4.00 per

1= 9x 4 = 36/-
= 36.00/-

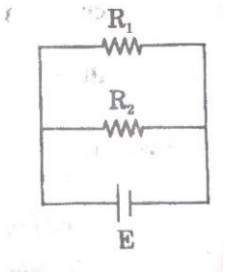
11. When a 12v battery is connected across an unknown resistor, there is a current of 2.5 mA in the circuit. Find the value of resistance of the resistor?

A. Given

$V = 12v$
$\ell = 2.5$ mA
$\ell = 2.5 \times 10^{-3}$ A

$$R = \frac{V}{\ell}$$
$$R = \frac{12}{2.5 \times 10^{-3}}$$
R = 4800 Ω

12.



Observe the given circuit:- R_1, R_2 are two resistors and $R_1 = R_2 = 4\Omega$
Emf of the battery E is10V

Answer the following questions

(a) How are the resistors R_1 and R_2 connected in the circuit?

(b) What is the total current drawn from the battery?

A. (i) Parallel connection

(ii) $I = \frac{V}{R}$

$= \frac{10}{2}$

$I = 5A$

13. A student says potential difference and emf are same. Justify your answer?

A. The potential difference is equal to the amount of current multiplied by the resistance. A potential difference of one volt is equal to one Joul of energy being used by one coulomb of charge when it flows between two points in a circuit .

14. Define ohmic and Non ohmic conductors with examples

A. Those which obey ohm's law are called ohmic conductors. Ex:- Metals
Those which do not obey ohm's law are called Non-ohmic conductors
Ex:- LED.

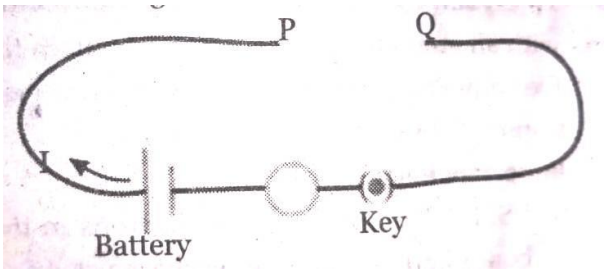
15. The headlights of a car connected in series or parallel ? Why?

A. The head lights of a car are connected in parallel because if one of the lights in a parallel combination fuses or fails, the other head light keeps working without being effected.

4 Marks:-

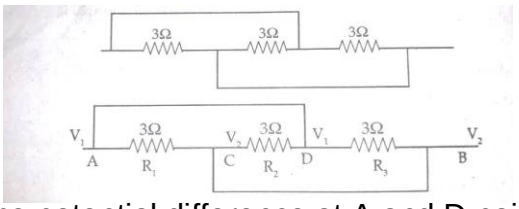
1. What is the relationship between length of a conductor and it's resistance? Write the experimentally procedure to verify that relationship?

A. (i) Collect iron spokes of different lengths with the same cross sectional area like copper, aluminum etc.,
(ii) Make a circuit as shown in the figure.
(iii) Connect one of the iron spokes, say 10cm length between p and Q and switch on the circuit
(iv) Measure the value of the current using the ammeter connected to the circuit and note the values
(v) Repeat this procedure for other lengths of the iron spokes.
(vi) Note corresponding values of current .
(vii) We notice that the current decreases with increase in the length for of the spoke.
(viii) Thus the resistance of each spoke increases in the length for a constant potential difference.
(ix) From this activity we can conclude that the resistance (R) of a conductor is directly proportional to its length (ℓ) for a constant potential difference i.e., $R \propto \ell$
at a constant temperature and a cross sectional area



2. Find the resultant resistance for the following given arrangement. Find the current when this arrangement is connected with 9V battery?

A.



Let the same potential difference at A and D point = V_1

The same potential difference at B and C points = V_2

Potential difference across , R_1 = $V_2 - V_1$

Potential difference across , R_2 = $V_1 - V_2$

Potential difference across , R_3 = $V_2 - V_1$

Across all R_1 , R_2 , R_3 resistors potential difference is same. All resistors R_1 , R_2 , R_3 are connected in parallel .

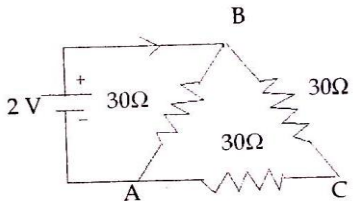
$$\frac{1}{Req} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3} \; ; \quad Req = \frac{3}{3}$$

According to ohm's law V = I R.

$$I = \frac{V}{R} = \frac{9}{1} = 9A$$

3. Find the equivalent resistance between any two terminals and find the total current following through the circuit? A.

A.



(i) Resistors, BC, are in series and the combination is in parallel with the resistor AB
BC, CA resistors in series = $R_1 = R_{BC} + R_{CA} = 30 + 30 = 60\ \Omega$

R, AB resistors are parallel ➔ $R2 = \frac{R_1 AB = 60 \times 30}{R1+AB \quad 60+30} = 20\ \Omega$

(ii) V = 2V
R_{Eq} = 20 Ω

i = ?

$$I = \frac{V}{R_{eq}} = \frac{2}{20} = 0.1Amp$$

4. Deduce an expression for the equivalent resistance of three resistors connected in series?

A. (i) Connections are made as ground in the figure.

(ii) In the circuit current (I) is constant

(iii) According to ohm's law $V_1 = 1 R_1$

$V_2 = 1 R_2$

$V_3 = 1 R_3$

(iii) Since the resistors are connected in series = $V_1 = V_2 + V_3$

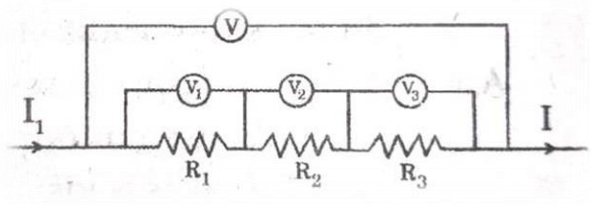
(iv) Substituting the values of $V_1 = V_2 + V_3$ in the above equation

$IR = 1R_1 + 1R_2 + 1R_3$

$IR = 1(R_1 + R_2 + R_3)$

Equivalent resistance $R = R_1 + R_2 + R_3$

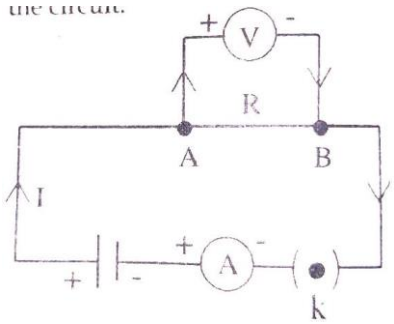
FIG



5. How do you prove experimentally the ratio v/I is a constant for a given conductor?

A. Ohm's law:- The potential difference between the ends of a conductor in a circuit is directly proportional to the flow of current in the circuit.

$V \propto I$ (or) $= \frac{V}{I}$ = constant



Verification / Experiment:-

(i) Set up a circuit as shown in figure.

(ii) The figure consits of a nichrome wire AB of length say 0.5m an ammeter voltmeter and four cells of 1.5v each

(iii) First use only one cell as the source in the circuit.

(iv) Note the reading in the ammeter (I) for the current and reading of the voltmeter (V) for the potential difference across the nichrome wire AB in the circuit.

(v) Now tabulate the values in the table as motioned below

(vi) Next connect two cells in the circuit and note the respective readings of the ammeter and voltmeter for the values of current through the nichrome wire and potential difference across the nichrome wire.

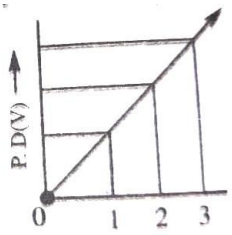
(vii) Repeat the above steps using three cells and the four in the circuit separately.

(viii) Calculate the ratio of v to I for each pair of potential difference vand current I.

Table

S.No	No.Of cells used in circuit	Current through the nichrome wire I (ampere)	Potential difference across the nichrome wire v (volt)	$\frac{V}{I}$
1	1			
2	2			
3	3			
4	4			

(ix) Plot a graph between V and I and observe the graph .



(x) From the above activity we will find that approximately the same value for V / I is obtained in each case.

(xi) Thus the V-I graph is a straight line that passes through the origin of the graph as shown above.

(xii) From above graph V /I is a constant ratio hence ohm's law is verified.

6. State Kirchnoff's loop law and explain?

A. **Loop Law**:- The algebraic sum of the increase and decrease in potential difference across various components of the circuit in a closed circuit in a loop must be zero.

Explanation:- Let us imagine in a circuit loop the potential difference between the two points at the beginning of the loop has a certain value. As we move around the circuit loop and measures the potential difference across each component in the loop the potential difference may decrease depending upon the nature of the element like a resistor or battery.

But when we have completely traversed the circuit loop and arrive back at starting point the net change in the potential difference must be zero. Thus the algebraic sum of changes in potential difference is to be zero.

Example:- Let us apply loop law to a circuit as below

For the loop ACDBA

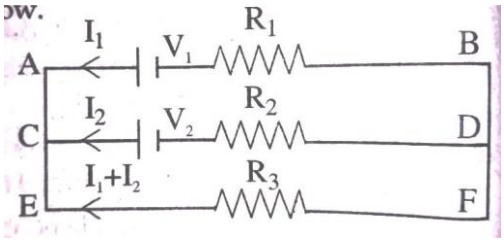
$$-V_2 + I_2 R_2 - I_1 R_2 + V_1 = 0$$

For the loop EFDCE

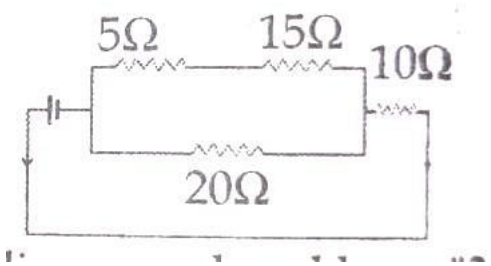
$$-(I_1 + I_2)R_3 - I_2 R_2 - I_1 R_1 + V_2 = 0$$

For the loop EFBAC

$$-(I_1 + I_2)R_3 - I_1 R_1 + I_1 R_1 + V_1 = 0$$



7. The resistances of 5 Ω, 20Ω and10 Ω are connected as show in the circuit find the resultants resistance of the circuit?



A. The two 5+15 = 20Ω . The above resultant resistance is connected parallel to the 20Ω resistor then the resultant resistance is

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{20} + \frac{1}{20} = \frac{2}{20}$$

This above resultant resistant is connected in Series to be 10 Ω again so the total resultant resistance is 10+10 = 20Ω

&&&

10. ELECTROMAGANETISM

KEY CONCEPT

- **Alternating current (AC) :** An electric current that reverser its direction and magnitude with a constant frequency.
- **Direct current (DC):-** An electric current in which the net flow of charge is in one direction only.
- **Electric Generator:-** A Machine which converter mechanical energy into electrical energy.
- **ELECTRIC MOTOR:-** A Machine for converting electrical energy into mechanical energy .
- **INDUCED CURRENT:-** The current generated in the coil whenever there is a continuous change of magnetic flux linked with closed coil.
- **INDUCED EMF:-** The emf is generated in the coil whenever there is a continuous change of magnetic flux linked with closed coil.

ϕ Is the flux linked with coil.

- **MAGNETIC FLUX**:- A measure of strength of magnetic field by taking account number of field lines.
- **MAGNETIC FLUX DENSITY** :- The strength of the magnetic field in terms of number of field lines per unit perpendicular area.
- **SLIP RINGS :-** Two small hollow cylinders made up of copper attached to two ends of the coil which make sliding contact with carbon brushes.

- **FAR DAY LAW OF ELECTROMAGNETIC INDUCTION:-** laws of electromagnetic induction " The induced EMF generated in a closed loop is equal to the rate of change of magnetic flux passing through it.
- **LENZ LAW:-** " The induced current will appear in such a direction that it oppose the changes in the flux in the coil".
- **MAGNETIC FIELD DUE TO CIRCULAR LOOP:-** The magnetic field due to circular coil car be found by using right hand rule.

  When the current in the coil is in clock wise direction the direction of the magnetic field due to the coil form away form us (downward direction).

  Similarly when the current in the coil is in anti- clock wise direction, the direction of the magnetic field due to the coil form towards us (upward direction).
- **MAGNETIC FIELD DUE TO SOLENOID:-** A solenoid is a long wire wound in a close packed helix.

  Magnetic field lines set up by solenoid resemble those of a bar magnet, indicating that a solenoid behaves like a bar magnet.

  The direction of the field duet o solenoid is determined by using right hand rule.

  The field lines outside the solenoid are continuous with those inside..

- **RIGHT HAND THUMB RULE:-** If you grab the current carrying wire with your right hand in such way that thumb is in the direction of current, then the curled fingers show the direction of the magnetic field.

½ MARKS

1. Which down S.I unit of Magnetic flux density?

A. Wb/m^2 (Tesla-T)

2. What is the units of Torque?

A. Nm

3. Name the scientist who first established the connection between electricity and magnetism?

A. Danish physicist H.C Oersted was the first to demonstrate in 1820 that a current carrying conductor produces a magnetic field around it.

4. Comment " Magnetic lines of force are endless" ?

A. Yes. The magnetic lines of force are always continuous closed loops , so they are endless.

5. Define a solenoid?

A. A long cylindrical coil of insulated copper wire with large number of circular turns is called a solenoid.

6. Name the scientist who first suggested that a magnet should excert force on a current carrying conductor ?

A. French scientist Andre Marie Ampere suggested that a magnet should exert force on a current carrying conductor.

7. State lenz law?

A. The induced a current will appear in such a direction that it opposes the changes in the flux in the coil.

8. What happens when a current carrying wire is placed in a magnetic field?

A. Magnetic field applies force on current carrying wire.

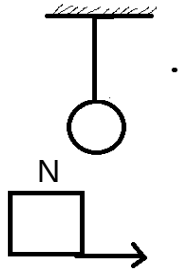
9. Which sources produce AC current?

A. Some sources that produce AC current are AC generators, thermal power stations etc.,

10. What type of generator is used at power stations?

A. AC generator .

11.



As shown in figure a coil is suspended. A bar magnet is moved perpendicular to the plane of coil with north pole pointing the coil. What is the change in magnetic flux in coil?

12. As magnet moves closer to coil flux increases .\A particle charge 'q' and mass 'm' is moving with a speed'v' perpendicular to the magnetic field of induction B. The radius of the circular path moving by the particle is _____. [D]

A. (a) $\frac{mvB}{g}$ (b) $\frac{mvg}{B}$ (c) $\frac{mB}{Vg}$ (d) $\frac{mV}{Bq}$

13. Which of the following is not true? [B]

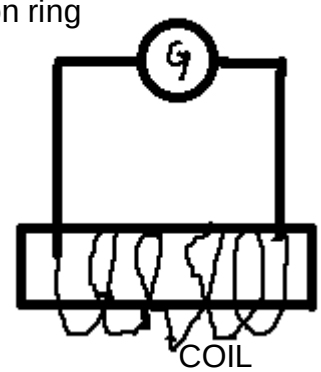
A. (a) Induction proceeds attraction

(b) A permanent magnet retains its magnetism even when heated on a flame

(c) We can not isolate a single pole.

(d) We can magnetize an iron ring

14.



Observe the figure. Deflection in the galvanometer (G) occurs, when **the magnet is pushed into the coil**.

15. The direction of current flowing in a coil is shown in figure. What type of magnetic pole is formed at the face of the coil [D]

(a) East (b) West (c) North (d) South

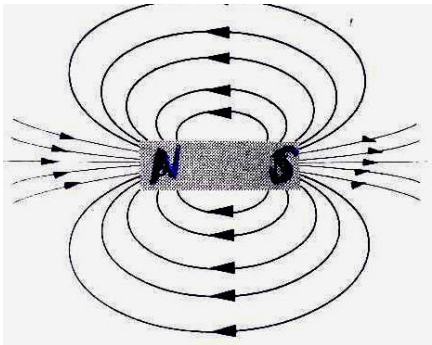
16. Which converts Mechanical energy into electrical energy? [C]

A. (a) Battery (b) Switch (c) Generator (d) Motor

17. Assertion (A) :- Magnetic needle in compass deflects when it is kept near current carrying wire.
Reason (B):- Current carrying wire produces magnetic field [C]

A. (a) Both A and R are correct, R is not correct explanation of A
(b) A is correct, R is not correct.
(c) Both A and R are correct , R is correct explanation of A.

18. What is wrong in the given diagram?



A. In the given diagram magnetic lines of force are directed from north to South. But they are from South to North.

19. Which of the following is correct?
X:- Generator converts mechanical energy to chemical energy.
Y :- Motor converts electrical energy to mechanical energy.

A. Y

20. Name the scientist who gave the relation between induced emf and rate of change in magnetic flux .

A. Faraday

1 Marks:-

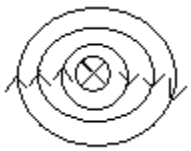
1. In a circuit of three resistors 5 Ω , 10 Ω and 15 Ω are connected in series, compare the current passing through the three resistors?

A. The current in series combination is same. So, the ratio of current will be 1:1:1

2. What is the use of slip – ring in AC motor?

A. Slip rings in AC motor are used to change the direction of current in the coil continuously.

3. The magnetic lines observed in an experiment are mentioned in the adjacent figure. Then show the direction (or) which direction of the current flowing through the wire.



A. According to right hand rule the direction of current into the page.

4. I am an instrument used to measure electric current. I am always connected in series in the circuit . who am I ?

A. Ammeter.

5. Suresh while playing with a bar magnet, brought it close to the T.V screen. He was surprised to see the screen distorted . what might be the reason?

A. When a bar magnet is placed near to the T.V screen then the motion of electrons are affected by the field produced by the bar magnet. So, the picture on T.V Screen is distorted.

6. The value of magnetic field induction which is uniform is 2T. What is the flux passing through a surface of area 1.5 m^2 perpendicular to the field?

A. Magnetic induction B = 2T

Surface area A = 1.5 m^2

Magnetic flux ϕ = ?

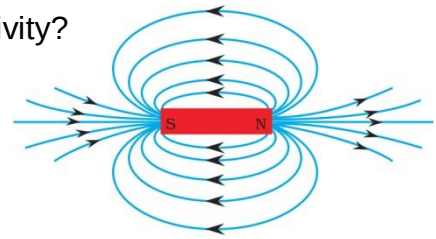
$$B = \frac{\phi}{A}$$

$$\phi = B.A$$

$$= 2 \times 1.5$$

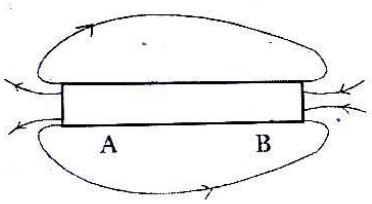
$$= 3 \text{ wb.}$$

7. This figure shows which activity?

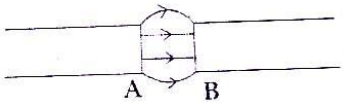


A. Magnetic field lines of a bar magnet by using compass needle.

8. Identify the poles of the magnet in the given figure?



(a)



(b)

A. In figure (a)
A is N – pole B is S- pole . In figure (b)
A is N- pole B is S- pole.

9. What happiness to the field lines pattern if the magnet is broken into two halves?

A. If magnet is broken into two halves the field line pattern remains the same.

10. State Right hand rule?

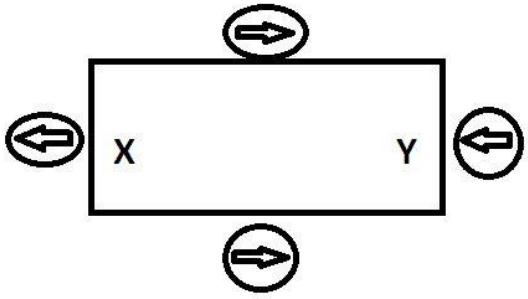
A. Generally right hand rule is used when velocityand field are perpendicular to each other. ‘ If the fore finger points towards the direction of velocity of charge or current (I) middle finger points to the direction of field (B) then thumb gives direction of force (F) when the three fingers are stretched in such a way that they are perpendicular to each other.

11. Choose the correct answer for the following [B]

Group-A	Group-B
1. Electric generator (AC)	a) electro magnetic induction
2. Solenoid	b) two slip rings
3. Dynamo	c) two half slip rings
4. Electric generator (DC)	d) soft iron core.

A. (A) 1-d, 2-b, 3-c, 4-a (B) 1-b,2-d,3-a,4-c
(C) 1-c,2-d,3-c,4-a (D) 1-d, 2-c, 3-a ,4-b

12. The diagram shows a bar magnet surrounded by four plotting compasses. The directions of magnetic fields are shown in the circles. Then X,Y are respectively. [C]



A. (A) N,N (B) S,S (C) N,S (D) S, N

2 Marks:-

1. When a 12 v battery is connected across an unknown resistor, there is a current of 2.5mA in the circuit. Find the value of resistance of the resistor?

A V = 12V
L = 2.5mA
$= 2.5 \times 10^{-3}$ A

$$R = \frac{V}{I} = \frac{12}{2.5 \times 10^{-3}} = 4800\Omega$$

2. Explain resisted experiment to show that electricity and magnetism were related phenomena?

A. Place a compass needle underneath a wire and then turn on electric current. Immediately the needle of compass shows the deflection. By this we can conclude that electricity and magnetism are related phenomena .

3. Mahesh appreciated the law behind the making of “Generator” name the law and state it?

A. Faradays law
Law:- They induced emf generated in a closed loop is equal to the rate of change of magnetic flux passing through it .

4. Mention any two daily life situations for the electro magnetic induction which is formed by the movement of bar magnet in the solenoid ?

A. The daily life situations for the electromagnetic induction which is formed by the movement of bar magnet in the solenoid are
   1. In security checking
   2. In tape recorders
   3. Induction stove
   4. In the usage of A.T.M cards.

5. Which energy do we get from an electric motor? Write two daily life applications of the electric motor?

A. We get mechanical energy from electric motor. In our daily life we use electric motor in
   (1) Grinders (2) Water pumps

6. Calculate the flux passing through an area of 50 cm^2 when it is placed in a magnetic field of induction 1.5 T such that normal to the plane of the area makes an angle 60^0 with magnetic field.

B= 1.5
A= 50Cm2
= 50X 10^{-4}
Θ= 60^0

A. $\phi = BA \cos \Theta$

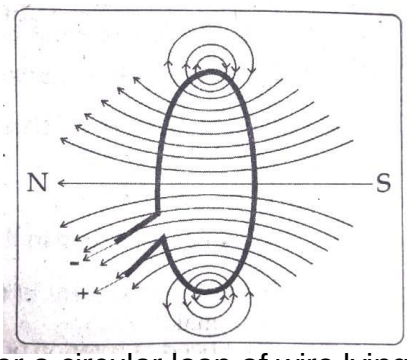
$\phi = 1.5 \times 50 \times 10^{-4} \times \cos 60^0$

$= 7\,5 \times 10^{-4} \times \frac{\sqrt{3}}{2}$

$= 37.5 \times 10^{-4} \times \sqrt{3}$

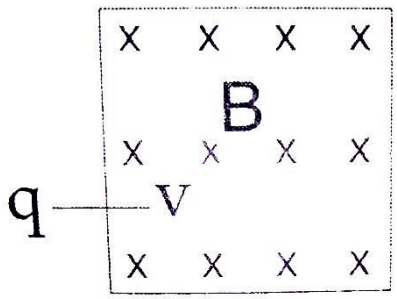
$= 37.5 \times 10^{-4} \times 1.732$

$\phi = 64.95 \times 10^{-4}$ wb

7. 

