Std- 10 Medium- English

Gala paper -2 solution -2023-24 Subject- Science

1. C) 2) D) 3) D 4) B 5) A 6) A

7) C6H6 8) right hand thumb 9) Translocation 10) Mendel

11) C 12) PVC 13) True 14) True 15) True 16) True

17) Thyroxine 18) Placenta 19) C Presbyopia

21) (B) 22) (C) 23) (B) 24) (C)

25. The following changes are observed during chemical reaction :
(1) Change in physical state of the substance.
(2) Change in colour observed in the substance.
(3) Evolution of a gas appears during the reaction.
(4) Change in temperature of the reaction mixture during the reaction.

26. Ores obtained from the earth does not contain metal element only, but contains large amount of impurities such as soil, sand, undesired other substances, etc. are called gangue. The process used for removing the

gangue from the ore are based on the differences between the physical or chemical properties of the gangue and ore.

27. The organism that lives in water such as a fish obtains oxygen for respiration which is dissolved in water. Whereas the terrestrial organisms take in oxygen directly from the air. Since, the amount of oxygen dissolved in water is fairly low as compared to the amount of oxygen in the air, breathing rate in aquatic organisms is much faster than terrestrial organisms.

Ans28:- Variation is necessary for existence of any species as it helps the species of various organisms to survive and flourish even in adverse environment.

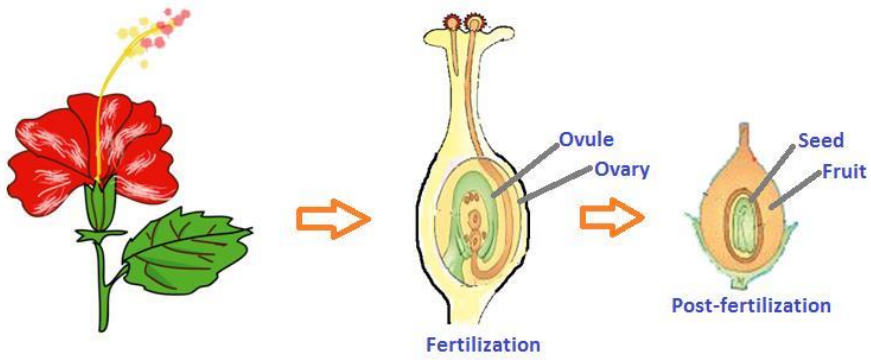
• If all the organisms of a population living in that habitat are exactly identical, then there is a danger that all of them may die and no one would survive under those conditiors. This will eliminate the species from the habitat completely.

• However, if some variations are present in some individual organism to tolerate excessive heat or cold, then there is a chance for them to survive and flourish even in adverse excessive heat or cold.

• Thus, variation is useful for the survival of a species over time.

29. After fertilization, the following changes are observed in a flower:

1. There is the formation of a diploid zygote and it develops into an embryo, which forms the future plant.
2. The endosperm cells serve as a source of nutrition for the developing embryo.
3. The ovule becomes the seed.
4. The ovary becomes the fruit.
5. In most plants, the antipodals and synergies disintegrate before, during, or immediately after fertilization.
6. The outer and inner integuments of the ovule become the testa or the seed coat of the seed.
7. Petals and sepals fall off.



30. Ans:- Newton showed that reverse of dispersion of light is also possible. Newton kept two identical glass prisms close to each other one in an erect position and the other in an inverted position. White light of the Sun (sunlight) gets dispersed when it passes White light of the Sun (sunlight) gets dispersed when it passes through first prism P1. This allowed all the colours of the spectrum to pass through the second prism. The second prism P2 receives all the rays of seven colours from first prism and recombines them into the original white light. This observation gave Newton the idea that the sunlight is made up of seven colors. Any light that gives a spectrum similar to that of sunlight is called white light.

Ans-32 .A component used to regulate current without changing the voltage source in an electric circuit is called variable resistance. e.g. rheostat.

Ans 33. Factors on which the magnetic field produced by a straight current-carrying conductor depends:

1. Current in the conductor: The magnitude of the magnetic field produced is directly proportional to the current passing through the wire.

2. Distance from the wire: The magnitude of the magnetic field produced is inversely proportional to the distance from the wire.

Ans 34. Consumers: 1. Consumers are a group of organisms that feed upon other organisms to meet their food requirements.

2. Based upon their position in the trophic level and the kind of organism they feed on, consumers have been categorized into primary, secondary, tertiary and quaternary consumers.

3. Primary consumers belong to second trophic level and they feed upon producers.

4. Secondary consumers belong to third trophic level and they feed upon primary consumers.

5. Tertiary consumers belong to fourth trophic level and they feed upon secondary consumers.

6. Quaternary consumers belong to the fifth trophic level and they feed upon tertiary consumers.

7. For example: In a food chain; Grass Insects Frog Snake→

Ans:-35 - 10% transfer of energy from one trophic level to its next trophic level is called 10% Law, which was given by Raymond Lindemann.

2. In a food chain, along with food some amount of energy is also transferred.

3. This transfer of energy takes place through the various trophic level.

4. With each tropic level the amount of energy is reduced and only 10% of the energy gets transferred to a higher trophic level.

5. For example, if producers get 10,000J energy from the sun then primary consumers get 1000J, secondary consumers get 100J and tertiary consumers to get only 10J of energy.

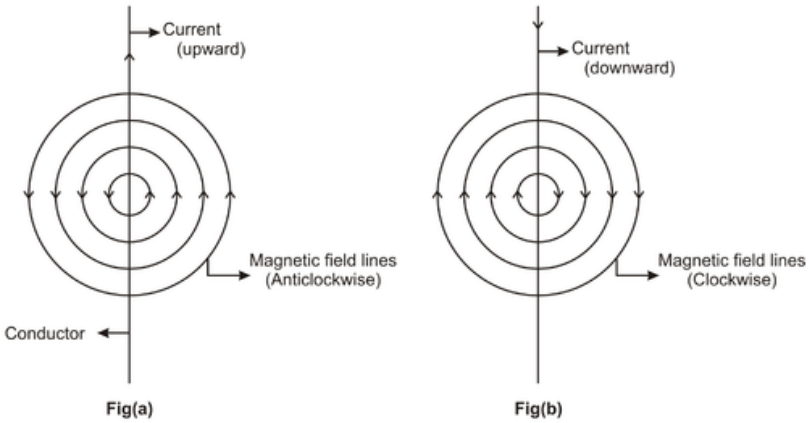
Ans 36. Life processes can be defined as the basic functions performed by living organisms in order to maintain their life on this earth. The basic life processes common to all living organisms are - nutrition and respiration; transport and excretion; control and coordination (response to stimuli); growth; movement and reproduction.

Ans 37- Some characteristics of Magnetic Field Lines of a straight current-carrying conductor:

1. **It forms concentric circles around the conductor.**
2. **It lies in a plane perpendicular to the conductor.**
3. **The reversal in direction of current flow reverses the direction of the field.**
4. **The strength of the field is directly proportional to the magnitude of the current.**

5. **The strength of the field is inversely proportional to the distance of the point from the wire.**

The figure below represents the same:



These are the characteristics of a magnetic field around a straight current-carrying conductor.

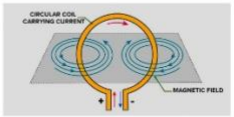
Ans 36. The existence of life on the planet earth is mainly based on certain functions and processes. There are certain basic vital processes, which are essential for an organism to stay healthy and to maintain the proper functioning of the body's organ systems. They are necessary for survival. These basic essential activities performed by an organism are called life processes. Types of Life Processes- Nutrition, Transportation, Metabolism, Respiration, Reproduction, Excretion.

Ans-371) The magnetic field lines due to a current-carrying circular loop are in the form of concentric circles.

At the centre of the loop, the lines are almost straight.

As it is clear from the figure, the magnetic field lines will be less dense in the region near the circumference of the loop than at the center.

Thus, the magnetic field will be stronger at the center of the loop than in the region near the circumference.