Consider a circular loop of wire lying in the plane of table. Let the current pass through the loop clock wise. Apply the right – hand rule to find out direction of magnetic field inside and outside the loop?

A. Applying right – hand rule , the magnetic field lines of the force produced by a circular current carrying loop are shown in the figure .

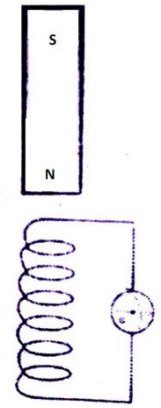
8. 

In the figure shown the magnetic field acts perpendicular and into the paper plane. A charged particle of charge "q" enters into the field at right angles with a velocity V. Then
(a) What is the direction of force acting on charge q ?
(b) What is the magnitude of force?

A. (a) According to formula **F = q V X B**
It moves perpendicular to the plane containing V and B (Fleming's left hand rule) . It moves up in circular path .

(b) F = qVB Sin ∅, Hence ∅ = 90^0
F max = qVB

9. From the diagram given below:-
What will happen when the magnet is dropped into the coil?



A. When the magnet is dropped into the coil a relative motion between coil and magnet is established and induced current is produced. Hence some deflection in the galvanometer is observed .

10. What is the difference between magnetic flux and magnetic flux density?

A.

Magnetic flux	Magnetic flux denesity
1 It is denoted by ' Φ	It is denoted by ' B' $B = \frac{\Phi}{A}$
2 S.I unit is weber	S.I Unit is weber/meter (or) Tesla
3 It is the number of lines of force passing thorough the imagined plane in the filed.	The magnetic flux per unit area perpendicular to the phase is known as flux density.

4 Marks:-

1. Explain faraday's law of induction with the help of an activity?

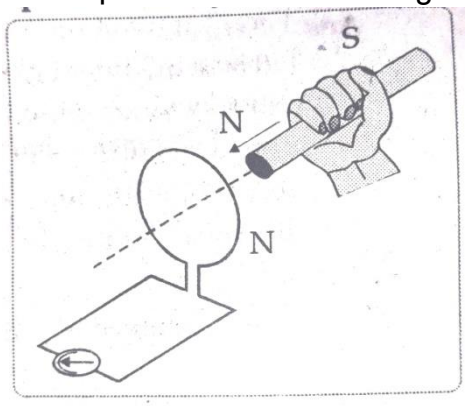
A. AIM :- To explain faraday's law of induction.
Apparatus:- Galvanometer , coil to a sensitive bar magnet.

Procedure:-

1. Connect the terminals of a coil to a sensitive galvanometer as shown in the figure.
2. Normally we would not except any deflection of needle in the galvanometer because there is no EMF in circuit.
3. Now if we push a bar magnet towards the coil , with its north pole facing the coil the needle in the galvanometer deflects, showing that a current has been set up in the coil the galvanometer does not deflect if the magnet is at rest.

4. If the magnet is moved away form the coil, the needle in the galvanometer again deflects but in the opposite direction which means that a current is set up in the coil in the opposite direction.
5. If we use the end of south pole of a magnet instead of north pole . The result i.e., the deflections in galvanometer are exactly opposite to the previous one.
6. This activity proves that the change in magnetic flux liked with a closed coil, produces current .

Conclusion:- From this faraday's law of induction can be stated as ' whenever there is a continuous change for magnetic flux linked with a closed coil, a currents is generated in the coil". This induced emf is equal to the rate of change of magnetic flux passing through it .



2. Explain the working of electric motor with a neat diagram?

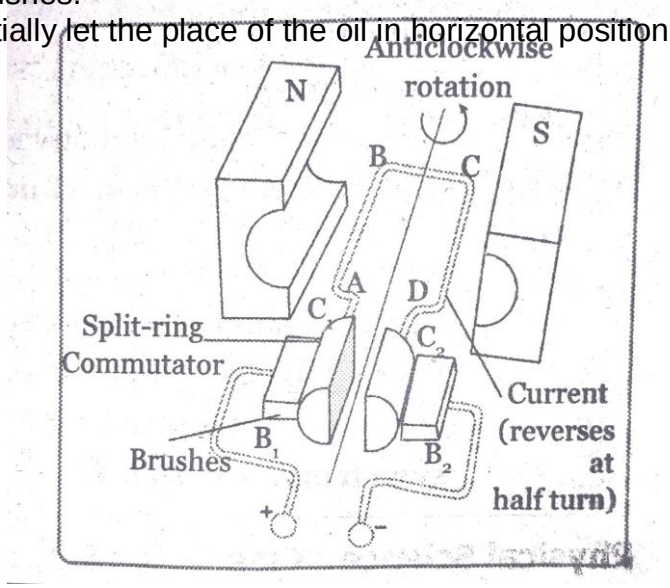
A. Electric Motor:-

An electric motors is a device which converts electrical energy into mechanical energy.

Principle:- It works on the principle that on principle that a current carrying conductor placed in a magnetic field experience a force.

Working procedure:-

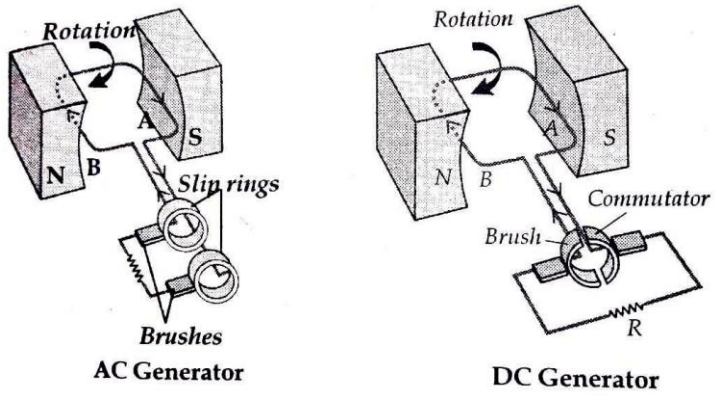
1. It consists of armature strong horse shoe type magnet, split rings and Carbone brushes.
2. Initially let the place of the oil in horizontal position.



3. The split ring C , touches the brush B, and split ring C_2 touches the brush B_2 when the current flows in the direction ABCD as shown in figure.
4. According to right hand rule no force acts on arm CB, and DA because as they are parallel to the magnetic field.
5. The force acting on the arm AB pushes it downwards while the force acting on the arm CD pushes it upwards. So the armature rotates in anti – clockwise direction.

6. After half a rotation the split ring C comes in contact with brush B_2 and C_2 with brush B. So the current in the coil is reserved and flows in the direction. DCBA.
7. If the direction of the current in the coil unchanged the coil gets to and fro- motion.
8. In electric motor the split rings act as a commutator which reverse the direction of flow of current through a circuit.
9. Now the coil rotators continuously in anti-clockwise direction.

3. Which device is used to convert mechanical energy into electrical energy? Drawn a neat diagram and label the parts of this device?

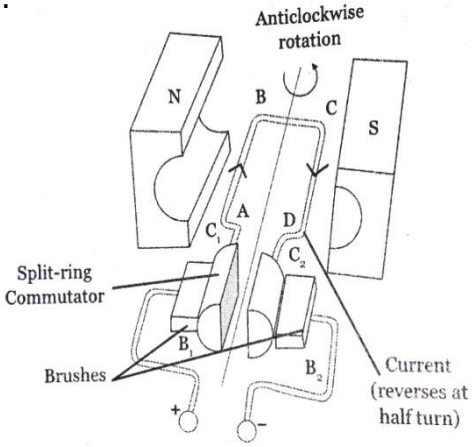


4. Collect information about various applications electromagnetic induction in our daily life?

A. Application of faraday's law of induction in dally life:
   1. Security check at installation like airports , Railway station and Government establishments uses the phenomenon of electro magnetic induction to defect metal objects like guns , knives etc.,
   2. Tape records audio / video are used to record and playback the content through electro magnetic induction.
   3. Bank cards (ATM, debit, credit) cards have magnetic strip that store information which can be received by machines employing electro magnetic induction .
   4. Induction stove /cooker works on the principle of electro magnetic induction.
   5. It is useful in electric bells.

5. Name the device that converts electrical energy into mechanical energy. Drawn its diagram and label the parts?

A. Electric motor is the device that convents electrical energy into mechanical energy.



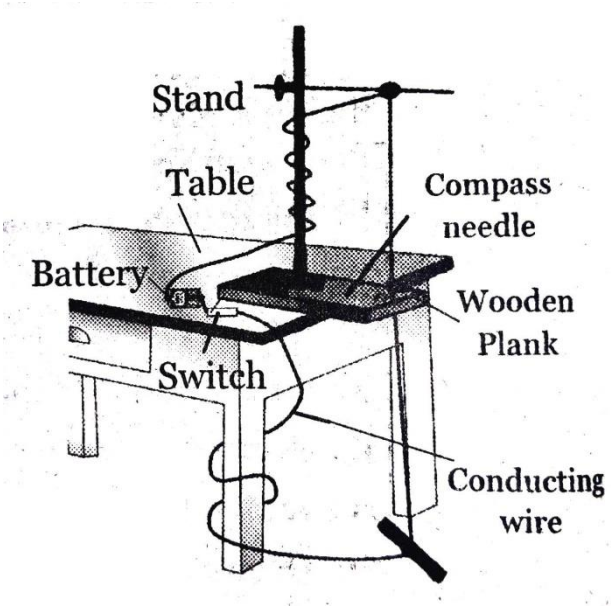
6. How can you verify with experiment ‘ the magnetic filed lines are closed loops?

A. AIM :- To study the pattern of the magnetic field lines around a straight wire carrying current.

Apparatus:- Stand , Compass, table, battery, switch, and conducting wire

Procedure:-

1. Take a wooden plank and make a hole and place it on a table.
2. Now place a retort stand on this plank and suspend a copper wire from the retort stand and see that the wire from passes through the hole.
3. Connect a battery and switch and place a magnetic compass at the hole.
4. When current is passed through the wire the magnetic needle deflects and it is directed as the tangent to the circle.
5. If the current flows in direction the field lines are in clockwise direction the field and if current flows in down ward direction the field lines are in anticlockwise direction ,
6. The direction of the current and magnetic line of force can be explained with the help of right hand thumb rule.
7. According to the right hand thumb rule if you hold a current carrying conductor with your right hand such that the direction the thumb show the direction of current then other finger shows the direction of magnetic lines of force.



7. Rajkumar said to you that the magnetic field lines are open and they start at north pole of bar magnet and ends at south pole . What questions do you also Rajkumar to correct him by saying ‘field lines are closed”?

A. I asked rajkumar some questions to correct him.

1. Are the magnetic field lines closed or open loops?
2. How do the field lines behaves in side the magnet ?
3. Why is the magnetic compass needle following a curved path from one pole to another?
4. What do field lines indicate?
5. What is the direction of field line inside the magnet?
6. Is the direction of field lines from its south pole or north pole?

&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&

11. PRICNIPLES OF METALLURGY

KEY CONCEPTS:-

- MINERAL:- a metallic compound occurring in the earth crust along with impurities is called mineral.
- ORE:- A mineral from which a metal can be extracted economically and conveniently is called ore
- SMELTING :- The process of reducing the oxide with coke is called smelting. In this process the ore is mixed with flux and fuel then strongly heated.
- CALCINATRION:- Calcinations is a pyro chemical process in which the ore is heated in the absence of air .
- DISTILLATION:- The method is very useful for purification of low boiling metals which contain high boiling metals as impurities. The extracted metal in the molten state is distilled to obtain the pure metal as distillate.
- ELECROLYTIC REFINING:- In this method the impure metal is to act as a node. A strip of the same metal in pure form is used as cathode. They are put in a suitable electrolytic cell containing soluble salt of the same metal.
- FROTH FLOATATION :- This methods employed for the concentration of Sulphide ores. The finely powdered ore is added to water in a tank which contains pine oil. Air high under pressure is blown to produce forth in water forth takes the ore particles to the surface where as impurities settle at the bottom.
- ROASTING:- Roasting is a pyrochemical process in which the ore is heated in the presence of oxygen or air below its melting point.
- THERMITE PROCESS:- When highly reactive metals are used as reducing agents and displace metals of lower reactivity from the compound. In these displacement reactions the amount of heat evolved is so large that the metals produced in molten state .
- BLAST FURNACE:- Blast furnace is a furnace in which both fire box and hearth are combined in big chamber which accommodate both ore and fuel .

	ore	formula	metal
1	Haematite	Fe_2O_3	Fe
2	Magnetite	Fe_3O_4	Fe
3	Magnesite	$MgCO_3$	Mg
4	Epsom salt	$MgSO_4 . 7H_2O$	Mg
5	Carnallite	$KCl.MgCl_2 6H_2O$	Mg
6	Zine blende	Zns	Zn
7	Zincite	Zno	Zn
8	Cinnabar	Hgs	Mg
9	Galena	Pbs	Pb
10	Bauxite	Al_203	A1

½ Marks:--

1. The impurity present in the ore is called _____
   (a) Gangue (b) Flux (c) slag (d) Mineral

A. Gangue (a)

2. Which of the following is the correct formula of Gypsum
   (a) $CaSO_4$, $2H_2O$ (b) $CuSO_2$, ½ H_2O (c) $CuSO_4$, $5H_2O$ (d) $CaSO_4$ $2H_2O$

A. $CaSO_4$, $2H_2O$

3. Galena an ore of

   (a) Zn (b) Pb (c) Hg (d) A1.

A. Pb

4. The metal that occurs in the native form is

   (a) Pb (b) Au (c) Fe (d) Hg

A. Pb

5. The most abundant metal in the earth's crust is

   (a) silver (b) Aluminum (C) Zinc (d) Iron

A. Aluminum

6. The reducing agent in thermite process is

   (a) Al (b) Mg (C) Fe (d) SI

A. Al

7. Which method is suitable for enrichment of sulphide ore

A. Forth floatation

8. Arrangement of the metals is decreasing order of their reactivity is known as

A. Activity series.

9. Write the chemical formula of cinnabar?

A. Hgs

10. Match following

(1) Epson salt [ ] (a) Fe_2O_3

(2) Haematite [ ] (b) Pbs

(3) Galena [ ] (c) $MgSo_4\ 7H_2O$

1. 1-b,2-c,3-a2. 1-c,2-a,3-b3. 1-c, 2-b, 3-a 4. 1-a,2-b,3-c

A. 1-c, 2-a, 3-b

11. find out reactivity of order Fe, Mg, Ca, Zn, Ag

(a) Ca>Zn>Mg>Cu>Ag>Fe

(b) Ca>Zn>Cu>Mg>Ag>Fe

(c) Ca>Mg>Zn>Fe>Cu>Ag

(d) Ca>Mg>Fe>Zn>Cu>Ag

A. Ca>Mg>Zn>Fe>Cu>Ag

12. In the following which one not most reactivity metal

(a) K (b) Na (c) Ca (d) Au

A. Au

13. the order of extraction of metal from ore?

1. Concentration (or) grassing

2. Extraction of crude metal

3. Refining

(a) 1,2,3 (b) 3,2,1 (c) 1,3,2 (d) 2,1,3

A) d

1 Marks :-

1. List two metals that are found in nature in uncombined form
   Ans.Au, Ag
2. Write the name or any two ores of Iron

A. Haematite , Fe_2O_4

B. Magnetite , Fe_3O_4

3. Define the terms gangue and slag?

A. Gangue:- The impurities like clay, sand present in the ore is called a Gangue

Slag:- The impurities obtained during the poling process get Oxidized to form slag (scum) over the surface of the molten metal

Ex:- $Casio_4$, $FeSiO_3$

4. What is meant by Furnace?

A. Furnace :- Furnace is the one which is used out pyrochemical processes in metallurgy.

5. Iron gets rust but gold does not ? Why?

A. Gold is a less reactive metal iron is a moderate reactive metal . So iron gets rust easily.

6. Define the term ore?

A. Ore:- The mineral from which the metals are extracted without economical loss are called ore.

(b) Ex:- "Bauxite" (Al_2O_3, $2H_2o$) is ore of aluminum

7. Give the formula of the following

(a) Magnasite (b) Epsom salt

A. (a) $MgCO_3$ (b) $Mg\ So_4.7H_2o$

8. What is the name of given the given compound $Fe_2O_3.H_2o$?

A. Hydrated ferric oxide

9. Thermite reaction is exothermic or endothermic reaction ? Why?

A. Exothermic, the amount of heat evolved is so large.

10, Which method is used in joint of railway tracks?

A. thermite process?

11. What is a thermite process?

A. The reaction of iron oxide (Fe_2O_3) with aluminum is used to join the railtrack is known as the thermite reaction.

12. Write difference between ore and mineral?

A. **Ore**:- Material which contains sufficient quantity of Minerals so that metals can be extracted profitably.

Minerals:- Minerals are natural materials in which the metals or their compounds are found in earth.

2 Marks:-

1. What is the difference between roasting and calcinations

Roasting	Calcination
1. Roasting is a pyrochenical process in which the ore is heated in presence of air below its melting point 2. It is on oxidation reaction.	1. Calculation is a pyrochemical process in which the ore is heated in the absence of air 2.It is a decomposition reaction

2. Which method do you suggest for extraction of higher activity metals ? Why?

A. High reactivity metals like K,Na,Ca,Mg,etc., can be extracted by metal.
Reason:- (1) Simple reduction methods like heating with carbon,CO,etc.,
(2) The temperature required for the reduction is too high and more expensive.
(3) Hence electrolysis is the suggestible method to extract high reactive metals.

3. What is the thermite process? Mention its applications in daily life?

A. Thermite process:- The reaction of Iron oxide (Fe_2O_3) with aluminum is used to join the rail track is known as the thermite reaction

$$Al + Fe_2O_3 \longrightarrow Al_2O_3 + 2\,Fe_2 + Heat$$

Applications in daily life:- 1. To join railings of railway track
2. To join cracked machines parts.

4. Where do we use hand picking and washing methods in our daily life?

A. Hand picking:- If the ore particles and the impurities are different in one of the properties like colour, size, etc., are separated by hand picking.

Washing:- 1. Ore particles are crushed and kept on a sloppy surface.

2. They are washed with a controlled flow of water.

3. Less dense impurities are carried away by water flow , leaving the more dense ore particle behind.

5. Write a note on ore dressing in metallurgy?

A) Ore dressing in metallurgy :- ore has a large amount o impurities such as soil and sand etc.,
1. Dressing or concentration means, simply getting rid of unwanted rocky material as possible.
2. The impurities are known as " gangue".
3. The various physical methods to separate the ore and gangue are
1. Hand picking.
2. Washing
3. Froth floatation and
4. Magnetic separation.

6. How do metals occur in nature ? Give examples to any two type of minerals ?

A. 1. The earth crust is the major sources of metals.
2. Some metals are available in nature in the free state as they are less reactive.
3. Most of the metals are found in nature in the combined form due to their more reactivity.

Sl.No.	Type of the Mineral	Name of the Mineral
1	Oxide Mineral	Bauxite ($A1_20_3.\ 2H_20$)
2	Sulphide Mineral	Zinc blend(zns)

7.Fill the following table

Ore	Formula	Metal
1.Bauxite	$A1_20_3.\ 2H_20$	Al
2. Cinnabar	Hgs	Hg

3. Pyrolusite	$Mn0_2$	Manganese
4. Mangnesite	$Mgc0_3$	mg

8. Explain the methods which produce very pure metals ?
A. The process of obtaining the pure metal from the impure is called refining of the metals.
Distillation :- 1) This method is very much useful for purification of low boiling metals like zinc and Mercury.
2. The extracted Metal in the molten state is distilled to obtain the pure metal as distillate.

9.What is Furnace ? Explain parts of Furnace ?
A. Furnace:- Furnace is the one which is used to carry out pyrochemical processes in metallurgy.
Mainly three parts :- Hearth, Chimney and Fire box.

10. Ramu: All minerals become ores
Teja: All Ores becomes Minerals
Whom do you support Give your reasons.
A. Teja : All ores becomes minerals.

11. Write down some reaction during in thermite reactions.

A. $Ticl_4 + 2Mg \xrightarrow{850^oC} Ti + 2Mgcl_2$

B. $Ticl_4 + 4Na \xrightarrow{850^oC} Ti + 4Nacl$

12. Write a chemical reaction during in Blast Furnace.
A. The reactions inside the Furnace are

$2C_{(s)} + O_{2(g)} \rightarrow 2Co_{(g)}$
Fuel

$Fe_2O3_{(s)} + 3CO_{(g)} \rightarrow 2Fe_{(1)} + 3CO_{2(g)}$
Hematite

$Caco_{3(s)} \rightarrow Caco_{(s)} + Co_{2(g)}$
Lime stone (Flux) Lime

$Cao_{(s)} + Sio_{2(s)} \rightarrow Casio_{3(l)}$
Lime Silica (gangue) Calcium silicate(Slage)

13. Write Four methods for metals refining.

4 Marks Questions

1. Write short notes on froth Floatation process ?
Froth Flotation Process:- 1. Froth Flotation method is used for dressing the sulphide ore.
2. The ore with impurities is Finely powered and kept in water containing Pine oil taken in a Floatation cell.
3. Air under Pressure is blown to produce forth in the water.
4. Froth so produced, takes the ore particles to the surface.
5. The impurities settle at the bottom.
6. Forth is separated and washed to got ore particles.

Froth Floatation Process

2. What is the activity series ? How does it help in the extraction of metals?

A. Activity series:- 1. Arrangement of the metals in descending order of their reactivity is know as activity series.

2. The activity series of metal is $\frac{K,Na,Ca,Mg,A1}{High\ reactivity}$, $\frac{Zn,Fe,Pb,Cu}{moderate\ \ reactivity}$, $\frac{A,g,cu}{Low\ reactivity}$

3. Write the name of the method we used to separate the ore, in which one of them is magnetic substance. Draw a near diagram indicating the method.