Ans 38- Displacement Reaction:

- **"A chemical reaction in which a highly reactive species(or element) displaces or pushes out a less reactive element from its solution is called displacement reaction."**
- **For instance, zinc removes iron ions from iron sulfate solution.**
- **Copper nitrate solution releases copper by reacting with iron to form an iron sulfate solution.**
- **A displacement reaction is also referred to as a substitution reaction.**

The chemical equation of a displacement reaction:

- **For example, the displacement reactions include the reaction of iron and copper sulfate, which results in the production of iron sulfate.**
- **As iron is much more reactive than copper in this situation, copper is replaced.**

Ans 39)

CALCINATION	ROASTING
Process in which ore is heated in the absence of air or supplied in small quantities is known as calcination.	Roasting is the process where ore is converted into its oxide. This process is done in the presence of excess air by heating it above its melting point.
During calcination moisture is pumped out from an ore.	During roasting moisture is present.
Calcination is used for carbonates and oxide ores.	Roasting is used for sulphide ores.
During calcination Carbon dioxide is given out.	During roasting a large amount of poisonous, metallic and acidic compounds are released.

Ans 40)

Metals	Nonmetals
Metals are very hard except for sodium.	Non metals are soft except for diamonds.
Metals are generally malleable and ductile.	Non metals are generally brittle and can break down into smaller pieces.
They are shiny and lustrous.	They are not shiny and are non lustrous except iodine.
They are electropositive in nature.	They are electronegative in nature.

Metals are good conductors of heat and electricity.	Non metals are generally bad conductors of heat and electricity except graphite.
They are used in machinery. Example: Copper, silver, gold etc.	They have medicinal and chemical uses. Example: carbon, oxygen, sulphur etc.

Ans 41)

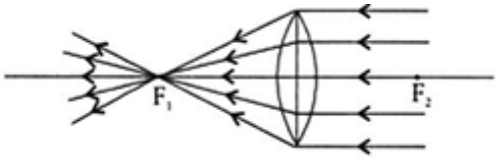
Nervous system	Hormonal System
- It consists of the central nervous system (CNS) and peripheral nervous system (PNS).	- It consists of endocrine glands.
- A neuron is a structural and functional unit of the nervous system. It consists of dendrites, axon and soma. Dendrites are a kind of tiny extension of nerve cells that receives signals from sensory receptors or other neurons. The long extension of the cell body of the neuron is named as axon that serves to conduct the impulse far from the cell body/soma.	- The endocrine secretion of glands (hormones) releases directly into the blood to affect the target cells.
- Nerve impulses are inaccurate in their actions.	- Hormones exhibit specific effects by affecting only target cells that carry the specific receptors.
- Neural responses are quick and short-lived.	- Hormonal effects are slow but are long term.
- The flow of information is rapid.	- The flow of information is very slow.

Ans 42) **Vegetative propagation is the method which uses the vegetative parts of the plants for the cultivation of plants. The advantages of this method are that the genetically identical offsprings are produced. Therefore, the advantageous traits can be preserved. This method helps because there is no need of the two parents. Only one parent is required which eliminates the need for special mechanisms such as production of special whorls in the flower, pollination, etc.**

Ans 43) **The copying of DNA during reproduction is important because:**

- **The replication of DNA ensures that each daughter cell formed at the end of cell division, receives equal amount of DNA.**
- **If DNA won't be copied then the daughter cells won't receive all necessary genes.**
- **There may be absence of important proteins which are encoded by DNA, if DNA won't be replicated.**
- **Copying of DNA may result in recombination which will lead to evolution.**
- **Transfer of genetic material from one generation to other makes the organisms to have similar functions.**
- **Stability of population is maintained**

Ans 44) **A convex lens can be used to burn paper in sunlight at room.**



Ans-45 Mirror formula :

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

So, u=−27cm

Concave mirror have negative focal length.