Ans:-Magnetic separation

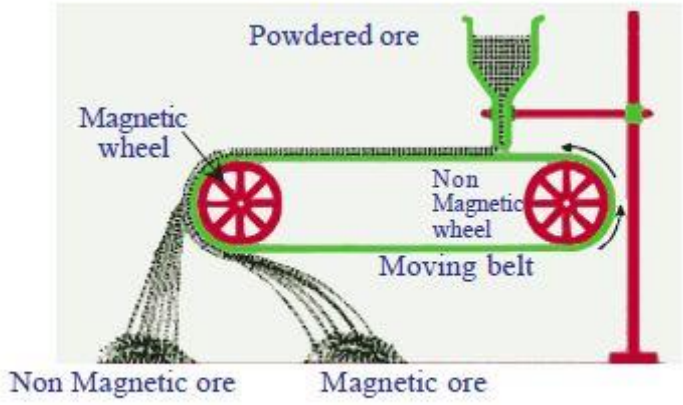


fig-2: Magnetic separation

4. Write the name of the method we use for concentration of sulphide ore raw a neat diagram and label ? Its parts.

A. Froth floatation of the process .

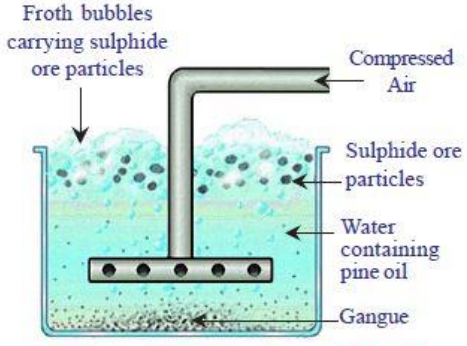


fig-1: Froth floatation process for the concentration of sulphide ores

5. Which Furnace use for smelting process Draw a neat diagram and label its parts.

A. Blast Furnace.

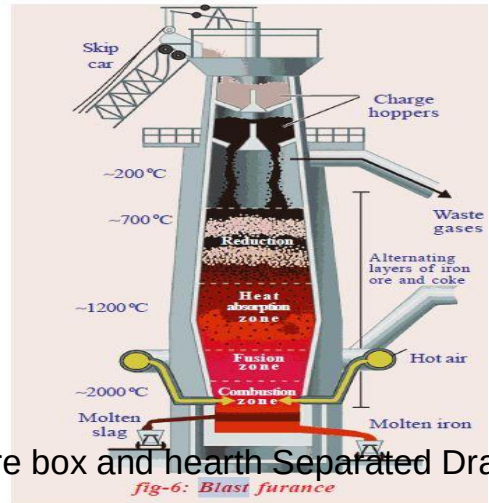


fig-6: Blast furance

5. Which Furnace have both Fire box and hearth Separated Draw a neat diagram of that Furnace.

   Ans: Reverberatory furnace

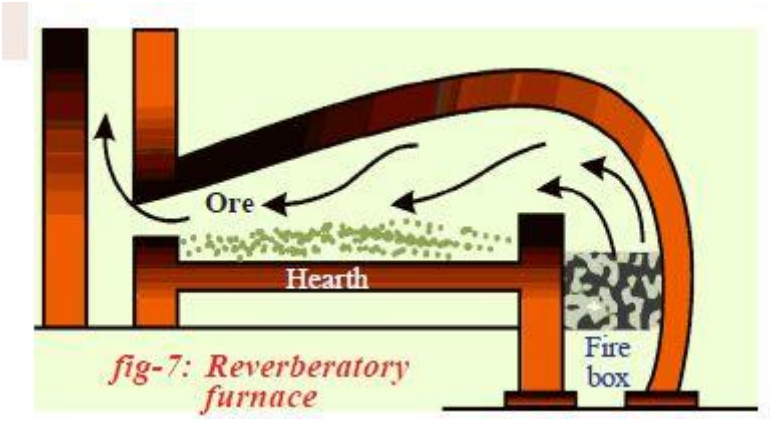


fig-7: Reverberatory furnace

12. Carbon and its Compound

Key concept:-

- Carbon: It is a non metal, its belong to IVA group in a periodic table
- It contains four electrons in the valence shell
- Carbon atomic number = 6, and electronic configuration is $1S^2\ 2S^2\ 2P^2$
- Carbon electro negativity is 2.5
- Carbon loses four electrons from the outer shell
- Carbon has to satisfy its tetravalency by sharing of electrons with other atoms
- Hybridisation: This concept introduced by Linus pauling
- The redistribution of orbital of almost equal energy in individual atoms to give equal number of new orbital with identical properties like energy and shape is called by hybridisation
- Carbon atom undergoes SP^3 hybridisation
- Example for SP^3 hybridisation: CH_4
- SP^2 hybridisation: C_2H_4
- SP hybridisation: C_2H_2
- Allotropy: The property of an element to exist in two or more physical forms .
- The allotropes of carbon in mainly two types.
  (1) Amorphous forms (2) Crystalline forms
- Amorphous forms Examples: Cole, Coke, Charcoal etc.
- Crystalline forms: Ex. Diamond, Graphite and $Carbon_{60}$
- Diamond: in diamond each carbon undergoes SP^3 hybridisation and tetrahedral structure and is one the hardest material due to C-C strongest bond.
- Graphite: It is two dimenstioned layer structures within the layers. Graphite is used as lubricant.

- Buckminster fullerene (C_{60}°): It contains nearby spherical C_{60} molecules with the shape of a soccer ball.
- Nano tubes: Nano tubes are another allotropic form of carbon. Nano tubes are the sheets rolled into cylinders. Which are good electrical conductors.
- Catenation: If any element forms bonds between its own atoms to give big molecule.
- Carbon atoms can form single bond, double bond and triple bond. It is versatile element in nature.
- Hydro Carbons: The compound containing carbon and hydrogen mainly in their molecule formula

- Two types of hydro carbons:
  (1) Open chain hydro carbon: CH_3-CH_2-CH_3
  (2) Closed chain hydro carbons: CH_2-CH_2

  CH_2 CH_2
  \ /
  CH2
- Hydrocarbons classified into two types
  (1) Saturated hydrocarbons (2) Unsaturated hydrocarbons
- Unsaturated hydrocarbons two types
  (1) Alkenes (2) Alkynes
- Homologous series: The series of a carbon compounds in which two successive compounds differ by-CH_2 unit is called homologous series.
  Ex: CH_4, $C2H_6$, $C3H_8$….
- Isomerism: The phenomenon of possessing same molecular formula but different properties by the compounds is known as isomerism

<u>Nomen clature of Aliphatic hydrocarbons</u>:

The name of a straight chain of an aliphatic hydrocarbons divided into three parts – word root, primary suffix and secondary suffix.

1)

Root length	Word root
C_1	Meth
C_2	Eth
C_3	Prop
C_4	But
C_5	Pent
C_6	Hex
C_7	Hept
C_8	Oct
C_9	nona
C_{10}	deca

- In order to IUPAC names a primary suffix is added to the word root to indicate a saturated or unsaturated molecule.

Class of compound	Primary suffix	General name
C-C	- ane	Allkane
C=C	- ene	Allkene
C≡C	- yne	Alkyne

- Longest chain rule: select the longest continuous chain carbon atoms, all the other carbon atoms constitute in the chain are branched chains

  Ex: CH3 - CH_2 - CH_2 – CH - CH_3
  |
  CH_2
  |
  CH_4

- Lowest number rule: The numbering may be done from left to right or right to left, bottom to top or top to bottom so that the substituted carbon atoms have the lowest number possible.

Functional group	Prefix	Suffix
-OH	hydroxy	-ol
-CHO	formyl	-al
-C=O	-Oxo	-one
-COOH	Carboxy	-oic acid
-COOR	Oxy carbonyl	-Oate

- COMBUSTION: The process of burning of carbon compounds in excess of oxygen to give heat and light.
- OXIDATION: Oxidation may be carried out using oxidising agents. Oxidising agents are substances that oxidize other substances.
- ADDITION REACTION: Unsaturated organic compounds that contain multiple bonds like alkenes and alkynes undergo addition reaction to become saturated.
- Substitution reaction: A reaction in which one atom or group of atoms in a given compound is replaced by other atom or group of atom
- Ester: Ester contains functional group  and the general formula is $R\text{-}COO\text{-}R^1$

- Esterification: The reaction between carboxylic acid and an alcohol in the presence of conc-H_2SO_4 to form a sweet odour substance.
- Saponification: Alkaline hydrolysis of ester producing soap is called saponification
- Micelle: A spherical aggregate of soap molecules in water is called micelle

½ Mark Questions & Answers:

1) Who introduced the concept of hybridization of orbital?
A) Linus pauling
2) Which orbital hybridization is present in diamond?
A) SP^3
3) Carbon has the ability to form longest chains with its own atoms. What we call this property?
A) Catenation
4) Which of the following compound is saturated?
   (a) $CH_3 – CH_2 – CH_2 – CH_3$
   (b) $CH_3 – CH_2 – CH_2 – CH = CH_2$
   (c) $CH_3 – C \equiv C – CH_3$
A) $CH_3 – CH_2 – CH_2 – CH_3$
5) Name the simplest hydro carbon?
A) Methane
6) Name the acid present in vinegar?
A) Acetic acid
7) What we call the property of the element occurring in two or more forms?
A) Allotrops
8) Which gas is released when sodium metal is dropped in ethanol?
A) Hydrogen gas
9) Name the catalyst used in hydrogenation of vegetable oils?
A) Nickel
10) Match the following and choose correct answer?

Group-A	Group-B

1. CH_4	a. SP hybridization
2. $C2H_4$	b. SP^2 hybridization
3. $C2H_2$	c. SP^3 hybridization

A 1-a, 2-b, 3-c B 1-b, 2-c, 3-a,
C 1-c, 2-b, 3-a D 1-c, 2-a, 3-b

A) [C]: 1-c, 2-b, 3-a

11) Match the following and choose correct answer?

Group-A	Group-B
1 Alkanes	a. CnH_{2n-2}
2 Alkenes	b. CnH_{2n}
3 Alkynes	c. CnH_{2n+2}

A 1-a, 2-c, 3-b B 1-c, 2-b, 3-a,
C 1-b, 2-c, 3-a D 1-a, 2-b, 3-c

A) [B]: 1-c, 2-b, 3-a

12) Match the following with appropriate functional group?

Group-A	Group-B
1 Aldehyde	a. C=O
2 Ketone	b. -OH
3 Alcohol	c. CHO

A 1-c, 2-a, 3-b B 1-a, 2-b, 3-c,
C 1-a, 2-c, 3-b D 1-b, 2-c, 3-a

A) [A]: 1-c, 2-a, 3-b

13) Name the word root for the following hydrocarbon?
$CH_3 – CH_2 – CH_2 – CH_2 – COOH$

A) Pentane

14) Assertion (A): In diamond each carbon atom has a tetrahedral environment
Reason (R): In diamond each carbon atom in its exited state under goes SP^3 hybridization
Choose correct option.
(i) Both A and R are true, and R is correct explanation of A
(ii) Both A and R are true, R is not correct explanation of A
(iii) Both A true and R are true
(iv) Both A and R are false

A) (i) - Both A and R are true, and R is correct explanation of A

15) Find the odd one out?
(a) Aromatic (b) Alkanes (c) Alkenes (d) Alkynes

A) Aromatic

16) List any two homologous series of Alkanes?

A) 1) CH_4 2) C_2H_6

17) The molecular formula C4H10 contains how many isomeric alkanes?
a) 1 b) 2 c) 3 d) 4

A) [B] 2

18) The product of hydrocarbon combustion are
a) Carbon dioxide + water
b) Oxygen + water
c) Only carbon dioxide
d) Only oxygen

A) [A] Carbon dioxide + water

19) Which of these is not a crystalline form of carbon?
a) Diamond
b) Coal
c) Graphite
d) Buckministerpullarine

A) [B] Coal

20) The suffix used for naming an aldehyde is
a) –ol
b) –al
c) –one

d) –ene

A) [B] –al

1 Mark question and Answers:

1) Give the name functional group i)-CHO ii)-C=O?

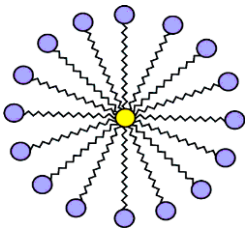
A) i) Aldehyde ii) Ketone

2) What is meant by allotropy? Write the allotropes of carbon?

A) The occurrence of the same element in two or more different physical forms is known as allotropy. Allotropes of carbon are diamond, graphite, buckminster fullerene.

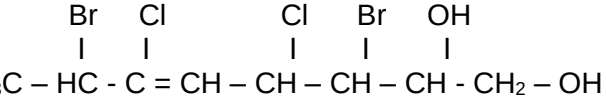
3) What are micelles draw the shape of micelle?

A) A spherical aggregate of soap molecules in water is called micelle.



4) Write the structural formula of the following carbon compound 3, 7 dibromo – 4, 6 – dichloro oct-5-en-1, 2-di-ol ?

A)



5) Give the name of the functional groups?

a) – COOR b) - OH

A) a) Ester

b) Alcohol

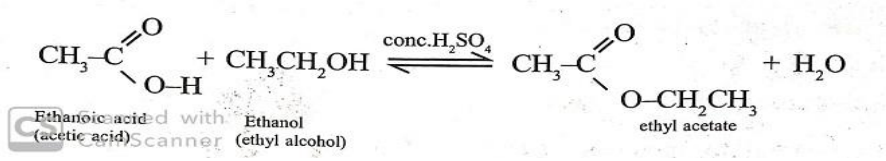
6) Write any two uses of nanotubes?

A) Uses of nano-tubes:-

1) Nanotubes are used as molecule wires
2) Nanotubes are used in integrated circuits
3) Nanotubes are used to insert bio-molecules into the single cell

7) Give an example for esterification reaction?

A) The reaction between carboxylic acid and an alcohol in the presence of conc. H_2SO_4 to form a sweet odour substance, ester with the functional group is called esterification.



8) Identify i) The word root and ii) Functional group for the following carbon compound

$CH_3 – CH_2 – CH_2 – CH_2 – COOH$

A) i) Pent

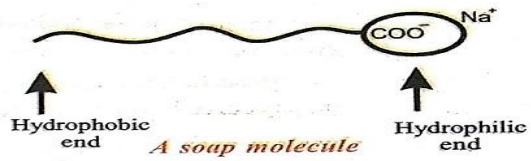
B) ii) carboxylic acid

9) what is soap? Write its molecular formula?

A) Soap is a sodium or potassium salt of a higher fatty acid. The formula of soap in general is RCOO Na or RCOOK.

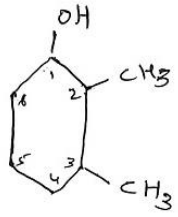
10) Draw the structure of soap molecule?

Ans:



A soap molecule

11) Write the IUPAC name the following carbon compound?



A) 2, 3-di methyl cyclo hex-an-1-ol

2 Mark questions & Answers:

1) What are the various possible structural formula of a compound having molecular formula C_3H_6O? Give the IUPAC names of the above possible compounds and present them in structures?

A) i) $CH_3 - CH_2 - CHO$ Propanal

ii) $CH_3 - \underset{\underset{O}{\|}}{C} - CH_3$ Porpanone

These two compounds molecular formula is same but structure formula is different with different functional groups, aldehyde (CHO), Ketone (CO) these are called isomers.

2) What is isomerism? Explain with an example?

A) The phenomenon of possessing same molecular formula but different properties by the compound is know as isomerism. The compound that exhibit isomerism are called isomers.

Ex: The following two different structure of carbon compounds having same molecular.

Formula: C_4H10

$CH_3 - CH_2 - CH_2 - CH_3$ and $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_3$

n-butane iso butane

3) Define homologous series of carbon compounds. Mentioned any two characteristics of homologous series?

A) The series of carbon compounds in which two successive compounds differ by $-CH_2$ unit is called homologous series.

Homologous series of organic compounds have following characteristic futures.

i) They have one general formula
Ex: Alkanes C_nH_{2n+2}

ii) They posses similar chemical properties due to the same functional group.
Ex: Alcohols have same functional group –OH

4) Two carbon compounds A and B have molecular formula C3H8 and C3H6 respectively. Which one at the two is most likely to show addition. Justify your answer?

A) Since C3H6 is unsaturated which has double bond undergoes addition reaction

$CH_2 = CH - CH_3 \xrightarrow{Ni} CH_3 - CH_2 - CH_3$

Propene H_2 Propane

While C_3H_8 is saturated undergoes substitutional reactions

5) How do you appreciate the role of esters in everyday life?

A) Esters are sweet or pleasant smell substances.
They are used in soaps, alchol and cosmetics industry.
These are used in the making of perfumes.
The reason for the sweet odours of fruits and flowers are esters present in it.

Hence, I appreciate the role of esters in everyday life.

6) How do you appreciate the role of ethanol as a fuel?

A) The ethanol is used as fuel for energy in automobiles.
Petrol an gasohol are also extracted from ethanol.
So, I appreciate the role ethanol used as a fuel.

7) What are hydrophilic and hydrophobic parts in soaps?

A) The polar end is hydrophilic in nature and attracted towards the water.
The non – polar end is hydrophobic in nature and attracted towards grease or oil on the cloth, but not towards the water.

8) Why diamond is hard but graphite is smooth?

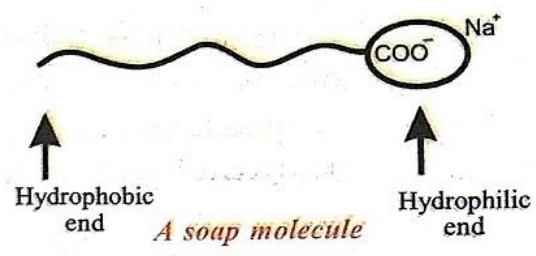
1) Each carbon atom in diamond has a tetrahedral environment. The three dimensional structures of diamond in C- C bonds are very strong any attempt to district the diamond structure requires large amount of energy. Hence diamond is one of the hardest material.

2) Where as graphite not so hard ,it has two dimensional layer structure, and layers separated by $3.35A^{0.}$,They can easily slip on one another hence graphite is soft.

4 MARKS QUESTIONS AND ANSWERS

9) Explain the cleansing action of soap?

A) 1. Suppose that we put a dirty cloth in the soap solution. Dirt is mainly greasy matter.

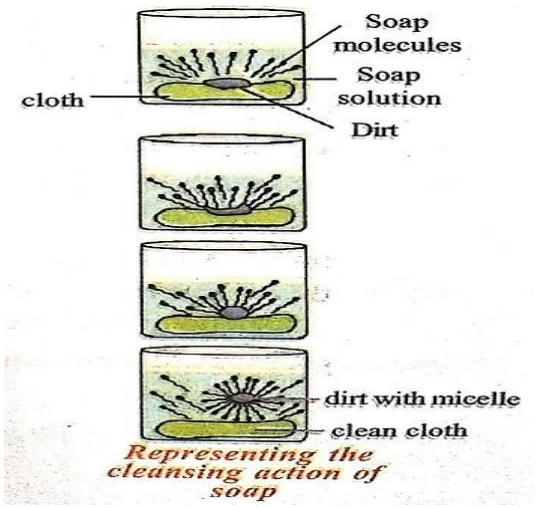


2. Soap has one polar end (the end with –C-OH carboxyl) and one non-polar end (the end with hydrocarbon chain) as shown here

3. The polar end is hydrophilic in nature and attracted towards the water.

4. The non-polar end is hydrophobic in nature and attracted towards grease or oil on the cloth, but not towards the water.

5. When soap dissolves in water, its hydrophobic ends attach themselves to dirt and remove it from cloth, as shown sequentially in the figure



10) Suggest a test to find the hardness of water and explain the procedure?

A) **Hard water:-** A sample of water which does not give good lather with soap but forms sticky scum (precipitate) is called hard water.
Test:-Hardness of water can be tested with the help of good quality soap.

Procedure:-

1. Take 50ml of water from different source i.e., tap water, well water, lake water, pond water, river water, etc., in different test tubes and label them as A, B, C, D, etc.,
2. Add 1gm of good quality soap to each test tube.
3. Close each test tube with rubber corks.
4. Shake test tube A for 15 seconds and keep it. Undisturbed for 30 seconds.
5. Measure the height of the foam formed. Note the height of form in our note book.
6. The water which gives less foam is considered hard water.

11) Distinguish between esterification and saponification reactions of organic compounds?

A)

ESTERFICATION	SAPONIFICATION
1. The reaction between carboxylic acid and alcohol in the presence of conc. H_2SO_4 to form a swept odoured substance ester and this process is called esterification.	1. The process of making soap by the hydrolysis of fats and oils with alkalies is called saponification.
2. Alcohol reacts with carboxylic acids to produce esters.	2. Higher fatty acids react with basis to form soaps.
3. $CH_3COOH + CH_3CH_2OH \xrightarrow{Conc.H2SO4}$ $CH_3COOH\ CH_2\ CH_3 + H_2O$	3. $(C_{17}\ H_{33}COO)_3\ C_3H_5$ +3 Na OH→ 3 $C_{17}\ H_{33}$ COO Na + CH_2OH CH (OH)-CH_2OH
4. Water is a by-product in esterification reaction.	5. Glycerol is a by product in saponification reaction.

12) Alkanes are considered as paraffin. So they undergo substitution reactions but not addition reactions. Explain with suitable example?

A) **Substitution reaction:-** 1. Alkanes undergo substitution reactions.

2. For example, Methane (CH_4) reacts with chlorine in the presence of sunlight.

3. Hydrogen atoms of CH_4 are replaced by chlorine atoms.

$CH_4 + Cl_2 \rightarrow CH_3Cl + HCl$

Methane Methyl Chloride

$CH_3Cl + Cl_2 \rightarrow CH_2Cl_2 + HCl$

Methyl Chloride Dichloromethane

$CH_2Cl_2 + Cl_2 \rightarrow CHCl_3 + HCl$

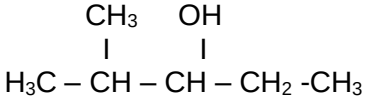
Dichloromethane Chloroform or Trichloromethane

$CHCl_3 + Cl_2 \rightarrow CCl_4 + HCl$

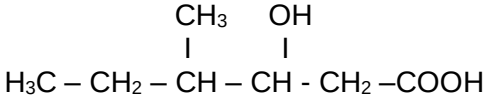
Chloroform Carbon Tetrachloride or Tetrachloromethane

13) Write IUPAC names for the following carbon compounds?

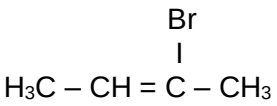
a)

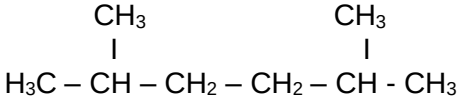


b)



c)



d) 

Answer:

a. 2- methy1 pentan – 3-ol.
b. 3- hydroxyl-4-methyl hexan -1 –oic acid.
c. 2- bromo but-2- ene.
d. 2, 5-dimethyl hexane.

14) Observe the name of a carbon compound given following.
2,3-di chloro – 5- hydroxyl oct – 4-en-1-oic acid
i) How many carbon atoms present in the carbon compound?
ii) What is principal function group in the compound?
iii) What are the substituent's are in the compound?
iv) Is carbon compound given saturated?

Answer:

I. 8
II. Carboxylic acid (COOH)
III. Chlorine (Cl), alcohol (OH)
IV. No, en indicates double bond which is unsaturated.

BIOLOGY
X CLASS-STUDY MATERIAL FOR GIFTED STUDENTS
NUTRITION –FOOD SUPPLYING SYSTEM

Half mark questions

Fill in the blanks

1. The food synthesized by the plant is stored as _____.
2. _____are the sites of photosynthesis.
3. Pancreatic juice contains enzymes for carrying the of digestion of _____ and _____.
4. The finger like projection which increases the surface area in small intestine are called _____.
5. The gastric juice contains _____acid.
6. _____vitamin synthesized by bacteria present in intestine.

Answers

1) Carbohydrates 2) Chloroplasts 3) Proteins, fats 4)Villi
5) HCL 6) Cyanocobalamin

Choose the correct answer

1. Which of the following organisms take the food by parasitic nutrition? ( )
   A) Yeast B) Mushrooms
   C) Cuscuta D) Leeches
2. The rate of photosynthesis is not effected by: ( )
   A) Light intensity B) Humidity
   C) Temperature D) Carbon dioxide concentration
3. A plant is kept in dark cup board for about forty eight hours before conducting any experiment on photosynthesis in order to : ( )
   A) Remove chlorophyll from leaves B) Remove carbon dioxide from leaves
   C) Ensure that no photosynthesis occurred D)Ensue that leaves are free from the starch
4. The digestive juice without enzyme is ( )
   A) Bile B) Gastric juice
   C) Pancreatic juice D) Saliva
5. In single celled animals the food is taken ( )
   A) By the entire body surface B) Mouth
   C) Teeth D) Vacuoles
6. Which part of the plant takes in carbon dioxide from the air for photosynthesis( )
   A) Root hair B) Stomata
   B) leaf veins D) sepals

Answers

1. C and D 2. B 3. B 4. A 5. A 6. B

1 Mark Questions

1. Write the difference between ingestion and digestion

Ingestion	Digestion
1. In this process food is taken into the body through the mouth.	1. Breaking up of complex food molecules into simple molecules
2. it is a physical process	2.it has both physical and Chemical processes
3.no involvement of enzymes	3.Enzymes break up complex food molecules into simple molecules

2. Write the differences between light reaction and dark reaction

Light reaction	Dark reaction
1.Occurs in the grana of the chloroplast	**1.**Occurs in the stroma of the chloroplast
2.Occurs only in the presence of light	**2.** It is not dependent on light
3.End products are O_2, ATP, and NADPH	**3.**End product is Glucose

3. Write the difference between chlorophyll and chloroplast

Chlorophyll	Chloroplast
1.it is a color pigment	1.it is a cell organelle and it passes the chlorophyll
2.it is present in chloroplast	2.it is present in palisade tissue of leaves
3.it harvests solar energy and converts into chemical energy.	3.it is responsible for photosynthesis

4. Why photosynthesis is considered as the basic energy source for most of living world?

All living things constantly need energy to be alive. They get the energy in the form of food. The food directly or indirectly comes from the green plants through photosynthesis. Hence photosynthesis is considered as the basic energy source for most of living world

5. Why is better to call the dark phase of photosynthesis as a light independent phase?

The Dark reaction does not depend on light. It occurs in night and day time also. Hence it is better to call the dark phase of photosynthesis as a light independent

phase.

6. Why is it necessary to destarch a plant before performing any experiment of photosynthesis?

It is necessary to destarch a plant before performing any experiment on photosynthesis because if starch is present it may interfere with the result of the experiment.

7. Why is it not possible to demonstrate respiration in green plant kept in sunlight?

If sunlight is present the CO_2 which is produced in respiration will be used in photosynthesis. So it is not possible to demonstrate respiration in green plant kept in sunlight

8. Give examples:

a) Digestive enzymes:

ptyalin, amylase, pepsin, trypsin, lipase, peptidases, sucrose.

b) organisms having heterotrophic nutrition:

all animals including human-beings.

c) vitamins :

Vitamin-A, Vitamin-B (B-complex vitamins), vitamin-C, Vitamin-D, Vitamin-E, vitamin – K.

d) Nutritional deficiency diseases:

Kwashiorkar, marasmus.

9. Where do plants get each of the raw materials required for photosynthesis?

1. Green plants get carbon dioxide from surrounding atmosphere through stomata of leaves.
2. Water along with minerals absorbed from the soil by their root system.
3. Sunlight is trapped by the leaves with the help of chlorophyll. chlorophyll is available in palisade tissue of leaves

10. Name the three end products of photosynthesis

Glucose**,** oxygen and water are the three end products of photosynthesis.

11. What is the connecting substance between light reaction and dark reaction?

$NADPH_2$ is the connecting substance between light reaction and dark reaction.

12. Most leaves have the upper surface more green and shiny than the lower ones why?

a. The upper surface of the leaves is greener and shiny

because they contain more number of chloroplast on the upper surface and very few on the lower surface.

Due to this reason the upper surface of the leave is thick green in color.

13. What is the role of roughages in the alimentary canal?

a. Roughages are the fibers of carbohydrates or proteins

b. They clean the alimentary canal

c. They avoid constipation

2 Mark Questions

1. Write the differences between autotrophic nutrition and heterotrophic nutrition?

Autotrophic nutrition	**Heterotrophic nutrition**
1.The organism prepare its own food	**1**.The organism doesn't prepare its own food
2.Food is prepared from CO_2, water, and sunlight	**2.**Food can't be prepared from CO_2, water, and sunlight
3.Ex: Green plants	**3.**Ex: Animals

2. Explain the necessary conditions for autotropic nutrition and what are it's by products?

a. Autotrophic nutrition takes place through the process of photosynthesis.

b. Carbon dioxide, water, chlorophyll pigment and sunlight are the necessary conditions required for autotropic nutrition.

c. carbohydrates and oxygen are the by-products of photosynthesis

3. What is the role of acid in stomach?

a. HCL is released in stomach

b. It kills harmful germs of the food

c. It creates an acidic medium, which facilitates the action of pepsin

4. What is the function of digestive enzymes?

Digestive enzymes breakdown the complex food molecules like carbohydrates, proteins and fats into simple molecules like glucose, amino acids and fatty acids

5. What is the role of saliva in the digestion of food?

a. Saliva is a watery liquid secreted by three pairs of salivary glands in our mouth.

b. Food is masticated by our teeth in the mouth and mixed with saliva to make it wet and slippery.

c. Saliva helps in the smooth passage of food through our alimentary canal into the stomach

d. Saliva contains an enzyme called ptyalin, which helps in the breakdown of carbohydrates into dextrins and maltose.

Carbohydrates *dextrins + maltose*

6. What will happen to proteins digestion as the medium of intestine is gradually rendered alkaline?

a. The food coming from the stomach to intestine is acidic in nature.

b. Bile and pancreatic juices render the internal condition of the intestine gradually to a basic or alkaline one.

c. In the alkaline medium, pancreatic enzymes trypsin can act on the food and digests the proteins.

d. The enzymes present in the intestinal juice complete the digestion of proteins into amino acids.

Roughages are the fibers of carbohydrates or proteins

7. How do non green plants such as fungi and bacteria obtain their nourishment?

a. Bacteria and fungi are non-green plants so they can't prepare their own food materials.

b. They are saprophytes which feed on dead and decaying plant and animal bodies.

c. The fungi and bacteria breakdown the complex organic molecules present in dead and decaying matter and convert them into simpler substances outside the body.

d. These simpler substances are then absorbed by fungi and bacteria as their food.

8. If we keep on increasing CO_2 concentration in the air what will be the rate of photosynthesis?

The rate of photosynthesis increases up to a certain concentration of CO_2 .After that there will be no increase in the rate of photosynthesis.

9. **What happens to plants if the rate of respiration becomes more than the rate of photosynthesis**?

If the rate of respiration becomes more than the rate of photosynthesis, the plant is starved due to the lack of food. It gets etiolated and finally it leads to the death.

10. Why do you think that carbohydrates are not digested in stomach?

a. For the digestion of carbohydrates, enzymes ptyalin or amylase are required.

b. The gastric juice produced by stomach doesn't contain the enzyme ptyalin or amylase. It contains only pepsin which digests proteins.

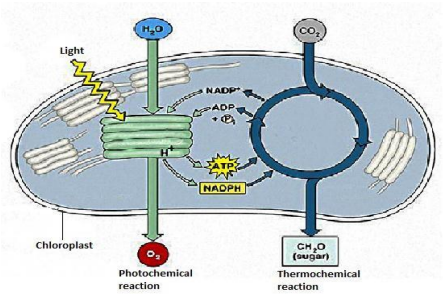
c. Hence carbohydrates are not digested in the stomach.

d. Carbohydrates are digested partially in the mouth and completely in small intestine.

11. **If there were no green plants, all life on the earth would come to**

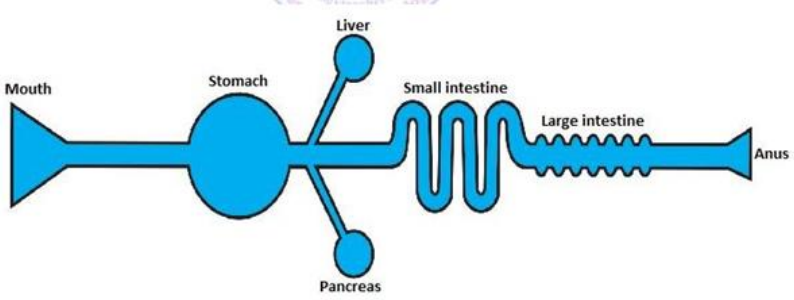
an end! Comment

If there were no green plants on the earth, there will be no food and oxygen. Finally



there will be no life on the earth.

12. **Raheem prepared a model showing the passage of the food through different parts of the alimentary canal. Observe this and label its parts.**



13. Observe the following diagram and write a note on light dependent, light independent reactions

a. Light reaction (light dependent) takes place in the grana of chloroplast in the presence of light.

b. Dark reaction (light independent) takes place in the stroma of chloroplast.

c. ATP and $NADPH_2$ are formed in light reaction.

d. Carbon fixation occurred in dark reaction, ATP and $NADPH_2$ are utilized in this process.

14. What food habits you are going to follow after reading this chapter? Why?

To avoid indigestion of food, and to become healthy, I would follow these food habits.

a. I eat simple and well balanced diet

b. I take food in leisurely manner.

c. I thoroughly masticate the food.

d. I drink plenty of water.

e. I eat high fiber food.

f. I avoid junk food.

g. I don't encourage over eating.

h. I eat fruits and vegetables.
i. I follow one particular time for meals

4 Mark Questions

1. **With the help of chemical equation explain the process of photosynthesis in detail**

Equation:

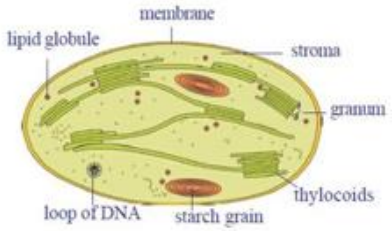
$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{light energy}} C_6H_{12}O_6 + 6H_2O + 6O_2$$

Photosynthesis: It is a photochemical reaction. It occurs in the chloroplasts, in the presence of light. During this process carbohydrates and oxygen are formed.

Requirements: CO_2, Water, Light and chlorophyll.

End products: Glucose, oxygen, water

2. **Explain the structure of chloroplast with a neatly labelled sketch?**



a. The chloroplasts consist of 3 membranes.
b. The 3rd membrane forms stacked like structures called granum. It is the site of trapping solar energy.
c. The intermediary fluid filled portion is called stroma.
d. Glucose is synthesized in stroma and turn as starch

3. **What is malnutrition explain some nutrition deficiency diseases.**

Eating of food that does not have one or more than one nutrients in required amount is known as mal nutrition.

Malnutrition diseases: 1. Kwashiorkor 2. Marasmus

a. **Kwashiorkor disease:**
   i. This is due to protein deficiency in diet.
   ii. Body parts become swollen due to accumulation of water in the intercellular spaces.
   iii. Very poor muscle development.
   iv. They have swollen legs and fluffy face.
   v. They difficult to eat.
   vi. They often suffer from diarrhea
   vii. They have dry skin.

b. **Marasmus:**
   i. This is due to deficiency of both proteins and calories.

ii. Generally this disease occurs when there is an immediate second pregnancy or repeated child births.

iii. They are Lean and week.

iv. They often suffer from diarrhea.

v. They have dry skin.

4. What process you follow in your laboratory to study the presence of starch in leaves?

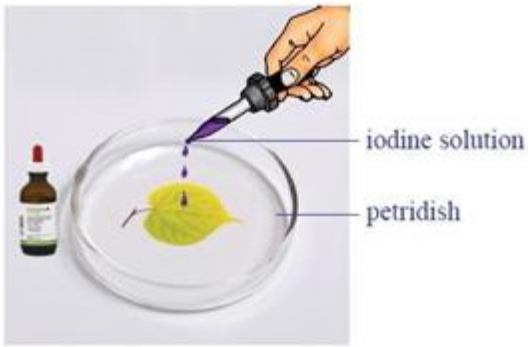
Aim: to prove the presence of starch in leaves

Apparatus: potted plant, beaker, burner, tripod stand, ethanol, asbestos gauge, petri dish, iodine solution.

Procedure:

a. Take a leaf of potted plant. Boil the leaf in the methylated spirit or ethanol over a water bath till it becomes pale white due to the removal of chlorophyll.

b. Spread the leaf in a dish and add a few drops of tincture iodine solution on it.



Observation:

1. The presence of starch will be indicated by a blue-black color

Result: during the process of photosynthesis carbohydrates are synthesized in leaves.

5. How would you demonstrate that green plants release oxygen when exposed to light?

Aim: To prove that oxygen is produced during photosynthesis.

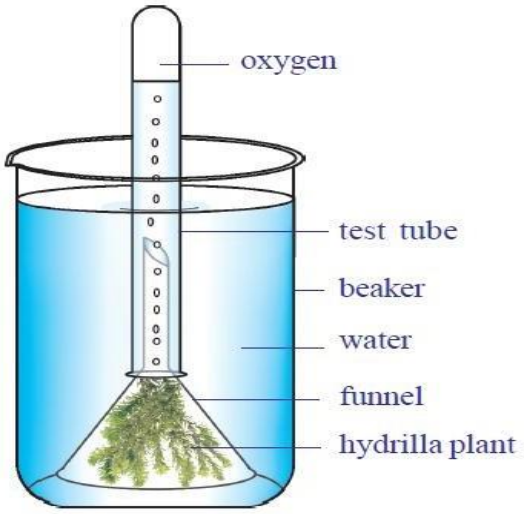
Apparatus: Beaker with water, test tube, funnel, hydrilla twigs, glowing splitter.

Procedure:

a. Place some hydrilla plants in a funnel and keep it upside down in the water of beaker.

b. Invert a test tube full of water over the stem of funnel.

c. Ensure that the level of water in the beaker is above the level of stem of the funnel.



d. Place the apparatus in the sunlight for 3 days.

e. After some time the gas bubbles come from the hydrilla plant. These bubbles are collected at the top of the test tube.

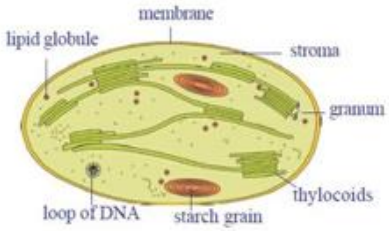
f. After sufficient gas is collected test tube is taken out of the beaker carefully by closing it with thumb.

Observations: When the glowing incense stick was kept in the test tube, it burst into flames.

Result: This shows that oxygen is produced during photosynthesis

6. Draw neatly labelled diagram of chloroplast found in leaf and its role in photosynthesis?

Role in photosynthesis: During photosynthesis several events occur in the chloroplast like:Conversion of light energy into chemical energy.



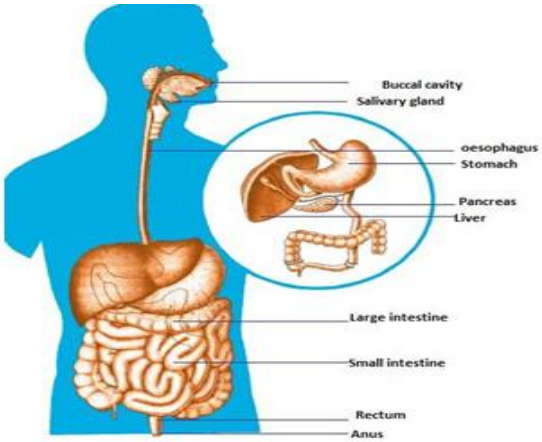
a. Splitting of water molecules.

Reduction of carbon-dioxide to carbohydrates

7. Draw the labelled diagram of human digestive system?

List out the parts where peristalsis takes place?

1.



8. Almost all the living world depends on plants for food material. How do you appreciate the process of making food by the green plants?

a. Only the plants can prepare their food by own.

b. Plants produce carbohydrates and oxygen through photosynthesis.

c. Photosynthesis is a photo chemical reaction.

d. It occurs in the chloroplasts in the presence of light.

e. During this process carbohydrates and oxygen are formed.

f. In this process CO_2, Water and light are participated.

So we can say that if there is no photosynthesis there is no life

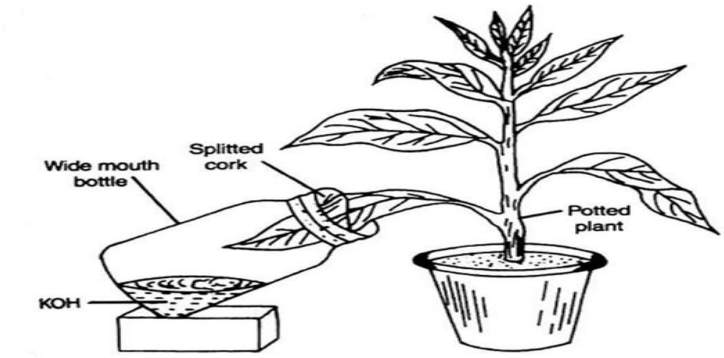
9. Answer the following questions by diagrams showing the experiment.

a. What will you prove by this experiment?

b. What apparatus do you sue in this experiment ?

c. Why do we use KOH solution in this experiment?

Why did we study to leaves in this experiment



A. a) Carbon dioxide (CO2) is necessary for the photo synthesizes.

b) Wide mouthed bottle, split cork, KOH solution, iodine, potted plant.

c) KOH is used for the absorption of CO2 in the bottle

d) We should test two leaves of which one must having the availability of CO2 and other must not behaving the availability of CO2 to prove that CO_2 is essential for the photo synthesis.

RESPIRATION

-The energy releasing system.

A. Half Mark Questions

- Respiration is an energy releasing process, digested food is to be oxidized for the release of energy & heat.
- CO_2 was earlier known as fixed air by Lavoisier.
- Vitilated air mean – Air without oxygen.
- Reparable air is changed in to chalky acid air in lungs.
- A text book of human physiology was written by John Daper a chemist.
- Series of events in respiration are

  Breathing → Gases exchange at lungs → Transport by blood → Exchange at tissue → Cellular respiration.
- We will find vocal cards in Larynx
- Cluster of air sacs in lungs are Alveolus
- Diaphragm contract – Chest cavity increase
- Inter coastal muscles contract – Chest cavity increases
- Respiration is catabolic because of break down of complex molecules
- Epiglottis diverts air into lungs
- Left lung slightly smaller making space for Heart
- Lungs are protected by membranes called pleura.
- Percentage of oxygen decreases in exhaled air relative to inhaled air.
- Percentage of Co2 increases in exhaled air relative to inhaled air.
- Percentages of nitrogen will not change in inhaled and exhaled air
- $Hb + O_2 \rightarrow HbO_2$ takes place in lungs
- $HbO_2 \rightarrow Hb + O_2$ take place in tissue
- At a height of 13 km (8 Miles) above sea level the concentration of O_2 is $1/5^{th}$ at sea level
- Lactic acid is respiratory end product in bacteria
- Ethanol is respiratory end product in yeast
- Respiration is a combustion process - Lavoisier
- One molecule of ATP produce 7200 calories
- Accumulation of lactic acid results in muscle pain
- Total lung capacity of human being is 5800 ml
- Changes in the respiratory systems are due to – change in habitat, body size, availability of water, circulatory system
- Mangroves trees respire with their aerial roots / pnematophores / knees.

- **Matching**

No		
	ıabolic	otosynthesis
	ıtabolic	spiration
	d product of glycolysis	ruvic acid
	iglottis	ıards over the glottis
	robic	karyotic

	aerobic	okaryotic, muscles
	achea	nd pipe
	ATP	00 calories

B. One Mark Questions

1. What is respiration?
   A. Respiration is the process which releases the energy from food.
2. What does the respiration mean ?
   A. The term respiration is derived from Latin word respire which mean “To Breath”
3. What will happen if the respiratory tract is not moist ?
   A. Temperature of inhaled air is not controlled, dust particles not removed.
4. What is the function of epiglottis
   A. It is a cartilaginous flap. Which prevents entry of food into wind pipe
5. What are alveoli? what is its role?
   A. Interior of lung has many small sac like structures called alveoli. They increase the respiratory area of exchange.
6. What is the role of diaphragm?
   A. It is a dome shaped structure between the thoracic and abdominal cavities. Contraction and relaxation of it allows the air into lungs and out of lungs.
7. What is the exhalation?
   A. It is breathing air out off lungs due to decreases in volume of chest cavity.
8. What are pleura?
   A. The two membranes surrounding the lungs. They protect the lungs.
9. Where do respiratory exchange of gases taken place?
   A. 1) Exchange of gases at lungs
   2) Exchange of gases at tissue.
10. What is the internal respiration called as cellular respiration?
    A. Because it takes place at cellular level.
11. Why the mitochondria are called the power house of cell?
    A. The energy release in respiration is stored as ATP in mitochondria.
12. What is Glycolysis?
    A. It is break down of glucose into pyruvic acid.
13. In case of strenuous exercise 4m feel muscle pain. Why?
    A. It is due to accumulation of lactic acid.
14. Why we are advised not to talk while eating?
    A. Because food particles may enter into wind pipe leads to choking.
15. Similarities between respiration and combustion?
    A. Both utilize oxygen both release energy.
16. Difference between respiration and combustion?
    A. **Respiration** :- biological process, energy is released in several stages
    Combustion:- physical process energy is released at a time.
17. Similarities between aerobic and anaerobic process?
    A. Both processes have glycolysis, both process involve release of CO_2 and energy.
18. Difference between aerobic and anaerobic process?

A. **Aerobic**:- Takes place in the presence of oxygen.
CO_2, H_2O are end production.

Anaerobic:- Takes place in the absence of O_2.
CO_2 and alcohol are end products.

C. Two Mark Questions

1. Give difference between inspiration and expiration?

Inspiration	**Expiration**
Breathing in air	Breathing out air
Volume of chest cavity increases	Volume decreases
Muscles of diaphragm and inter coastal contract	Muscles relax

2. why we are advised not to talk while eating? Or food some times enters the wind pipe causing choking. How?

A. i. wind pipe is air passage to lungs.
ii. Opening of wind pipe into pharynx is guarded by epiglottis.
iii. While eating, if we talk epiglottis will not cover glottis. So food enters into trachea.

3. why does a deep sea driver carry oxygen cylinder?

A. oxygen present in water in a dissolves state. We cannot use that dissolved oxygen so they carry oxygen cylinder.

4. what happens if diaphragm is not there?

A. it is a muscle layer between chest and abdominal cavity the contraction and relaxation of muscles of diaphragm helps in change the volume of the chest cavity. It is use full for breathing. (Or) breathing movements will be obstructed.

5. how do you appreciate the mechanism of respiration?

A. i. Respiration is a vital process carried by all living cells.
ii. the way the cells receive oxygen and send out CO_2 is surprising.
iii. the mechanism of breathing is also surprising.

6. How are lungs protected?

A. lungs are protected in a bony ribcage and also covered by double layered pleura.

7. how are the gases transported through blood?

A. i. At the lungs oxygen from air enters into the blood($Hb + O_2 \rightarrow HbO_2$).
ii. At the tissue oxygen from blood enters into tissue ($HbO_2 \rightarrow Hb + O_2$).
iii. CO_2 transport takes in reverse in these places.

8. what is cellular respiration?

A. Oxidation of glucose at the cells for release of energy.

9. if you have a chance to meet pulmonologist, what question do you ask ?

A. i. what are various pulmonary diseases?
ii. what are causes of pulmonary diseases?
iii. what are the precautions to prevent pulmonary diseases?
iv. are pulmonary diseases contagious?

10. after vigorous exercise we feel pain in muscles why? Or what is the relationship between pain and respiration?

A. during vigorous exercise muscles undergo oxygen debt
ii. so they carry anaerobic respiration and produce lactic acid.

iii. this results in muscle pain.

11. plants photosynthesize during day time and respire during night. do you agree?

A. No, respiration is a continuous activity and carried during day and night. So plants respire during night only is wrong.