f=−18cm

Putting the values in (1),

1v+1−27=1−18

We get , v=−54cm

Also,

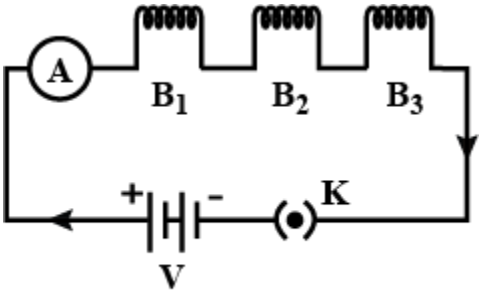
Magnification = h2h1=−vu

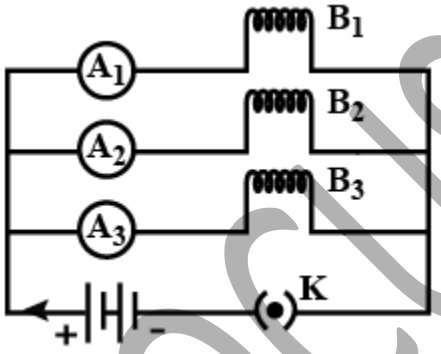
h27.0=−−54−27

h2=−14.0cm

Image will be real and inverted and will be of size 14 cm.

Ans- 46) Let us assume that resistance of each bulb is R
Case(1)
Current in each bulb =V3R
case (2)
Net current =3VR
Current will get equally divided in three bulbs =I3=VR
Bulbs in case (2) will glow with great brightness current ∝ Brightness
B) Now I one bulb gets fused, in case (9) rest of bulbs will not glow because in series voltage eruption in one appliance will affect other appliances.
But in case (b) all other bulbs will glow as voltage eruption in one bulb does not affect the voltage of other bulbs.





Section -D

Ans 47) (I) Tooth decay cause:

1. **Tooth decay begins when the pH of the mouth falls below 5.5.**
2. **Dentine and enamel are gradually weakened by tooth decay. When bacteria react with carbohydrates to produce acids, the enamel is first softened or demineralized. After eating, bacteria in the mouth produce acids by oxidizing the sugar and food particles there.**

3. **Food particles and a significant number of bacteria that stick to the teeth make up dental plaque. Plaque on the teeth prevents saliva from penetrating the tooth layer to neutralize the acid. Plaque is removed from the teeth after eating before the bacteria start creating acids.**
4. **The primary focus should be on reducing the number of bacteria in your mouth if you want to stop tooth decay. Brushing and flossing your teeth helps to prevent the accumulation of gummy bacteria (plaque).**
5. **Combining an antimicrobial mouthwash (such as Listerine or Scope) alongside brushing and flossing can assist to reduce oral bacteria.**

(II)Self Defense:

1. **Self-defence refers to a phenomenon by which every living organism protects itself from its enemy or predator.**
2. **They use different methods for self-defense like physical (biting, slapping, or roaring) and chemical (sting or poison).**

Physical Defense:

1. **In plants, thorns or spines are formed for protection against predators.**
2. **In animals, Attacks, roaring, and biting are forms of physical defense.**

Chemical Defense:

1. **In animals, stinging, biting, and sucking lives toxins in competitors, causing pain and irritation.**
2. **Due to acids released by animals, Inflammation or diseases can happen.**
3. **In plants, the hairy structure of the leaves of the nettle plant introduces acid to other species causing the burning sensation.**
4. **The carnivorous plants produce chemicals to digest their prey or predator.**

Ans 48) Procedure for the Laboratory Preparation of Hydrogen Gas

- **Step 1:** Take a few grams of zinc granules and place them in a 500 mL flask.
- **Step 2:** With the help of a thistle funnel, add dilute hydrochloric acid to the zinc granules. If hydrochloric acid isn't available, dilute sulphuric acid can be used as an alternative.
- **Step 3:** Hydrogen gas will be automatically collected with the help of a delivery tube via the downward displacement of water. This can be explained by the fact that hydrogen gas is lighter than water.

The setup for the laboratory preparation of hydrogen gas is illustrated below.