D. Four Marks

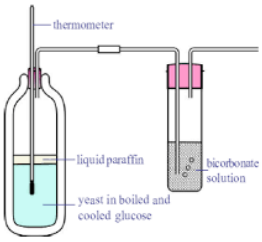
1. Write difference between aerobic and anaerobic respiration. (AS 1)

robic	naerobic
$H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 686$ K.Cal	$H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + 56$ K.Cal
kes places in the presence of oxygen	kes in the absence of the oxygen
O_2 and H_2O are end products	O_2 and alcohol are end products
mplete break down of food	complete break down of food

2. Differences between photosynthesis and respiration? (AS 1)

otosynthesis	**espiration**
$CO_2 + 12H_2O \xrightarrow{Light\ Chlorophyll} C_6H_{12}O_6 + 6O_2 + 6H_2O$	$H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ + 686 K.Cal
O_2 , H_2O are the reactants	$H_{12}O_6$, $6O_2$ are the reactants
$H_{12}O_6$,O_2 are products	O_2, H_2O are products
ght energy is trapped	eat energy is produced
kes place in green plants only	kes place in all living cells
s an anabolic process	s catabolic process

3. Experiment on anaerobic respiration (AS 1)



Testing for production of heat and CO_2 under anaerobic respiration

i. Prepare glucose solution in a glass bottle

ii. Heat it to remove dissolved oxygen

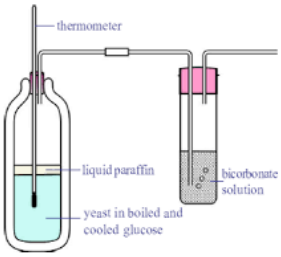
iii. Now put some yeast, supply of oxygen from air can be cut by pouring liquid wax layer on mixer

iv. Add few drops of janus green B to check that oxyen has been removed. The blue dye turns pink when oxygen is in short supply.

v. Arrange for any gas produced by the yeast to go through lime water. Arrange a thermometer too.

vi. Temparature increases, lime water turn white.

4. Observe the diagram and answer the following.(AS 3)



Testing for production of heat and CO_2 under anaerobic respiration

i. What is the aim of the experiment?

j. Why sugar solution is heated?

k. What is the change you notice in the mixture after adding janus green B

l. How can you infer respiration is conducted

5. Answer the following questions? (AS 3)

i. What is the aim of the experiment ?

ii. if dried seeds are used. What is the result?

iii. if lime water beaker is kept outside the bottle what happens?

iv. what is the change you can notice in the lime water

6. Answer the following questions ? (AS 3)

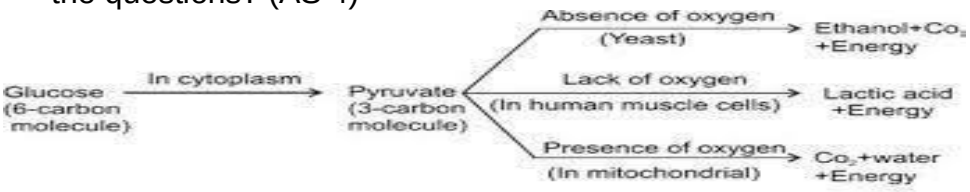
i. What is the aim of the experiment ?

ii. if thermometre bulb is kept out side the seeds. What is the result?

iii. if lime water is also kept inside the bottle, what it infers?

iv. what is your observation in this experiment?

7. Observe the flow chart and answer the questions? (AS 4)



(Break down of glucose by various pathways)

i. What is glycolysis?

j. Where does glycolysis takes place?

k. What are the end products of aerobic respiration?

l. What are the end products of respiration in yeast ?

8. Observe the table and answer the following? (AS 4)

ame of the organism	pe of respiration	spiratory organ
ngle celled organism	ffusion	dy surface

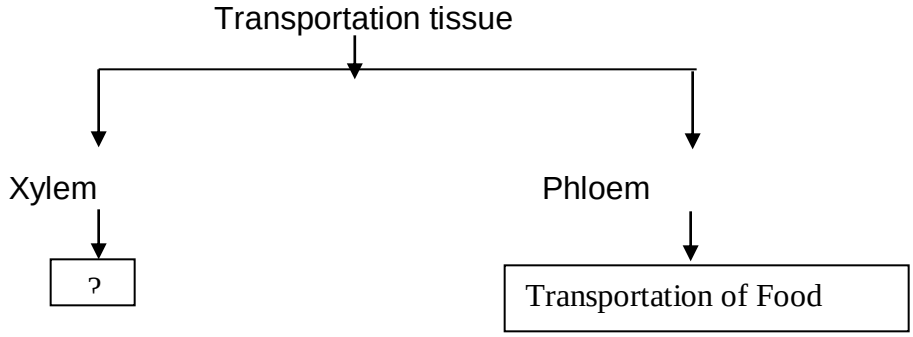
sects	acheal	achea
sh	onchial	lls
og	utaneous and pulmonory	in, lungs
rrestrial animals	lmonory	ngs

i. Respiratory organs in land animals are?
ii. What is the name of the respiration carried out by gills?
iii. In single cell organisms respiratory organs are?
iv. What are the respiratory organs in frog.

UNIT 3
TRANSPORTATION
Gifted Children Material
½ MARK QUESTIONS

1. **Which process plays an important role in obsorption of water by root hair ?**
   Ans: Osmosis
2. **Name the conducting tissue of plants which is made of sieve tubes along with companion calls?**
   Ans: Phloem
3. **The scientist who noticed valves in the leg veins for the first time is _____?**
   Ans: Firolamo Fabrici
4. **What is the name of the device used by the doctors to measure blood pressure ?**
   Ans: Sphygmomanometer
5. **Name the enzyme that involves in this reaction ?**
   Fibrionogen ____? ⟶ Fibrin
   Ans: Thrombin
6. **Which valve is present in between the left atrium and left ventricle?**
   Ans: Mitral Valve
7. **Which Vitamin is responsible for the clotting of blood?**
   Ans: Vitamin – K
8. **Which substance is commonly used in blood banks to prevent clotting of blood ?**
   Ans: Heparin.
9. **Which part of your wrist is pressed by a doctor to examin the pulse rate?**
   Ans: Artery
10. **Which group of animals consists of highly branched digestive system?**
    Ans: Platy helminthes
11. **Give Example for open type of circulatory system?**
    Ans: Arthropoda or Molluscs
12. **What to you call the two layered membrane that covers the heart?**
    Ans; Pericardium
13. **Blue colour blood : Snail :: white colour : _____?_____**
    Ans: Cockroach

14.Complete this flow chart



Ans: Transportation of Water

15.What is the name of the straw coloured fluid after formation of blood clot?

Ans: Serum

1 MARK QUESTIONS

1.What are the three main types of blood vessels in the body?

Ans: The three main types of blood vessels in the human body are arteries, veins, capillaries.

2.Which is the largest artery in the body?why is it big in size?

Ans: The Aorta is the biggest artery in the human body. The aorta is big in size because it has to supply oxygenated blood to all the body parts except lungs.

3.Which blood vessel carries blood for oxidation?

Ans: Pulmonary artery carries blood for oxidation.

4.Name the structures which are present in veins and lymph ducts and absent in arteries?

Ans: Valves are present in veins and lymph ducts and they are absent in arteries.

5.What is cardiac cycle?

Ans: One contraction and one relaxation of atria and ventricles is called one heart beat .series of events take place between one heart beat to beginning of the next

6.What is lymph?

Ans:Lymph is a colour less fluid circulated in lymphatic vessels .it contains leucocytes .and RBC , plasma proteins are absent

7.What is single circulation?

Ans: If the blood flows through heart only once for completing one circulation it is called single circulation.Ex:Fish

8. What is double circulation?

Ans: If the blood flows through heart twice for completing one circulation it is called double circulation.Ex:Frog and higher

animals.

9. What is hypertension?

Ans: People who have B.P more than 120/80 during rest period are said to have hypertension.

10.**What happens blood platelets are absent in blood?**

Ans: blood clotting cannot be takes place.
So bleeding from the injuries occurs continuously leads to death.

11.What haeepns if there are no valves in the Heart ?

Ans:

- The valves between each atrium and its ventricles are one way valves. They allow the blood to flow from atrium to the ventricles without any hindrance, back flow of blood is stopped.
- If there are no valves in the heart, blood flow will not be proper heart can not pump the blood properly into the blood vessels.

2 MARK QUESTIONS

1.Write differences between systole – diastole?

Ans:

Systole	Diastole
❖ It measures the amount of pressure that blood exerts on arteries when the heart is contracted. ❖ Normal range is 90 – 120mmHg. ❖ Ventricles are contracted	❖ It is the pressure that is exerted when the heart is relaxed. ❖ Normal range is 60–80mmHg. ❖ Ventricles are relaxed

2. **Two persons blood pressure is like this;**

1. Sitha_ 140/80

2.Githa_ 110/90

Whose blood pressure is high? What does it indicate?

Ans: The normal Blood pressure is 120/80.Here 120 indicates systolic pressure, 80 indicates diastolic pressure.Sitha B.P is 140/80.So she has high blood pressure.

3.By the information provided by scientist William Harvey,complete the following table.

S.No	Vessels Structure	Artery	Vein

1	**Thickness of walls**		
2	**Values**		
3	**Pressure in the Vessels**		
4	**Direction of blood flow**		

Ans:

S.No	Vessels structure	Artery	Vein
1	Thickness of walls	Thick	Thin
2	Valves	Absent	Present
3	Pressure in the vessels	High	Low
4	Direction of blood flow	Heart to Organs	Body organs to heart

4. What is the use of platelets ?

Ans:

1. Blood platelets play an important role in blood clotting.
2. When the blood vessel is injured,, the platelets collect the site of the injury and form a plug.
3. This reduces the loss of blood to some extent
4. They also release several factors into the blood which help in blood clotting and in the repair and healing of blood vessels.

5. What is root pressure ? How is it useful to the plant?

Ans:

1. Root pressure: Root pressure is osmotic pressure within the cells of a root system that causes sap to rise through a plant stem to the leaves.

2. Uses: Root pressure develops due to the absorption of water by roots and pushes the water upwards by few meters and is enough to supply water to leaves in small plants and small trees.

6.Suggest some precautions to avoid cardiac problems ?

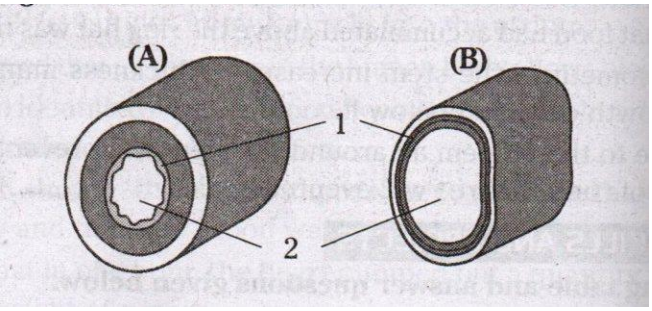
OR

What changes would you like to bring in your life style to avoid cardiac problems ?

Ans:

- Avoid heavy fat food and junk food.
- Try to spend stress free life as stress leads to cardiac problems.
- Keep away from bad habits like smoking and alcohol consumption.
- After 40 years, yearly twice I will consult cardiologist.

7. The diagram given below shoe cross section of two kinds of blood vessels.



1.Identify the blood vessels A and B. in each case, give reasons to support your answer ?
2. Name the parts numbered 1 and 2.

Answers:

1.'A' is T.S. of artery and 'B' is T.S. of vein. Artery walls are thick. Veins walls are thin.
2.Part 1 is muscle layer and 2 is lumen.

8.How did you prepare a match-stick Stethoscope in your school?
Ans:

- Take a shirt button
- Insert a matchstick into the button
- Place it on wrist.
- We have to observe the movements of the matchstick.

9.**After reading the functions of lymphatic system, what precautions you would suggest to your elders about Edema ?**

- Should not sit in the same position for long time.
- Should move legs frequently.
- Should sit in a up right position.
- Take low salt diet.

10.What will happen if pulmonary veins are tied with a thread ?
Ans: Pulmonary vein brings oxygenated blood from the lungs and open into left auricle. If the pulmonary veins are tied with a thread the oxygenated blood will not supply to the heart and body parts from the lungs. Hence the person will die because of lack of oxygen.

4 MARK QUESTIONS

1.Write the difference between xylem and phloem

Xylem	Phloem

1. It transport water and minerals from roots to the apical parts the plant. 2. Xylem consists of tracheids, vessels, xylem fibres and xylem parenchyma. 3. Conduction of water is unidirectional.	1. It transport food material from the leaves to growing parts of the plant. 2. Phloem consist of sieve tubes ,sieve cells, companion cells, phloem fibres and phloem parenchyma. 3. Conduction of food material is bidirectional.

2. Observe the table given below and analyze the questions.

Name of the animal	Weight of the body	Weight of the heart	No of beats/min
Blue Whale	1,50,000kg	750kg	7
Elephant	3,000kg	12-21kg	46
Man	60-70kg	300gm	76
Coaltit(Bird)	8gm	0.15gm	1200

a) Why heart beat is less in animals with more weight ?

Ans:The animals with more weight usually have heavy weight hearts.In these animals,it takes time for reaching high amount of blood to circulatory system.Hence the heart beat is less in animals with more body weight.

b) In which animal the heart beat rate is very slow ?

Ans: Blue Whale

c) Is there any relation between weight of the body and heart beat rate ?

Ans:Yes.There is relation between body weight and heart beat rate.If the body weight is more,heart beat rate is less.If the body weight is less,heart beat rate is more.

d) Why the weight of heart is less than body weight ?

Ans:As all the body parts constitute the whole organism,the heart one of the organ is usually has less weight than body weight of an animal.

3.To study the internal structure of the mammalian heart you have observed the longitudinal section of sheep heart in your lab. Now answer the following questions.

a) Is the thickness of the wall of the heart is uniform throughout ?

b) How many chambers are there in the heart ? What are they ?

c) How are the chambers connected to each other ? How are they separated ?

d) How is the heart protected from mechanical shocks ?

Answers:-

a.Ans: No

b.Ans: There are four chambers in the heart. 2 Auricles(Atria), 2 Ventricles

c.Ans: Chambers are connected by the valves and separated by septa.

d.Ans: Pericardium and pericardial fluid.

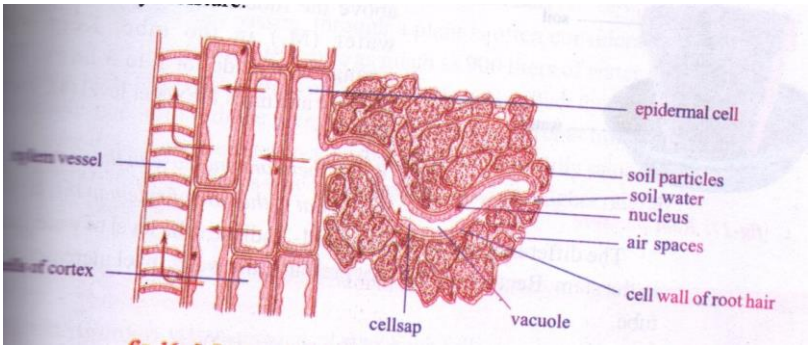
4.Expalin the way how plants get water by osmosis through root hair.

OR

Expalin the mechanism of entry of water into root hair by osmosis with the help of a diagram.

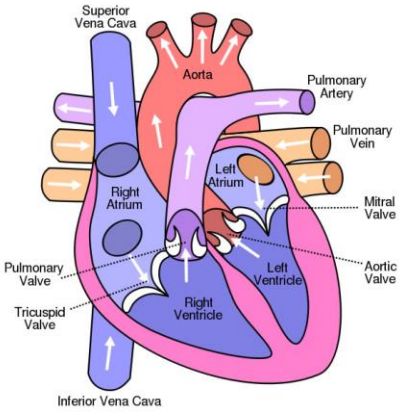
OR

Explain the process of water entry into the root hair in plants with the help of diagram .



1. The soil water is an extremely dilute solution of salts.
2. Soil water concentration is more dilute than that of the cell sap in the root hair.
3. Therefore water will pass into the vacuole of the root hair by osmosis.

5.Observe the diagram and answer the following questions



i.What are the chambers that present in the heart?

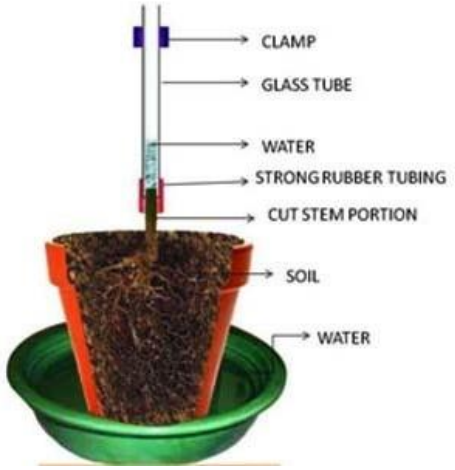
ii. What are the blood vessels that carry blood to all the body parts?

iii. What kind of blood do the Pulmonary arteries carry to the lungs?
iv. What are there in the Veins to allow the blood to flow in one direction ?

Answers:

i.Left atrium, Left Ventricle, Right atrium, Right Ventricle,
ii.Arteries, Aorta
iii.Deoxygenated blood
iv.Valves

5.Observe the diagram and answer the following questions



1.What is the aim of this experiment ?
2. What are the apparatus required in this experiment?
3. Why is the glass tube connected to the stem ?
4. What is the inference can you draw from the above experiment ?

Answers:

1. To demonstrate root pressure in plants
2. Potted plant with stem cut, rubber tube, glass tube, clamp.
3. To observe easily the water level through glass tube.
4. To raise in the water level is due to the root pressure created in the plants.

6.Differentiate between vessels which carries deoxygenated blood and oxygenated blood ?

OR

Differentiate between which have large lumen and small lumen ?

OR

Differentiate between veins and Arteries

Ans:

Veins	Arteries
Moves towards the heart	Moves away from the heart

Collects blood from body organs	Distributes blood to the body organs.
Valves are present.	Valves are absent.
Carry deoxygenated blood, except pulmonary vein	Carry oxygenated blood except pulmonary artery.
Veins start in blood capillaries.	Arteries end in capillaries.
They can be seen subcutaneously	They are deep seated
Veins are further divided into venules	Arteries are further divided into arterioles.

7.Venki got injured while playing Kabbadi, His blood clotted within 6 minutes. Write the procedure involved in it?

Ans:

- When the blood flows out from injuries, the platelets release an enzyme called thrombokinase.
- Thrombokinase acts on inactive prothrombin and coverts into thrombin.
- Thrombin converts the soluble fibrinogen into insoluble fibrin fibers.
- The blood cells entangle in the fibrin fibers forming the clot.

OR

Platelets ⟶ Thrrombokinase
Prothrombin ⟶ Thrombine
Fibrinozen ⟶ Fibrin

UNIT 4
EXCRETION -THE WASTAGE DISPOSING SYSTEM

½ Mark Questions:

1. **If you drink more water , will you pass more urine?**

A. Yes, If we drink more water , will you pass more urine.

2. **What are the other excretory organs of human body ?**

A. Lungs, skin, liver are the other excretory organs of human body.

3. **Why is urine yellow in colour?**

A. Because of urochrome, urine is yellow in colour.

4. **What is uraemia?**

A. If kidneys stop working completely , our body is filled with extra water and waste products. This condition is called uraemia.

5. **How is urea produced in lives?**

A. By the deamination of proteins urea is formed in liver.

6. **Give two enamellers for gum yielding plants?**

A. Neem and Acacia

7. **What are the processes used by plants to get rid of excess water?**

A. Transpiration and guttation

8. **How do unicellular organisms remove waste products?**

A. Diffusion from the body surface to the surrounding water.

9. **Why does the ingestion of alcohol increase urination?**

A. Alcohol inhibits the secretion of vasopressin pituitary. That is why when it is drunk to excess the person urinates too much.

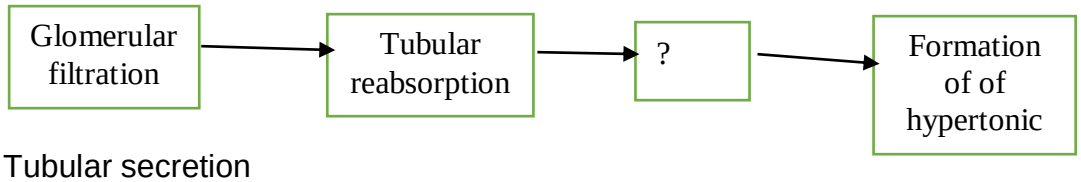
10. **What would happen to amoeba if osmoregulation did not take place?**

A. If osmoregulation did not takes place, the organism would get flooded with water and burst.

11. **What might be reason for getting odour when potted plant shift from its place?**

A. Plants excrete small amount of waste material is surrounding of its roots.

12. **Fill the flow chart of urine formation**



A. Tubular secretion

13. **Skin: Sweat: : Lungs:**_____

A. Co_2

14. **Write the correct pathway of urine.**

A. Kidneys------→ Ureters -----→ Urinary bladder -------→ Urethra

15. **What are the excretory organs of Arthropods?**

A. Malpighian tubules, green glands

16. **What are the excretory organs of phylum platy helminth's?**

A. Flame cells

17. **Which principle involved in dialysis?**

A. Osmosis and filtration

18. **Expand ESRD.**

A. End Stage Renal Disease

19. **Bio diesel is extracted from the latex of which plant?**

A. Jatropa

1-mark questions:

1.What is excretion?

A. Excretion is a biological process involved in separation and removal of wastes from body.

2. What happens if harmful products are not removed from our body every day?

A. If the waste materials which are harmful are not removed from our body everyday it leads to diseases.

3. Which arteriole has more diameter, afferent or efferent?

A. Afferent arteriole has more diameter than efferent arteriole.

4. Think why the diameter of the efferent arteriole is less than that of the afferent arteriole?

A. The diameter of the efferent arteriole is less than afferent arteriole so as to create pressure in the glomerulus to filter the waste materials. Due to this blood remains in glomerulus more time.

5. If you drink more water, will you pass more urine?

A. Yes, if we drink more water, more urine is produced and we pass more urine.

6.Why are we advised to take sufficient water?

A. It is advised to take sufficient water because the filtrations of waste products become easy and there is a free flow of urine including salts. And also, body temperature will be maintained.

7. Write the healthy habits which you practice to protect your kidneys from diseases?

A. (i) Drink plenty of water
(ii) Drink more fruit juices
(iii) Eat low salt diet that saves kidney life.

8. Write two slogans to popularize the awareness on organ donation.

A. Slogans about organ donation
(i) Organ donation saves life
(ii) Give a life, gift of life
(iii) Donate organs today for better tomorrow.

9. When you are on a field trip, your friend collected a sticky substance oozed out by a plant called gum. what are the plants you observe which give gum?

A. Acacia, Neem, Drumstick are the gum yielding plants present is our surroundings.

10.Why plants shed leaves and barks at specific time?

A. Some plants store waste materials is leaves and barks to dispose the waste they shed leaves and barks.

11. Imagine what happens if waste materials are not sent out of the body from time to time?

A. Wastes become toxic and the organism dies.

12. To keep your kidneys healthy for long period, what question will you ask a he prologist?

A. (i) How can I prevent formation of stones IN KIDNEY?
(ii) How diabetes harm kidneys?

13. How is rubber prepared?

A. Rubber is prepared from the later of heveaBrasiliensis.

14. Deepak said that “Nephrons are functional units of kidneys” how will you support him?

A. I support deepaks statement that nephrons are functional units of kidneys because Nephrons eliminates the wastes from the body regulates blood volume and blood pressure controls levels of electrolytes and metabolites and regulates blood PH.

15.The substances produced in plants are of two types, primary metabolites and secondary metabolites. Give an example for each type.

A. Primary metabolites are- Carbohydrates, fats, proteins.
Secondary metabolites are- Alkaloids, tannins, resins, gene’s, latex etc.