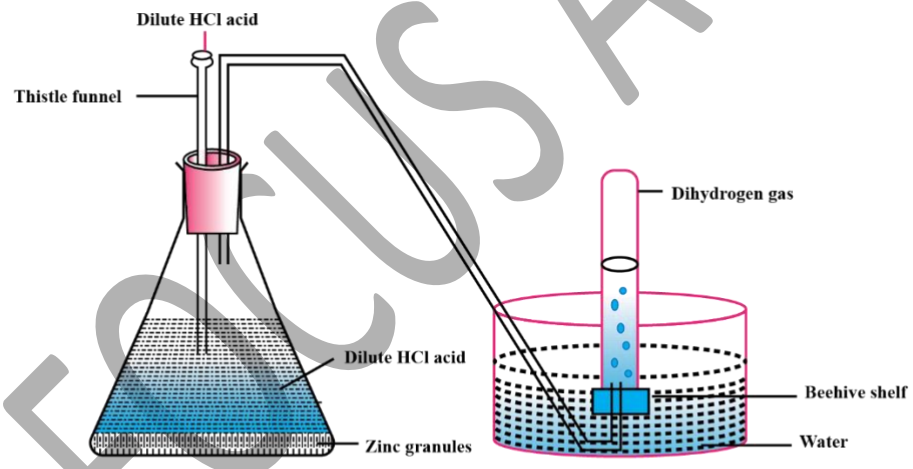
In the laboratory, dihydrogen gas is prepared by taking zinc granules in a 500 ml flask.

To this, dilute HCl or dilute sulphuric acid is added through a thistle funnel. Dihydrogen gas is released and the gas is collected by the downward displacement of water because it is a gas lighter than water

Reaction:

$Zn(s)+2HCl(aq) \rightarrow ZnCl2(aq)+H2(g)$

$Zn(s)+H2SO4(aq) \rightarrow ZnSO4(aq)+H2(g)$.



Preparation of Dihydrogen gas in laboratory

Ans 49) When Carbon and its compounds burn in the presence of Oxygen (or air), they give CO_2, heat and light.The process of burning carbon and its compounds in excess of oxygen for the release of heat and light (energy) is known as combustion.

Following are some of the examples of the combustion reaction of organic compounds:

$$C + O_2 \Rightarrow CO_2 + Heat + Light$$

$$C3H8 + 5O2 = 3CO2 + 4H2O.+ Heat + Light$$

(C3H8 is the molecular formula for Propane, a common gas present in LPG which we burn for cooking in our kitchens).

In General, saturated hydrocarbons burn with a clear blue flame, whereas unsaturated hydrocarbons burn with a yellow flame producing soot (carbon).

Combustion of hydrocarbons may be of two types: Complete combustion and incomplete combustion.

Complete combustion of hydrocarbons occurs in excess of oxygen(air), producing CO2 and H2O as the only final chemical products.Heat and light (clear blue flame) as a form of energy is generated.

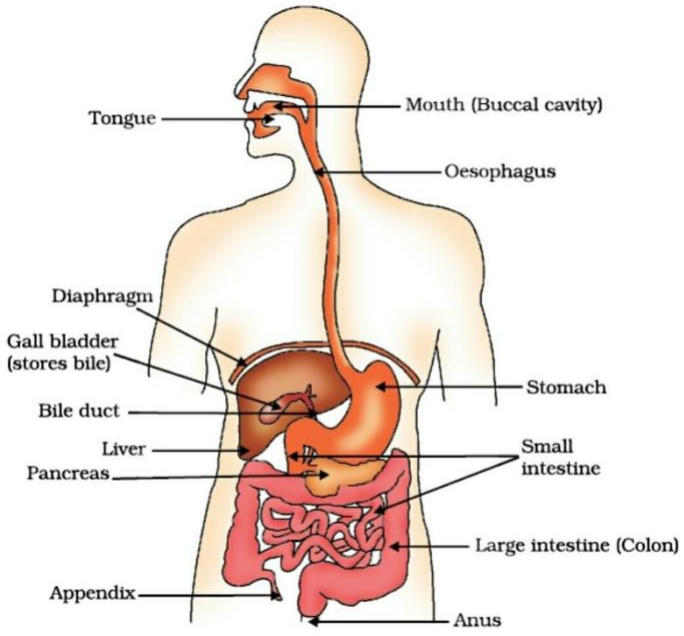
Incomplete combustion occurs when there is insufficient Oxygen(air) and the hydrocarbon is in excess.This reaction burns with a sooty or smokey flame and produces products which are CO(g) and/or C(s) and H2O.