16. Why is urine yellow in colour?

A. Because of urochrome, urine is yellow in colour, it forms in the lives from dead RBC.
17. Why are weeds and wild plants not affected by insects and pests?
A. Some plants like weeds and wild plants prepare chemicals which are unpleasant to taste and some chemicals which are unpleasant to taste and some chemicals are toxic and may even kill so insects and pests do not touch them.
18. What are the processes used by plants to get rid of excess water?
A. Transpiration and guttation.
19.When you are on a field trip, you might have collected some plants which contain alkaloids. Name the alkaloids which are harmful to us?
A. Scopolamine, Cocaine, Nicotine.
20. Which plants is your surroundings are useful for the production of medicine?
A. Neem, Calotropis, Tulasi, Acasia, Blackberry, Achyranthus.
21. Which hormone is secreted when concentrated urine to be passed?
A. Vasopressin.
22. What is haemodialysis?
A. Filtering the blood of a person whose kidneys are damaged with dialysis machine is called haemodialysis.
23. What is the osmoregulatory organelle in amoeba and paramecium?
A. Contractile Vacuole
24. Why more urine is produced in winter?
A. (i) When we are in cold environment, blood flow into our internal organs is increased to keep our organs warm.
(ii) The increase in the blood flow to the kidneys causes more blood to be filtered. Thus, more urine is produces in winter.
25. People in cold countries get very less/ no sweat. What changes occur in their skin and in other excretory organs.
A. In cold countries due to cool environment, the blood vessels are narrow and sweat production is reduced or no sweat. Thus, the skin keeps the body warm.
26. What are the defensive mechanism developed by plants of your village to product themselves from the herbivore? Give two examples.
A. Plants produce nitrogenous compounds to protect themselves from the herbivores. These compounds are called as alkaloids. For example
Datura -it produces alkaloid known as scopolamine.
Cactus: Develop spines on the body.
27. What are the substances present in urine?
A. Substances present in urine are proteins, creatinine, calcium, phosphorous, uric acid etc.
28. What are the substances that need to be removed from body?
A. Creatinine, uric acid, urea, cholesterol and calcium.
29. What are the other excretory organs of human body?
A. Lungs, skin, liver are the other excretory organs of human body.
30.Give the names of plants that emit milky substances from their parts?
A. Calotropis, Sapota.
31.Do cells need excretion?
A. Yes, the cells need excretion to keep all the body organs healthy and function properly.
32. Why do some children pass urine during sleep at night until 15 to 16 years age?
A.(i) some children wet the bed because do not make enough level of vasopressin.
(ii) Physical or emotional problems
(iii) stressful situations
(iv) Hereditary
(v) The capacity of the bladder may be reduced.

33.Do you think is there any relation between excretion and secretion?
A. Excretion and secretion are the same in nature.
i. Excretion is the removal of materials from a living being, while secretion is movement of material from one point to the other.
ii. Secretions is active while excretion is passive in nature.
34.What is latex?
A. Latex is a sticky, milky white substance secreted by plants.
Ex: Calotropis, Heveabraziliensis.
35. What is uremia?
A. If kidneys stop working completely our body is filled with extra water and waste products. This condition is called uraemia.
36.What happens if reabsorption of water does not take place?
A. If the reabsorption of water does not take place all the useful materials and large amount water is excreted through urine and the person feels weak.

Or

Our body is filled with water and hand feet may swell.
37. What are the organs that can be transplanted from brain dead patients?
A. Kidney, liver, heart, lungs, pancreas, skin, eyes(cornea).
38. what is cadaver transplantation?
A. The process of transplantation of organs from brain dead patients to another is called cadaver transplantation.
39.What would happen to amoeba if osmoregulation did not taken place?
A. If osmoregulation did not takes place, the organism would get flooded with water and burst.
40. Why do we get peculiar smell when you shift the potted plants?
A. When we shift the potted plant we get smell due to some peculiar secretions are secreted and send out from roots into soil.
41. Why does the ingestion of alcohol increase urination?
A. Alcohol inhibits the secretion of vasopressin by the pituitary. That is why when it is drunks to excess the person urinates too much.
42. How do unicellular organisms remove waste products?
A. Diffusion from the body surface to the surrounding water.

2 marks questions:

1. Collect the information about user of different kinds of alkaloids, take help of library.

A. Common alkaloids in plants and their user are

Alkaloid	**Part of the plant**	**Uses**
Quinine	Bark	Anti Malarial drug
Nicotine	Leaves	Insecticide
Morphine, Cocaine	Fruits	Pain Killer
Caffeine	Seeds	Central nervous system stimulant
Pyrethroids	Flowers	Insecticides
Scopolamine	Fruits, flowers	Sedative

Analyse the following information and answer the questions :(4 marks)

1. Which parts of the plants are used as alkaloids
2. What are the alkaloids which are used to control the diseases that occur in plants.
3. Name the parts of the plant from which we get alkaloids used as sedative.

4. Name the alkaloid which is used to prevent malaria.

a. The plant parts used as alkaloids are bark, leaves, fruits, seeds, flowers.

b. Pyrethroids are the alkaloids used as insecticides to control the diseases that occur in plants.

c. The fruits and flowers of scopolamine alkaloid are used as sedative.

d. The alkaloid used to prevent malaria is the bark of quinine.

2. Collect the names of gum yielding plants and the use of gum from the internet.

A. (i) Plants like neem, Acacia oozes out a sticky substance called gum when branches are cut.

(ii) The gum swells by absorbing water and helps in the healing of damaged parts of a plant.

(iii) gums are economically valuable used as adhesives and binding agents in the preparation of medicines food etc.

3. How are waste products are excreted in amoeba?

A. (i) Special excretory organs are absent in amoeba

(ii) Amoeba possess osmoregulatory organelle called contractile vacuole.

(iii) It collects water and wastes from the body swells up, reaches the surface and bursts to release its content to outside.

(iv) The main excretion taken place through body surface by simple diffusion.

(V) The waste material carbon dioxide is removed by diffusion through the cell membrane.

4. Diameter of afferent arteriole is bigger than efficient arteriole give reasons

A. The afferent arteriole is a nephron has a larger diameter than the outgoing efferent arteriole and this rinse the blood pressure in the glomerulus capillaries lead to the ultrafiltration of the blood in the bowman's capsule.

5. What are the differences between excretion and secretion

A. Excretion:

1. It is the removal of natural from a living being.
2. Excretion is mostly body wastes.
3. Ex: Tears, Urine, Co2 and sweat.

Secretion:

1. It is movement of material from one point to other point.
2.Secretion is important materials that can be metabolized and used by our body.
3.Ex: Enzymes, hormones, saliva.

6. Draw a block diagram showing the pathway of excretory system in human being.

A. Renal artery ----->afferent arteriole-→glomerculus-→ Bowman's capsule→ PCT→ loop of Henley-→ DCT-→ CD-→ Pyramid→ Calyces-→ Pelvis-→ ureter→ Urinary bladder -→ urethra→ outside.

7.Imagine what happens if waste materials are not sent out of the body from time to time? (OR) Hypothesis what happens if end products which are not useful to body are not sent out of the body?

A. 1. If waste materials are not sent out of the body flow time to time they get accumulated in the body.

2. The accumulation of toxic—astes in the body harms an organism.

3. If all the waste released is not sent out the waste gets stagnated, produce toxins and poisons which pollute the body. They lead to death of the organism.

8.To keep your kidneys healthy for long period what questions will you ask a nephrologist/urologist?

A. i. Does renal failure hereditary?

ii. How can I prevent formation of stones in kidneys.

iii. How does diabetes harm kidneys?

iv. What is the normal functioning of kidney?

v. What are the kidney function tests?
vi. What is smoking bad for the kidneys.
vii. What are the symptoms of kidney failure?
viii. What are the different types of kidney diseases.

9.By taking two plants of your surroundings as examples, explain how they protect themselves against the animals which eat them.

A. (i). Neem tree: Neem leaves contain an alkaloid nimbin to protect themselves from the animals which eat them.
(ii)Cactus: They have thorns to protect themselves.
(iii) Datura: Datura leaves gives bad odour.

10. Do you find any relationship between circulatory system and excretory system? What are they?

A. Yes, there is co-relation between circulatory systems and excretory systems.
1. If there is no supply of blood from circulatory system to excretory system there will be no source for the excretory system to perform filtration.
2. Circulatory systems may not supply purified blood to all the organs of the body without excretory systems**.**

11. When urine is discharged in beginning it is acidic in nature later it become alkaline?

A. It is acidic in the beginning but becomes alkaline on standing due to decomposition of urea to form ammonia.

12. Urine is slightly thicker in summer than in winter?

A. In summer, we loose lots of water in the form of sweat, so the kidneys reabsorb more water from the urine making it more concentrated.

4 marks questions:

1. what are the secondary metabolites of plants? What are its uses?

(or)

Explain waste materials of plants and their economic importance with examples. (or) Explain the uses of secondary metabolites of plants in our daily life.

(or)

Plants are giving not only food but also useful waste material to prove this statement give the evidences.

A. The materials which do not require for normal growth and development are secondary metabolites
Ex: Alkaloids, Tannins, Resins, Gums and Latex
(a) **Tannins:** used in tanning of lether and in medicine.
(b) Resins: Used in varnishes. eg: Pinus
(c) Gums: Used as adhesives, binding agents, preparation of medicines etc.
Eg: Neem, Acacia.
(d)Latex: Rubber from hevea Brasiliense's, bio diesel from jatropa.
(e)Alkaloid: Used as anti-material drug.
Insecticide, pain killer, medicine for snakebite, antiseptic, sedative, insecticides.

2. What are the gum yielding trees in your surrounding what procedure should you follow to collect gum from trees.

A. 1. Gum yielding plants: Neem, Acacia,
2. Gum is collected from the green yielding tress by stripping of the bark of them.
3. We should make the strips in alternate rows.
4. We can get a large quantity of gum within first 24 hours of stripping.
5. The secretion of gum is continued up to days , The gum solidifies in the form of gum tears.

6. Freshy secreted gum is collected from different alternative strips and they are dried un the sun for 10-15 days.

7. The gum is based on its colour and purity. Then it is packed.

3. Collects the information about excretory system in different animal phyla from internet or library. (or)
Write information in tabulation form of different phyla and excretory system in animal Langdon.

A.

Name of the phyla's organism	**Excretory system**
Protozoa	Simple diffusion from the body surface into the surrounding water
Porifera and coelenterate's	Water bathes almost all their cells
Plant helminth's	Flame cells
Nematoda	Rehhette cell
Annelids	Nephridia
Mollusca	Meta nephridia
Echinodermata	Water vascular system
Reptile, birds, mammals	kidneys

4. Excreting wastes from the human body not only by kidney but also by other organs help you. How do you support it?

A.

Accessory excretory organ	**Excretory materials**
Lungs	Co2 and water
Skin	Sweat and metabolic waste(sebus)
Liver	Bite Pigments
Large intestine	Excess of salts of calico's magnesium and iron are excreted along with faecal matter

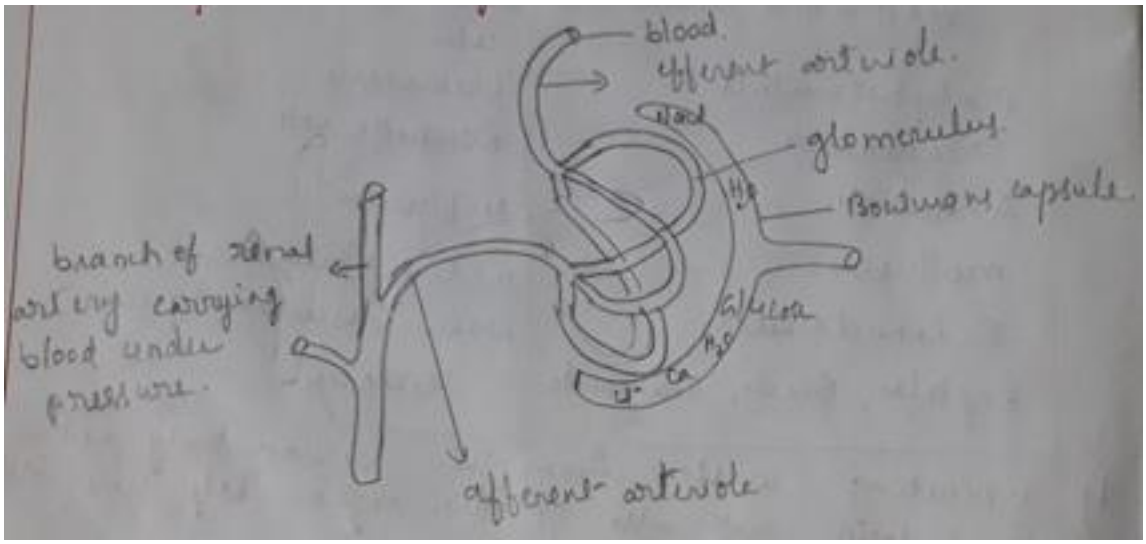
1. Kidneys filters blood and eliminate nitrogenous wastes.
2. Lungs remove co2.
3. Skin excretes sweat contain excess water and salts.
4. Liver eliminates bite pigments.
5. Large intestine eliminate excess salts of calcium, magnesium and iron.
6. Lacrimal glands excrete small amount of nitrogenous wastes through tears.

5. Deepak said that "Nephrons are the functional units of kidneys"-how will you support live?

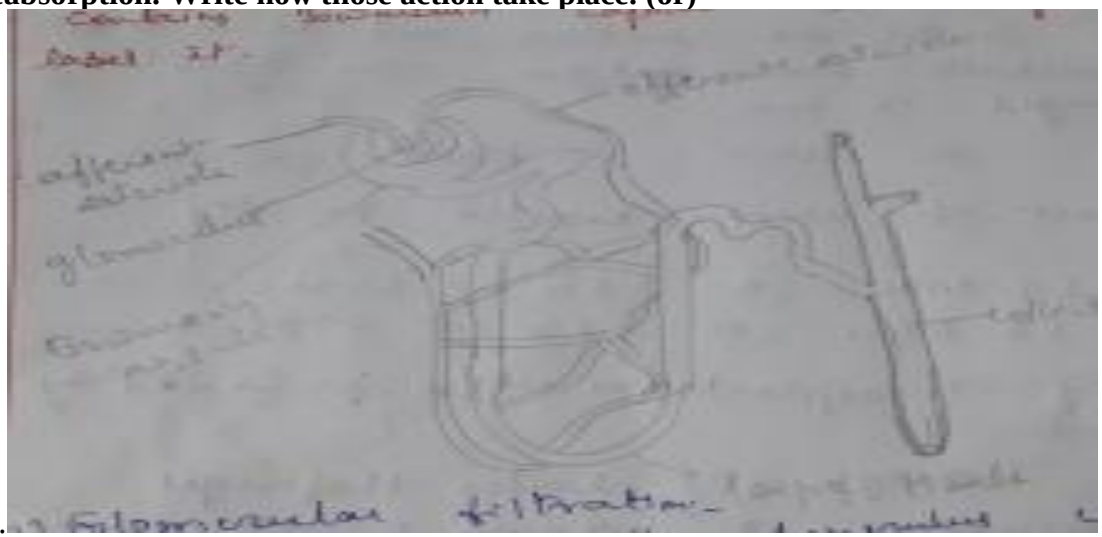
A.I support Deepak's statement that nephrons are functional units of kidneys because
(i) Nephron's chief function is to regulate the concentration of water and soluble substances like sodium salts by filtering the blood reabsorbing what is needed and excreting the rest is urine.

(ii) Nephrons eliminate wastes from the body, regulate blood volume and blood pressure, controls levels of electrolytes and metabolites and regulate blood PH.
Hence, Nephrons are functional units of kidneys.

6. If you want to explain the process of filtration in kidney, what diagram you need to draw?



7.Draw the diagram of nephron and recognize the parts of glomerulus and tabular reabsorption. Write how those action take place. (or)

A. 

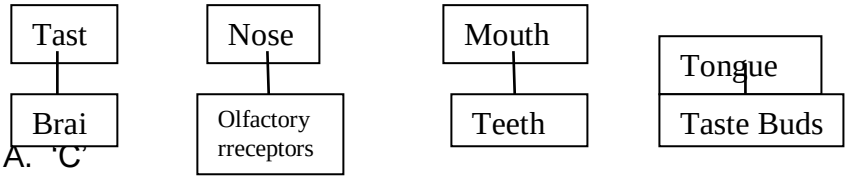
1. Glomerular filtration:
Blood flows inside the glomerulus under the influence of pressure due to the broadness of different arteriole. As a result it undergoes ultrafiltration waste molecules, nutrient molecules and water are filtered.
2.Tubalar reabsorption:
The peritubular capillaries around proximal convoluted tubule reabsorb all the useful components of primary urine such as glucose, amino acids, potassium, calcium, sodium chloride and 75% of water.

UNIT-5
CO-ORDINATION

½ Marks:

1. **Find out the wrong in the flow chart:**

(A) **(B)** **(C)** **(D)**

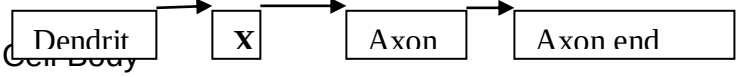


A. 'C'

2. **Which is the largest part of the brain.**
   A. Cerebrum
3. **Read the sentence and correct.**
   The nervous system that embedded in the walls of alimentary canal is called fore brain.

A. Secondary brain

4. **With what maximum speed does nerve transmission occur form stimulus to receptor?**
   A. 100m/sec
5. **Electrical impulse travels in a neuron from dendrite to Axon end. What is X?**



A. Cell Body

6. **Which gland acts as exocrine and endocrine gland .**
   A. Pancreas
7. **In which direction the folding the leaves take place?**
   A. The folding of the leaves takes place inward direction.
8. **Which gland is attached to the excretory system ?**
   A. Adrenal gland
9. **Which is in correct?**
   A. Central nervous system- Brain Spinal cord
   B. Peripheral nervous system- Somatic and autonomous
   C. Somatic nervous system- Sympathetic and para sympathetic
   D. Autonomous- Sympathetic and para sympathetic

A. 'C'

10. **Identify the mismatched**
    1. **Auxin - Latin word**
    2. **Auxin- to increase**
    3. **Phyto- Plant**
    4. **Tropism- movement**

A. Auxin- Latin Word

11. **What is enteric nervous system?**

A. The nervous system in the gut is called enteric nervous system.

12. **Miss matched identify the mismatched**
    1. **Lungs- Pleural fluid**
    2. **Brain- Amniotic fluid**
    3. **Foetus –Cerebrospinal fluid**
    4. **Heart- Pericardial fluid**
    A. Brain –Amniotic fluid
    B. Foetus- Cerebrospinal fluid

1 marks:

1. **Complete the following table:**

No	ɔncept	ırt
	ˈe Brain	ɔtic
	d Brain	
	nd Brain	

2. Define the term brain dead.

A. The complete and irreversible loss of brain and brain stem function is termed as brain dead.

3. The surface of the cerebrum has many folds they appear as elevations 'X' and depression 'Y'. What are X and Y?

A. X-gyri, Y-Sulci

4. All overbody functions are under direct control of brain and spinal cord. Do you agree with this? Why?

A. Reflex actions are not under the control of brain even though it is also sent to the brain along with spinal cord. Apart from these all other functions of our body are in direct control of the brain and spinal cord.

5. When we stop on a sharp object we immediately withdraw our leg. What is this called? What are the neurons that participate in this?

A. This is called reflex action. Senory neurons, motor neurocy,association neurons.

6. What Is Synapse? How Is It Useful In Transfer Of Information?

A. Synapse is the functional region of contact between two neurons.

7. Give Examples For Stimuli?

A. Light,heat,cold,sound,taste,touch,pressure,pain,water and force of gravity etc.

8. What Is Target Tissue?

A. The tissue(or) organs on which hormones act are called target tissues (or) organs.

9. Which Cranial Nerve Controls The Cardiac Muscles ?

A. vagus nerve

10. Which cells secrets insulin hormone ?

A. Islets of Langerhans cells of pan crease

11. Who Discovered The Plant Hormone Auxin?

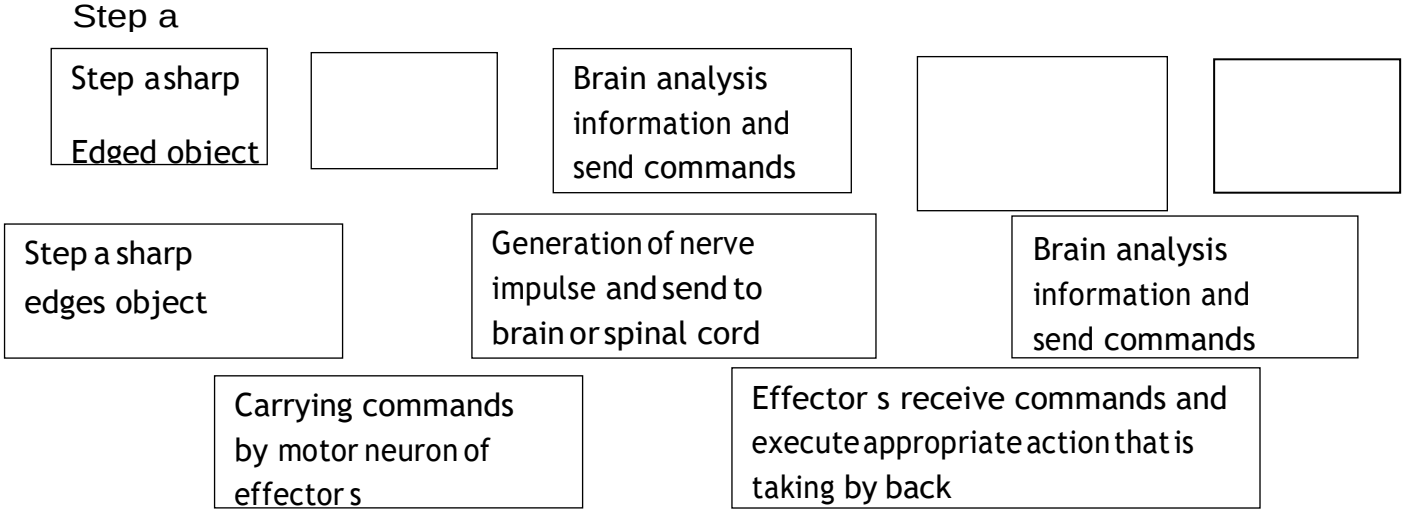
A. F.W.WENT

12. What is the structural and functional unit of nervous system?

A. Neuron (or) Nerve cell.

2 Marks:

1. Fill In The Missing Sections In The Following Flow Chart



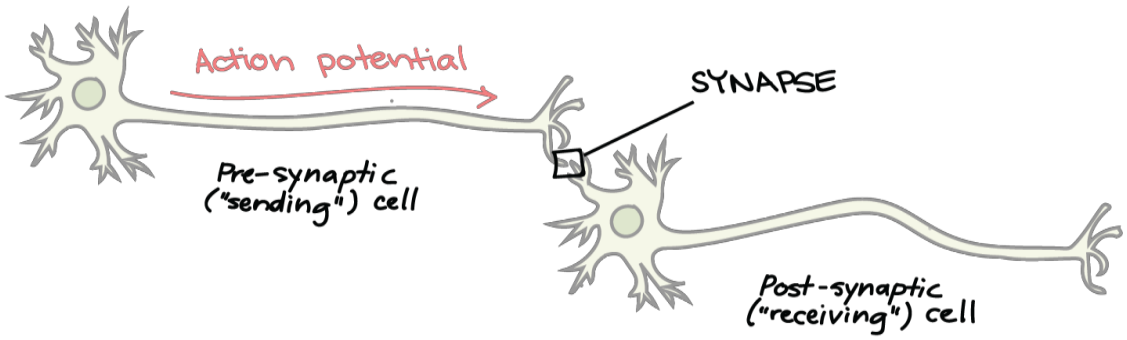
2. Distinguish Between Different Nerves And Efferent Nerves (Or) How Can You Differentiate Sensory And Motor Nerve Fibers (Or) How Can You Differentiate The Incoming Nerves With Outgoing Nerves?

A.

Afferent nerves	Efferent nerves
1) Nerves coming from receptors or sense organs are called afferent nerves.	1) Nerves that carry impulses from brain or spinal cord are called efferent nerves.
2) These are also called sensory nerves.	2) These are also called motor nerves.
3) Sensory nerves carry information from sensory organs like ears, eyes, nose, tongue and skin to brain and spinal cord.	3) The motor nerves carry impulses from brain or spinal cord to effector organs (muscles) and are responsible for the movement of hands and legs.
4) These are incoming nerves.	4) These are outgoing nerves.

3. Identify The Given Part In The Diagram And Write Its Use

A.



a) Synapse

b) It is a functional region of contact between two neurons where information from one neuron is transmitted to another neuron.

4. What questions Will You Ask a Doctor To Know About Endocrine Glands?

a) Which are known as endocine glands

b) Where can we find endocrine glands in our body?

c) What are the functions of endocrine glands

d) What will happen if endocrine glands are absent

e) What Happens If All Functions Of The Human Body Are Controlled Only By Brain?

All the organs in our body are not innervated by nerves. If brain is the only organ of control coordination is lost.

4 Marks:

1. Give An Example And Explain How Plants May Immediately Responds To a Stimulus.

(or)

A boy touched the athipothi plants then he observed the folding of leaves.what do you call this phenomenon/ what is the mechanism involved in it? Why do they fold?

(or)

What is thigmonasty? Explain it with one example?

Ans

A. Mimosa pudica (touch me not plant)

B. In this plant leaves show response to our touch(stimulus)

C. The leaves of this plant had a pad like swellings at the base called pulvini.

D. Here cells contain lot of water and large inter-cellular spaces.

E. Due to water pressure, pulvini hold the leaf erect.

F. Touch me not plant shows nastic movement by touch. This is called thigmonasty.

2. Man Is The Most Intelligent Animal What Could Be The Fact That Helped Us To Reach Such a Conclusion?

(Or)

Human Brain Is The Most Complicated Organ In The Animal Kingdom Comment On It?

Ans

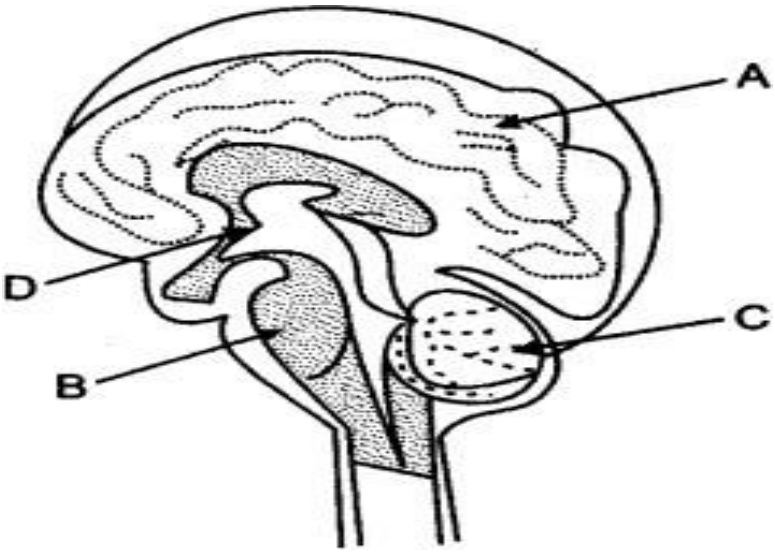
A. man has a very well developed brain

B. It has more than 10 billion neurons and 10 to 50 times more number of glial cells

C. He may utilize the brain for collecting analyzing and transformation of information

D. His feelings are communicated through language and he shares his ideas with other human beings.

3. Observe The Fallowing Diagram And Answer The Given Questions:



1. **This diagram belongs to which system of the body? A** A. Human nervous system
2. **Name the parts A and B?**

   A. A is cerebral hemisphere 'B' is mid brain

3. **Name any functional of part**

   C Control and the body equillibrum

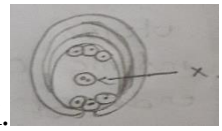
4. **Which part in this diagram is useful to solve problems and puzzles? 'A' A.**Cerebrum
5. **Name the part**

   'D' A.Pitutary gland

UNITVI:
REPRODUCTION(The Generating System)

1/2Marks questions.

1.In this diagram 'x' denotes …



A: Polar nuclei.

2.Which part that produces the sperm cells in the male reproductive system?

A: Testes.

3: In plants the fusion of male gamete with secondary nucleus results in …

A: Endosperm.

4: Parthenogenesis occurs in …

A: Bees

5: Name the body part which have division less cells.

A: Brain.

6: Which of the following show effect on the foetus?

A: Chemicals in cigarette smoke, Alcohol, Medicines.

7: What is the gestation period of human beings?

A: 280 days.

8: Write the sequence of steps of human life cycle?

A: Babyhood, Childhood, Adolescence, Adulthood.

9: What are the functions of testes during puberty?

A: Secrete testosterone, formation of sperms.

10: In which spore formation is common method of asexual reproduction?

A: Ferns

1 Mark questions

1: In what way does mitotic division help the living organisms?

A: Mitotic division helps in

1. 2Cell repair. 3.Healing wounds.

2: What questions you ask the doctor, who visited your school on world AIDS day?

A: 1. How does AIDS disease occurs?
2.How does the AIDS transmit?
3.What are the symptoms of AIDS?
4.What are the precautions to be taken to prevent AIDS?

3: What is colostrum?

A: The first secretion from the mammary glands after giving birth, rich in antibodies.

4: Give any two suggestions to create awareness to stop female foeticide.

A: 1. Preparing relevant slogans
2.Organisingrallies
3.Awareness campaign by using electronic and print media.

5: Write two precautions you take while observing Rhizopus in the laboratory.

A: 1. Don't touch the experimental bread with hand.
2.If you touch the bread, thoroughly wash your hand.

2Marks questions

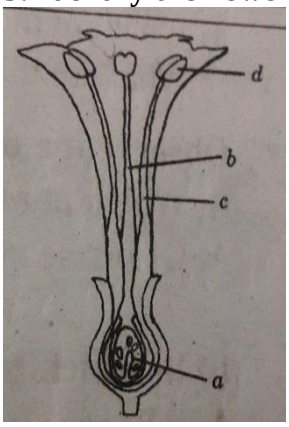
1: Chromosomal number is reduced to half in the daughter cells produced by meiosis what happens if the number is not reduced to half in daughter cells?

A: 1. If the reduction of chromosomes number is not done, the chromosomal number is doubled in the off springs.
2.The change in chromosomal number changes completely the characters in the individual.
3.The offspring differs to parental generation.
4.Abnormal characters will be formed in new generation, which are not useful for the existence of individual.

2: What are the questions you asked the doctor who visited your school to know the ways of transmission of HIV?

A: I shall ask the following questions to the doctor.
1.What are the ways of transmission of HIV?
2.How can we prevent the spread of HIV?
3.What precautions should we take while doing transfusion Of blood?
4.How does HIV transmit from mother to baby?

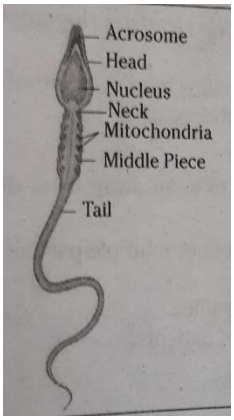
3: Identify the flower parts a,b,c,d and write their main function.



A: a) Ovary: -Female reproductive Orgon in flower. It produces Female gametes called ovules.
b) Style: -Ovary has a pipe like structure called style. It allows the pollen tube to enter the ovary for fertilization.
c) Stamen: - These are male parts called androecium. It has two parts. They are filament and anther.
d) Anther: - Produce male gametes called pollen grain.

4: Draw and label the diagram of human sperm cell.

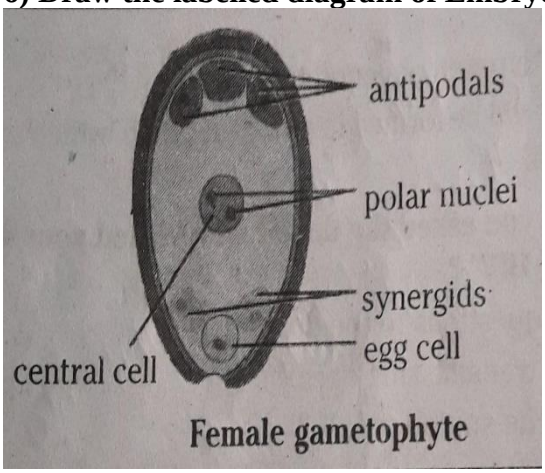
A:



5: How we will get the desired useful traits with the help of two selected traits by using grafting method.

A: 1. Two plants are joined together in such a way that two stems join and grow as a single plant.
2. One which is attached to soil is called stock and the cut stem of another plant without roots is called scion.
3.Both stock and scion are tied with the help of a twice thread and covered by a polythene cover.
4.Grafting is used to obtain a plant with desirable characters.
5.This technique is very useful in propagating improved varieties of plants with various flowers and fruits. Ex: Mango, Citrus, Apple, Rose.

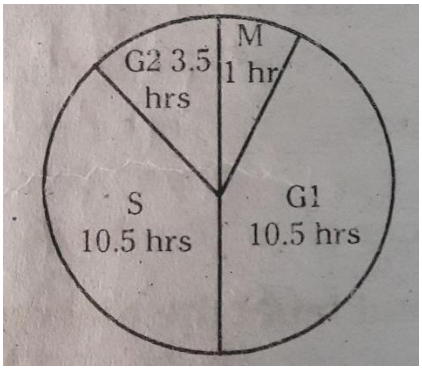
6) Draw the labelled diagram of Embryo sac.



7) What questions do you ask a doctor to know about different birth control methods?

A: 1. What is family planning?
2. What is meant by contraception?
3. How many types of contraceptive methods are there?
4. What are the contraceptive devices used for female?

8) Observe the diagram and answer the following



1. Which phases take same time duration?
A: G Phase and S phase.
2. In which phase DNA Synthesis takes place?
A: S phase.

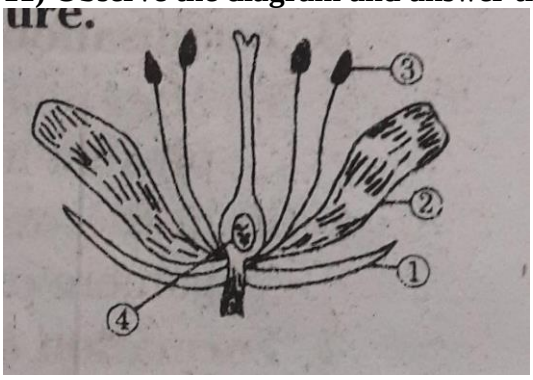
9) Write the process involved in seedless fruit development with two suitable example

A: In some plants ovary directly develops in to fruit without the process of fertilization this phenomenon is called as parthenocarpy.
Ex: Grapes, Watermelon.

10) What precautions will you take to keep away from diseases like AIDS and other sexually transmitted diseases?

A: 1. Avoid sex with unknown partners or multiple partners
2. Use condom every time.
3.Use disposable syringes and needles.
4. Transfusion of safe blood to the patients.
5. Avoid unsafe sex practices.

11) Observe the diagram and answer the following questions



1. Name male and female reproductive parts of the above figure?
A: Male reproductive parts- anther/pollen grains/stamen.
Female reproductive parts-ovary/ovule/style/stigma.
Write the names of 1 and 2 in the diagram.
1Sepal.2 Petal.

4 Marks questions

1: Observe the diagram and answer the following?

1. Which part produce the female gamete?

A: Ovary

2. Where does the fertilization takes place in female reproductive system?

A: Fallopian tube.

3. Where does the embryo develops until it is ready to born?

A: Uterus

4. In some cases doctors cut and tie the cut ends of the fallopian tubes. What is the name of surgery?

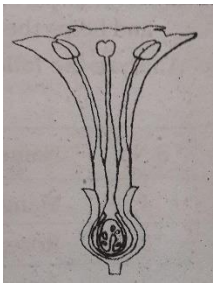
A: Tubectomy

2. In What way sexual reproduction differ from asexual one? State At least three reasons.

A:

Sexual reproductive	Asexual reproductive
Two Parents are required	One Parent is needed
Gametes are formed	Not formed
Fertilization talks place	Fertilization does not take place
Zygote is formed	Not formed
New Characters are formed	New Characters are formed only through mutations
Meiosis take place	Does not take Place

3: Observe the following diagram and answer the following questions.



A: 1. What are the four main parts of a flower?

A: Corolla, Calyx, Androecium, and Gynoecium.

2. Which part of the flower produces gametes?

A: Androecium and gynoecium produces gametes.

3. Which parts of the flower help in pollination?

A: Petals or corolla help flower in pollination.

4.Which part protect the flower during in bud stage?

A: Sepals or calyx protect flower in bud stage.

5.Which part of the flower will turn into a fruit in the future?

A: Ovary of the flower will change into fruits.

4: Analyse the following information and answer the following questions?

Sl.no Name of the plant Method of propagation

1. Mango Grafting
2. Rose, Hibiscus Cutting
3. Jasmine Layering
4. Bryophyllum Small plants grow on edge of Leaves
5. Colacasia Corns
6. Onions Bulbs

7: i. What do you call the given reproduction methods?

A: Given reproduction methods are called vegetative propagation.

ii. Potato plants do not produce seeds. How can you propagate this plant?

A: Potato plants propagates through the eyes.

iii. What are the advantages of propagation plants with the above given methods?

A: In vegetative propagation

i. More plants are produced in less time.
ii. Characters are not changed.
iii. It would be possible to develop new varieties with useful characters.

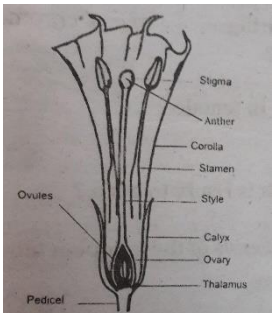
5: Organisms reproduce asexually in many ways. Some of the organisms are given below. Fill in the below table based on the collected information about the organisms and mode of asexual reproduction in it.

a) Onion. b) Spirogyra. c) Strawberry. d)Ginger. e) Honeybee.
f) Paramoecium. g) Planaria. h) Yeast.

A: Name of the organism Mode of asexual reproduction

a.Onion Bulb
b.Spirogyra Fragmentation
c.Strawberry Stolons
d.Ginger Rhizome
e.Honey bee Parthenogenesis
f.ParamoeciumBinaryfission
g.Planaria Regeneration
h.Yeast Budding.

6: i. Draw a neat labelled diagram of L.S of flower.



ii. What are the sexual parts in the flower.

A: i Androecium and

ii) Gynoecium.

7. Write the difference between meiosis and mitosis?

Type of reproduction	Asexual	Sexual
Genetically	Produces identical organism	Different Cells
Crossing over	Not occur	occur
Number of divisions	1	2
Number of daughter cells produced	2 diploid cells	4 haploid cells

Prepared by
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KOMARADA,VIZIANAGARAM

UNIT-7
coordination in life processes

1/2 Marks Questions:

1) **Which hormone is responsible for hunger pangs in stomach?**
   A: Ghrelin.
2) **Which place an important role in carrying hunger signals to brain?**
   A: Diencephalon and vagus nerve.
3) **Which hormone supresses hunger?**
   A: Leptin.
4) **What is the nature of the chyme?**
   A) Acidic.
5) Which system removes the excess salts from our body?
   A) Excretory system.
6) **What could be the range of temperature for us relish food items?**
   A:41Degree F to 140 Degree F.
7) **Which part of small intestine absorbs digested food?**
   A: Microvilli/ villi.
8) **Name the chemical which is used to test the action of saliva on flour?**
   A: Iodine solution.
9) **What controls the exit of stool from the body?**

A: Anal sphincter.

10) **How many pairs of salivary glands present in mouth?**
    A: 3 Pairs.
11) **Which type of teeth are present in humans and absent in herbivores?**

A: Canines.

12) **In which animal reverse peristalsis is seen?**

A: Cow.

13) **Which type of teeth have sharp and pointed edges?**

A: Canines.

14) **What type of food helps to indigestion problem?**

A: Fibre rich food.

15) **Which part of the brain control the mechanism of swallow?**

A: Brain stem.

1 Marks Questions

1) **What happens if the direction of peristalsis is reversed?**

A: If the direction of peristalsis is reversed the food present in the gut moves backwards.

2) **What is energy stored?**

A: The energy is stored in the cells as ATP

3) **Which system do you think will remove the excess salts from our body?**

A: The excretory system remove the excess salts from our body.

4) **What is the dental formula of humanbeings?**

A: 2,1,2,3/2,1,2,3

5) **What is mastication?**

A: Grinding, chewing, and shredding of food in the mouth by teeth is called mastication.

6) **What is bolus?**

A: Food that is formed due to the mastication of food in the mouth is called bolus.

7) **What stimulates stomach muscle into action?**

A: Nervous system.

8) **What is chyme?**

A: The partially digested food in the stomach is called chyme.

9) What is peristalsis?

A: The involuntary contraction and relaxation of the muscles of oesophagus stomach and intestine is called peristalsis.

10)What is second brain?

A: The nervous system present below the gut or alimentary canal that control digestion is called second brain.

11)What is the other name for second brain?

A: Enteric nervous system .

12)Why do you think small intestine is long and coiled?

A: The small intestine is long and coiled because it has to stay for more time for complete digestion and absorption.

13)What happens if there is no mucus in the oesophagus?

A: a) Mucus lubricates and protects the oesophageal walls from damage. this helps the food bolus to slide down easily in the oesophagus.

b) If there is no mucus, lubrication will not occur for bolus movement.

14)Name the two hormones which are involved in digestion?

A: a). Ghrelin induces hunger signals.

b). Leptin suppresses hunger signals.

2MARKS QUESTIONS

1)What do you mean by hunger pangs?

A:1. Hunger pangs are the contractions that occur in the stomach due to hunger generating signals that reach the brain from the stomach due to the secretion of hormone ghrelin.

2)Write differences between bolus and chyme?

Bolus	Chyme
1.food that is mashed in the mouth. 2.teeth and saliva turn food into bolus.	1.It is partially digested food in the stomach. 2.stomach digests food by peristalsis into chyme.

3).Observe the given part of the digestive system what is it? What is its role during digestion?

A:1.It is large intestine present in human digestive system.

2.It is large intestine water and mineral salts are absorbed .

4).How can you say that mouth is a munching machine?

A:1.The circular muscles of the mouth enable the food to the pushed into the oral cavity.

2.The teeth help in cutting and grinding while tongue movements help in mixing it with saliva.

Hence we can say that mouth is a munching machine.

5). What happens if salivary ducts are closed?

A: 1. Salivary glands secrets saliva. saliva contains mucin and ptyalin.

2. Ptyalin digest the complex carbohydrate into simple sugars.

in salivary ducts are closed food is not digested properly.

6)How do you appreciate stomach as a churning machine.How does this co- ordination go on ?

A: 1. The stomach acts like a washing machine,churning the food around to break it into smaller pieces

2.Mechanical mixing of food in stomach occurs by peristalsis.

3.Due to churning of food in stomach chyme is formed.

4.Hence we call stomach as a churning machine.

7).Rafi said smell also increases our appetite can you support this statement?How?

A:1.yes,I support the statement made by Rafi .

2.The chemoreceptors present in the nose trigger signals in the form of nerve impulses to the brain where the smell is detected .

3.Hence we get the feeling of increased appetite.

8.What will happen If islets of Langerhans fail to function?

A:1.Insulin may not be produced .

2.Huaman may suffer from sugar/diabetes.

3.sugar level increases in blood.

9.What happens if the direction of peristalsis is reversed in animal like cow?

A:If the direction of peristalsis is not reversed in animal like cow , the food will be masticate in the mouth and fermentation of the food with the micro-organisms in the stomach will not be takes pace.

10.Give reason

a)If you press the tongue against the palate, we can recognise taste easily?

A:Reason

1.When the tongue is pressed against the palate,the food substance is pressed against the openingof the taste bud letting it to reach the taste cells and triggering taste signals.

2.Finally the taste is recognized in the brain.

11).If size and shape of small intestine is like oesophagus , What will happen?

A:a)Food will not be digested completely .

b)Absorption of digested food is not done effectively.

12.What is papillae? Name different kinds of papillae present on the tongue?

A:A small nipple like projections present on the tongue are called papillae.

a)Fungi form papillae

b)Vallate papillae.

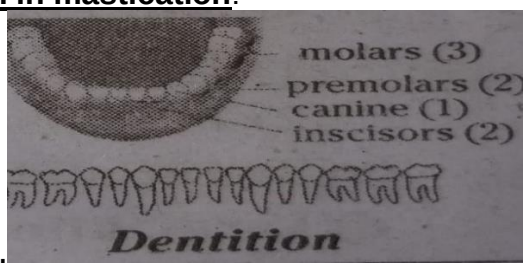
c)Foliate papillae.

4Marks Questions

1Q. what is mastication? explain the role of different sets of teeth in this process?

Ans: - Mastication: Mastication or chewing is the process by which food is crushed and ground by teeth .it is the first stage in digestion process.

Role of different sets of teeth in mastication:



1.There are incisors, canines, molar,premolars

2.Incisors are eight in number and they help the food to bite or cut

3.canines are four in number and these are used for tearing the food.

4.Eight premolars are present in our mouth and they are used for chewing and grinding food.

5.Molars are eight in number and they are also used for chewing and grinding food.

2Q. How can you justify the enteric nervous system as the second brain of the gut?

Ans:1.Enteric nervous system the second brain consists of sheaths of neurons embedded in the walls of the long tube of our get,or alimentary canal

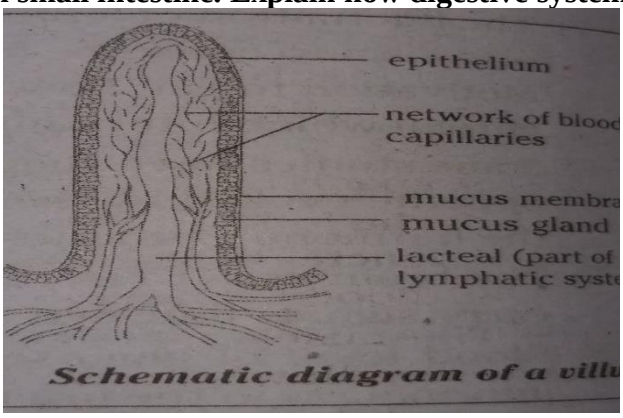
2.The second brain contains some 100 million neurons,more than in either the spinal cord or

the peripheral nervous system.
3.It can operate independent of the brain and spinal cord.
4.It controls peristaltic movements, secretion of enzymes etc
5.It contains support cell.
6.It can capable of coordination of reflexes.
7.Heicnce we can justify that the enteric nervous system as the second brain of the gut.