Ans50)

- **Inspiration and expiration are two processes involved in respiration. Inspiration is the process of taking in of the air and expiration is the breathing out of the air.**
- **During inspiration, there is an increase in the volume of the thoracic area. The diaphragm becomes flattened and there is the relaxation of the intercostal muscles. This allows the increase in the thoracic cavity and allows the lungs to expand and take the air inside.**
- **During expiration, there is a decrease in the volume of the thoracic cavity due to diaphragm being dome-shaped and contraction of the intercostal muscles. This allows the lungs to push the air outside.**

Ans 51)

a) Human digestive system



1. **Food is crushed and cut in the mouth with the help of teeth and is mixed with saliva that is secreted by three salivary glands(one below the tongue and two at the side of the jaw) to make it wet and slippery, this process is known as mastication.**
2. **Saliva contains amylase that breaks down complex carbohydrates and the tongue helps in pushing the food to the next part of the alimentary canal.**
3. **The soft food then passes through the esophagus in a wave-like movement known as a peristaltic movement.**
4. **In the stomach, food mixes with gastric juices and dil. HCl. The food is broken down into simple substances with the help of digestive enzymes like pepsinogen, while mucus protects the walls of the stomach.**
5. **From the stomach, the food moves into the small intestines with the help of ring-like muscles called pyloric sphincters which allow only a little food to pass through at a time.**
6. **In the small intestine, carbohydrates, proteins, and fats are broken down with the help of juices secreted by the pancreas, liver, and the small intestine itself.**

7. **Fat is converted into small globule-like forms with the help of bile juices from the liver. This process is known as emulsification.**
8. **Pancreatic juices contain trypsin enzyme that breaks down proteins and lipase that breaks down fats.**
9. **The later part of the small intestines is alkaline in nature and helps in the digestion of carbohydrates.**
10. **The broken-down food is then absorbed by small projections present on the inside walls of the intestine called villi. Villi are surrounded by blood and lymph vessels that absorb the food and transport it to the rest of the body.**
11. **Finally, the food moves into the large intestine where most of the water is removed from the food and is then passed out of the body through the anus.**

b) Absorption of food in the intestine:

1. **The small intestine has small finger-like projections called villi (this increases the surface area for the absorption of food materials), which is highly supplied with blood vessels.**
2. **As food passes through the small intestine, it is absorbed through the villi and enters the blood vessels, through which it is distributed to all parts of the body.**

c) Peristalsis:

1. **Peristalsis is the specific name given to the food movement in the body.**
2. **The peristaltic movement also called peristalsis refers to the contraction and relaxation of the food in the esophagus and the food pipe and the food is forced down the track to the stomach.**
3. **This movement is involuntary and is necessary for the movement of food down the stomach and bowels down the anus.**

Ans 52) The degree of divergence or convergence achieved by a given lens is called power of the lens.

The unit of power of lens is diopter and is expressed by D.

Focal length of lens used by first student is in positive hence it is a convex lens.

The lens of second student is a concave lens.

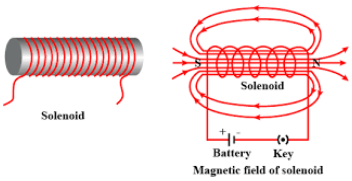
p= 1/f = 1/0.5 = 2

Power of lens Nilesh =+2

Power of lens Shital= -2

Ans 53) **A construction like a coil made by a conducting wire wound closely and separately in form of a cylinder is called a solenoid. as shown in figure below. The magnetic field resulting from solenoid is shown in the figure above. It is same as that due to a bar magnet. Thus, one end of the solenoid behaves as North Pole and the other end as South Pole. In the inner region of a solenoid, the field lines are parallel indicating that the magnetic field is uniform at every point inside the solenoid.**

The strength of the magnetic field produced by a solenoid is directly proportional to the number of turns on the solenoid and the current passing through it.



Ans 54) 'Waste' is any unwanted or unuseful material. These are objects that have been discarded since these materials aren't functioning anymore. Waste can be in any form (liquid, solid or gas), although generally, waste is solid. There are various types of wastes like unwanted food, torn clothes, kitchen waste, etc.

In general, the wastes may be classified into the following categories:

Solid wastes - These are the unwanted substances that are discarded by human society. These include urban wastes, industrial wastes, agricultural wastes, biomedical wastes and radioactive wastes.

Liquid wastes - Wastes generated from washing, flushing or manufacturing processes of industries are called liquid wastes.

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