3).Prepare a questionnaire to understand nervous coordination in digestion process?

Ans:1.what is meant by autonomous nervous system?
2.what are neurotransmitters?
3.what is enteric nervous system or second brain?
4.what is the length of the enteric nervous system present in our body?
5.where is the enteric nervous system present in our body?
6.which part of the nervous system can control several gut functions?
7.Does the enteric nervous system function independent of the brain?
8.How many numbers of neurons are present in enteric nervous system?

4)Draw a schematic diagram of villus in small intestine. Explain how digestive system coordinate with circulatory system?



Ans:Coordination of digestive system with circulatory system:
1.The digestive system breaks down the food into nutrients.
2. The transfer of food particles from the digestive system to the circulatory system takes place at the inner lining of the small intestine,through millions of finger like projections called villi, which containa network of capillaries.
3.The transfer of food particles is possible because of absorption
4. Circulatory system transports the nutrients to different cells of the body.

5).Prepare a table information containing different kinds of teeth, number, their shape and functions.

Ans:

Sl.No	**Name of teeth**	**Number**	**Shape**	**function**
1	Incisors	8	Chisel, sharp edges	Biting
2	canines	4	Sharp ,pointed edges	tearing
3	premolars	8	Diamond shape blunt and flat	Chewing and grinding
4	molars	12	Rectangular blunt and flat	Chewing and grinding

UNIT-8
Heredity

½ mark questions

1. Who invented double helical model of DNA?
   Ans: Watson and Crick
2. Who proposed inheritance of acquired characters?
   Ans: Lamarck
3. Who proposed natural solution?
   Ans: Charles Darwin
4. Who proposed Germ plasm theory?
   Ans: August weisman
5. Who wrote the book principles of Geology?
   Ans: Charles Lyell
6. Who contributed natural selection
   Ans: Alfred Russel Wallace.
7. Who & when published the book origin of species?
   Ans: Charles Darwin(1859)

1 mark questions

1. What are the variations?

Ans: Differences in closely relate species

2. What is the role of variations in evolutions?

Ans: what is the role of variations in evolution?

3. What is phenotype?

Ans: the external visible characters of an organism is called phenotype

4. Where is Genotype?

Ans: the genetic make up of an organism is genotype

5. What is dominant characters?

Ans: the character that is expressed in f1 generation in dominate character

6. What is recessive character?

Ans: the characters that suppressed in f1 & re expressed in f2 is recessive

7. What is the law of segregations?

Ans: the two alleles of a characters segregate & enter into separate gametes

8. What is the law of independent assortment?

Ans: in a cross for more than one pair of characters. The alleles assorted independently.

9. What are homologous organs?

Ans: organs structurally similar ex: limits of vertebrates

10. Example for inheritance of acquired character?

Ans: elongations of neck & forelimbs of Giraffe

11. What is paleontology?

Ans: The study of fossils

12. How can we calculate the age of fossils?

Ans: Carbon dating method

2 marks questions

1. What are the characters selected by Mendal?

Ans: flower-colour, position

Seed- colour, shape
Pod- colour, shape

2. Why Mendal selected pea plant?

Ans: bi sexual flower

4 marks questions

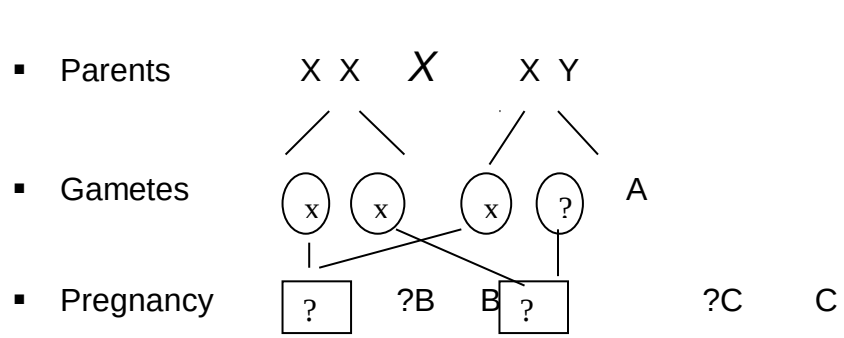
1. Male is responsible for sex determinations of a baby, do you agree?

(Or)

How does sex determinations happens in Man?

- In humans males have XY Chromosomes, in females have XX Chromosomes.
- During gamete formations males produce gametes with X or Y chromosomes.
- Females produced only gametes containing X chromosomes.
- So only males have dissimilar gametes, so they determine the sex.

2. Observe the table and answer the following



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1. What do you understand from the above?
2. What does A stands for?
3. What does B stand for?
4. What does C stand for?
5. Who determines the sex of the off spring?

3. Explain the process of Mono hybridization?

(Or)

If we want to cross a toll plant with a short plant what is the result of this cross?

Ans: the tall plant has TT factors, dwarf plant has tt.

Tall X Short
TT tt
T T t t ⟶ Gametes

	t	t
T	Tt	Tt
T	Tt	Tt

- All plants are tall in F1
- On selfing F1

Tt Tt

T t T t ⟶

Gametes

F2 generation

	T	t
T	TT	Tt
t	Tt	tt

In F2 generation TT is one, Tt is two and tt is one.

Genotypically

Phenotypically tall plants 3, Shart plant 1

4. Explain the process of natural selection in nutshell
    - Ans: according to Darwin variations are common in any group of organisms
    - Some of the variations ore useful and some are harmful
    - Useful variations are allowed to survive and reproduce
    - These useful variations they accumulate over generations and new species are formed

CHAPTER 10 - NATURAL RESOURCES
1/2 Mark Questions

1. Expand ICRISAT -

Ans: International crop research institute for semi arid tropics

2. Expand IUCN

Ans: International Union for the Conservation of nature and Natural Resources.

3. Expand MTR

Ans: Mountain Top Removal

4. Expand CNG

Ans: Compressed Natural Gas

5. Expand TMC

Ans: Thousand Million Cubic feet

6. Expand FAO

Ans: Food and agriculture Organisation.

7. Name the Seeds, from which biodiesel was produced

Ans: Jatropa Seeds

8. Name the two techniques involved in Micro irrigation method

Ans: a) Drip Irrigation, b) Sprinklers

9. Planting ..... on field bunds to strengthen them and make the soil nitrogen rich

Ans: Gliricidia

10. Expand BBF

Ans: Broad Bed Furrow

11. Sriram Sagar Project is also known as .....

Ans: Pochampadu

12. Pochampadu (Sriram Sagar Project) is on .....

Ans: Godavari River

1 MARK QUESTIONS:

1. What are Natural Resources?

Ans: The resources which are available in nature in huge quantity are called Natural resources.

2. What is conservation?

Ans: Conservation is the practice of caring for the resources, to get continuous benefit from them

3. What are Renewable resources?

Ans: Some of the resources can be replaced after they are used and are alled renewable resources.
Ex: Air, Water, Soil, Plants, Animals, Etc.,

4. What are non-renewable resources?

Ans: Some resources can not be replaced at all once they are used up, they are gone for ever. Such resources are called non-renewable resources. Ex: Fossil fuels.

5. What is sustainable Development?

Ans: When we use the environment in ways that ensure we have resources for the future, it is called sustainable development.

6. What Serve as lung for the world?

Ans: Forests serve as a lung for the world.

7. What is Contour Strip Cropping? What is its use?

Ans: Contour Strip cropping is a method of Soil Conservation. Several Crops such as corn, wheat and Clover are planted in alternating Strips across a Slope or across the path of the prevailing Wind.

8. What is Selective harvesting?

Ans. During the harvesting of contour strip cropping plants, We remove the crops alternatively. Then the other crops anchor the soil. This method is called Selective harvesting.

9. What is Bio-diversity ?

Ans: Bio-diversity is the variety of living things that populate the earth.

10. What is Percolation Tank?

Ans: Percolation Tanks are normally earthern dams with masonry structures where water may over flow

11. what are Fossil Fuels?

Ans: Fossil Fuels were produced from the remains of ancient plants and animals .
Ex: Coal, Petroleum, and Natural Gas.

12. What is Micro – Irrigation?

Ans: Micro Irrigation is an Irrigation method that saves water and fertilizers by allowing water to drip slowly to the roots of plants. Drip irrigation sprinklers are collectively called as Micro- Irrigation.

2 MARKS QUESTIONS

1 What are the effects of deforestation?

Ans:

- destroys wildlife habitats
- Deforestation increases soil erosion
- Deforestation causes floods
- Deforestation decreases rainfall

2 What is ICRISAT? Where is it located? What its functions?

Ans

- ICRISAT Stands for International crop Research Institute for semi Arid Tropics
- It is located in Patancheru of Hyderabad, Telangana State.
- It conducts Agricultural research for rural development.
- It provides technical support to villagers for cost efficient water storage and soil conservation structures

3. Suggest any four changes that you would like to be incorporated in the lifestyle of students of your age to move towards a sustainable use of available resources.

Ans:

- Follow 3R'S – reduce, Reuse, Recycle
- Switch off the lights and Fans when not needed
- Cycle to school than using a bike
- Save water by closing taps when not needed.

4. Can you suggest some changes in your school which would make it environment – friendly.

Ans:

- Plantation of trees and maintenance of school garden should be done.
- Biodegradable and non-biodegradable wastes should be collected and discarded separately
- Waste water should be discarded separately
- Electrical appliances should be switched off when not in use.

5. List any four methods for conserving fossil fuels.

Ans:

- Conservation of efficient forms like CNG
- Protection of Resources from fires
- Avoid wastage of Oil
- Make more use of renewable source of energy

6. Natural resources are decreased more rapidly . Guess what will be the consequences.

Ans:

- All the industries that depend on natural resources will shutdown and people lose their livelihood.
- Soil, water and air are polluted which lead to the loss of biodiversity
- Due to deforestation, the fertile land is exposed to air it results in the soil erosion
- Rapid decrease in the natural resources results in ecological imbalance.

7. Human being is modifying agriculture agriculture lands and lakes into residential areas. What is its effect on Biodiversity?

Ans:

Shelter may hot be provided for migratory birds

Food chain get disturbed

Decrease in the ground water level

8. Write any two suggestions for the conservation of biodiversity at your village?

Ans:

- Protecting and preserving natural habitats of birds and animals
- Using recycled products and following 3R principle in day to day life.

9. What steps do you take to conserve fossil fuel resources?

Ans:

- Usage of alternatives to fossil fuel
- Walk, ride by bicycle and use public transportation whenever possible
- Purchase energy efficient appliances
- Turn of light and other electronics when you are not using them.

10. What is biofuel? Name the plant that is used as biofuel.

Ans:

- Any type of plant (or) animal material that can be converted into energy is called biomass
- When these materials are used for energy production, they are known as biofuels
- Ex: Seeds of Jatropa.

4 MARKS QUESTIONS

1 What is sustainable development? How is it useful in natural resource management?

Ans: 1. **Sustainable development**: When we use the environment in ways that ensure we have resources for the future , it is called sustainable development.

2. If all the resources are carelessly managed, they will be used up.

3. So, the people must reduce the usage of resources

4. The continuation of life depends on the careful use of natural resources

5. Thus, sustainability should be implemented in all aspects of natural resources. So that they would be available to our future.

2. Suggest some approaches towards the conservation of forests?

1. The indiscriminate and unauthorized cutting of forests for timer, trade and fire wood should be controlled.

2. In case of cutting of forests, for every acre of forest an equal area of land should be planted with trees.

3. Overgrazing of forests should be prevented

4. We should prevent and control forest fires.

5. The local people should be involved in the conservation of forests by giving employment.

3. Why should we conserve forests and wild life?

Ans: **Need to conserve forests:**

1. Forests provide raw materials for timber industry and sports equipment industry
2. Forests prevent floods and soil erosion
3. Forests help in bringing sufficient rainfall
4. Forests also provide natural habitat to wild animals and birds
5. Forests maintain the ecological balance

Need to conserve wild life:

1. The wild life maintains ecological balance in nature. For example, if we conserve lions and tigers, they keep the herbivorous animals under control and save the plants from over grazing.
2. Wild life should also be conserved to prevent the extinction of rare varieties of animals and birds from this earth.

4 What are four R' s mantra to save the environment?

Four "R"s (**Reduce, Reuse, Recycle and Recover**) is the best method to conserve resources.

Reduce: consumption of resources must be reduced. The production of waste also be reduced.

Ex: Repair leaked taps, switch off unnecessary lights and fans.

Reuse: The materials are reused again. So when we are purchasing an item we give preference to those which are suitable for reuse again. We should not use disposable items

Ex: the articles made by waste material like bowls, bags and flower vases.

Recycle: The disposable materials can be reprocessed into new products.

Ex: one third of the iron produced in America comes from recycled automobiles.

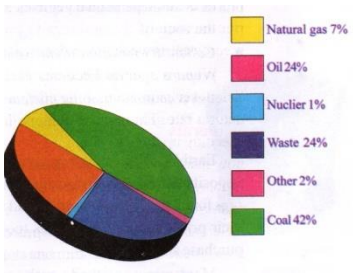
Recover: We must recover the resources what we used.

Ex: When we cut trees we must plant the trees again.

5 Observe the diagram and answer the given questions:

1. What are fossil fuels?

Ans: The fuels were produced from the remains of ancient plants and Animals are called fossil fuels.



2. Give examples for fossil fuels?

Ans: Coal, Petroleum (Oil) and natural Gas.

3. What do fossil fuels provide us?

Ans: FOSIL FUELS PROVIDE US ENERGY.

4. Why do we need to conserve them?

Ans: Because they are non – renewable resources.

6 Answer the given questions:

Village	**Type of Farmer**	**Net income per acre in Rupees**				**Total income per acre year in Rupees**
		Paddy Kharif	**Paddy Rabi**	**Cotton**	**Gingelly**	
Village – 1	Large	8200	8700	4900	3300	25100
	Small	7046	8490	10889	3110	29535
Village	Large	10698	5970	4000	3595	24263
	Small	9128	7380	3031	2650	22189

1 Which crop is most profitable for a small farmer in Vaddicherla?

Ans: Paddy in Kharif is more profitable

2 Which crop could replace paddy and be profitable as well for a small farmer in Vanaparthy?

Ans: If cotton replaces paddy, it will be profitable.

3 Do you think the income of a small farmer in Vaddicherla is sufficient enough to meet his expenditure?

Ans: No

4 Do you think farming as an occupation is profitable for the small farmer in Vaddicherla?

Ans: No.

ENVIRONMENTAL EDUCATION

1 MARK QUESTIONS

1. **What is global warming?**
   A. **The annual increase in the overall temperature of the earth's atmosphere is called global warming.**
2. **Name the gases which are responsible for global warming?**
   A. **Carbon monoxide (co), carbon dioxide (co2), chlorofluoro carbons (CFCs), Hydro carbons (HFCs), per fluoro carbons (PFCs).**
3. **Suggest alternative sources for fossil fuels?**
   A. **Solar energy, wind energy, tidal energy.**
4. **What activities you are going to follow to reduce the effects of global warming in your school or surrounding?**
   A. **a) We should grow trees in our school or surrounding.**
   b) We should use ecofriendly electronic and solar equipment.
5. **How do you control mosquito population?**

a) I pour kerosene stagnant water.
b) I spray in insecticides in damp areas.
c) I empty the trash cans regularly.

6. Write some methods to save the electricity at your house?
A. a) I turn off light and fans before I leave the room.
b) I use the solar appliances.
7. Prepare some slogans on benefits of solar energy?
A. a) Solar energy is non polluting
b) solar energy is abundant –use it.
8. What is Vaccination?
A. Vaccination is the administration of antigenic material (a vaccine) to stimulate an individual's immune system to develop adaptive immunity to a pathogen.
9. Why is Polio in India still prevalent ?
A. Polio is still prevalent in India due to lack of awareness, sheer negligence and biases.
10. What are Fossil fuels ?
A. Fossil fuels are one of the basic sources of energy for all our activities that are exhaustible.
Examples : Coal, Kerosene, LPG, Petrol, Diesel .
11. How the spread of polio is prevented?
A. Polio can be prevented by oral vaccine called anti polio drops.
12. What is meant by bio-magnification?
A. The tendency of pollutants to concentrate as they move from one tropic level to next tropic level is known as bio-magnification.
13. Write any two cottage industries in your surroundings?
A. Tailoring, Transport services, lace, etc.,
14. Write any proper water conservation method in your school.
A. Make it a habit to wash our hands near the trees, collect the rain water into the soaking pits.
15. What can we do to have insects in our surroundings and fields?

A. Spraying of pesticides will be minimized.

II Short questions and answers Marks: 2

1. What should we do to reduce Green House Gases in the Atmosphere?

A.1. By reducing use of incandescent bulbs.

2. To use Refrigerators for limited period, when actually it is needed.

2. What are the effects of Global warming?

A. Global warming leads to increase in atmospheric temperature. Ice at the Polar Regions melt and the level of ocean may increase and it leads to drowning many cities on the globe.

3. What are the ways to save gas in houses?

A. i) Put on the stove only after arranging all the things which are necessary for cooking .

ii) Use pressure cookers and kettles with lids only.

4. What steps do you take to improve natural resources?

A.1) Motivate the people to conserve water.

2) Try to avoid wastage of water whenever possible.

3) Plantation in the vacant lands.

4) Educate the farmer regarding proper utilization of water for irrigation.

5. "Forest is a renewable resource". Do you agree? Justify.

A.1) Forest are rich habitat for plant and animals. Forests serve as lung for the world and bed of nutrient for new life to prosper.

2) Forest pure air protect the earth from green from house effect by removing carbon dioxide and converting it into oxygen.

6. How we reduce the use of fuels while travelling?

i) Stop engines at traffic signals and traffic jams.

ii) It is better to travel by metro train or bus instead of personal vehicles.

iii) Use your own vehicle for family purpose only

8. What are the reasons for the decline of ground water?

A. i) The usage of ground water by the human beings for domestic, agriculture and industrial in day by day increasing.

9. What are the 3 R, s explain them how they are help in control environmental degradation.

A. The three 'R" s are REDUCE , REUSE, and RECYCLE . Everyone must reduce the waste and usage of natural resources.

10. Write about the domestic air pollution and its impact on health.

A. There are large number of households where fire wood , coal, etc are used as fuels in cooking area.

11. What are the effects of depletion of ozone layer?

A. Ozone plays a vital role in maintaining the life on earth. It filters out all radiations below 3000 A0 which are biologically harmful Chlorofluoro carbons used as aerosol propellants from blowing agents and refrigerants.

12. What is acid rain? How it effects the environment.

A. Presence of excess acids in rain waters is called acid rain. It is the important global environment problem.

13. What is Environment Movement?

A. social and political movement mainly concerning with the conservation of environment as well as improving the state of environment is known as Environment Movement. It can

also be said as green and conservation movement.

14 .Give examples for Environment movement ?

Examples for Environmental Movement :

1. Saving a tree from cutting.

2. Giving medical assistance to a suffering dog.

15. What will happen if the concentration of particulate matter high in air?

(or)

Effects of higher concentration of Particular matter in air :

1. Higher concentration of particulate matter in air prevents Solar radiations from reaching the earth`s surface.

2. They also prevent heat to escape from the earth`s surface. The net effect of these two phenomena is one of the causes of Global Warming.

3. They absorb light and reduce visibility and cause various respiratory diseases

16. What do you suggest to conserve fuel or to avoid waste of fuel at home to your mother?

Suggestions to my mother to avoid waste of fuels :

1. To put on stove only after arranging all the things that are necessary for cooking.

2. To use pressure Cooker.

3. To use required quantity of water only for cooking.

4. To reduce the flame as soon as the boiling process starts in a pressure cooke.

17. What is the result, if the soil is not covered with forest ?

1. If the soil is not covered with forest, there is no abstractions for the flow of water.

2. All the water flows out quickly. Only small amount of water percolate into soil, that is added to underground resources.

3. The water in the subsoil quickly gets evaporated.

4. It results in drying up of plants, increase in temperature.

18. How can you protect the wild animals in your surroundings?

A. 1. We can protect the wild animals even without maintaining a Zoo.

2. We can protect all the animals which line in and around in villages , in our fields or on the trees that are wild animals by allowing to grow a tree , by not cutting down a tree, by not killing a animal which is passing by.

2.FILL IN THE BLANKS

1. Greenhouse gases trap radiation and prevent heat from leaving the earth`s surface.

2. Excess presence of Greenhouse gases in the atmosphere causes Global Warming.

3. The (CFC) Chloro, Fluor Carbons are used in Air conditioners and Refrigerators.

4. Environmentalism Concern for the preservation, restoration and improvement of the natural and social environment.

5. Solid particles and liquid droplets present in air are called Particulate matter.

6. Some of the Examples of Particulate matter are Dust particles , Pollen grains, Smoke, Vehicular exhaust , fly ash , coal dust , cement and mist .

7. Vaccination is done to protect ourselves from diseases like Diphtheria, Whooping cough , Tetanus , Cholera , Hepatitis,

Polio.

8. The diseases that are caused by mosquito bites are Malaria , Dengue , Chikungunya etc.,
9. The population of mosquitoes raises in Rainy Season.
10. Stagnant water is a ground for breading mosquito population.
11. We should spray Kerosene on stagnant water to kill larvae of mosquitoes.
12. Fossil fuels are basic sources of Energy for all our activities.
13. Fossil fuels that are used for transport and industry are Petrol and Diesel.
14. Soaking food material before cooking saves 22% of fuel.
15. Solar Energy is the best and evergreen Energy resource
16. Solar Energy is a good substitute for our Conventional Energy Resources.
17. Gujarat stands first place in our country in utilizing Solar Energy.
18. Pollination is the process of transfer of pollen grains from the anther to the stigma of of a flower in the plant.
19. Farmers grow Marigold plants in fields of Mirchi.
20. Development is necessary but it should be environmental friendly.
21. The waste materials produce Methane gas.
22. By burning of waste material (CO2) Carbon Dioxide is produced.
23. Some of the examples for Renewable resources are Forests, Sun light, Earth, Air, Water etc.,
24. Some of the examples for Non Renewable resources are, Fossil fuels, Petrol, Coal, Natural gas etc.,
25. Forest cover is necessary for proper Rainfall.
26. Zoological gardens or Zoos are places for conservation of animals, research and creating awareness among people.
27. A zoo gives us an opportunity to see and learn about animals found in different places in the world.
28. The substances that are broken down by biological processes are called Biodegradable substances.
29. Some of the examples for Biodegradable substances are Kitchen waste, Spoiled food, vegetable peels etc.,

SLOGANS

1. Importance of plants:
   1. save trees, save lives.
   2. save trees , save earth
   3. killing trees is killing us.
   4. save trees now, they will save you in future.
   5. Trees the lungs of the world.

6. **If you save a tree you save a life.**
7. **No trees=No oxygen=No life.**

2. Important of forests:

1. **Save forests, forests will save you.**
2. **Save forests save the climate.**
3. **Protect forests and be safe.**
4. **Forests for living planet.**
5. **Save forests, stay healthy.**
6. **Say no to deforestation.**
7. **Forests –The lungs of the world.**

3. Water conservation:

1. **Save water – save life.**
2. **A drop of water is precious like a drop of blood.**
3. **Conservation of water – conservation of life on earth.**
4. **A drop of rain water is source for our life.**
5. **Water leakage is like – leakage of blood of earth.**

4. Solar energy:

1. **Solar energy is non – polluting.**
2. **You don't pay sunlight – use it freely.**
3. **Solar energy is abundant – use it.**
4. **Solar energy is ever green energy.**
5. **Solar energy is cost effective.**