Grade 10 Telangana Science 2019

Part A

Section- I

7 x 1 = 7

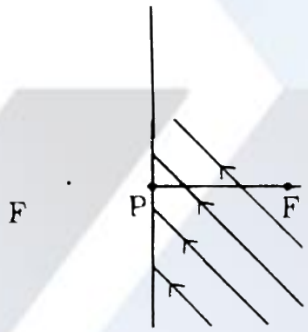
Q1. State the difference between the virtual image and the real image.

Solution:

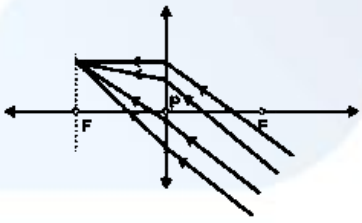
Real Image: Formed when light rays actually converge; these images are inverted.

Virtual Image: Occurs where light rays appear to diverge; these images are erect.

Q2. Complete the following ray diagram.



Solution:



Q3. Write any two uses of the spherical mirror.

Solution:

Reflecting telescopes: Concave spherical mirrors are used to collect and focus light to form images of distant objects.

Rear view mirrors: Convex spherical mirrors are used in vehicles to provide a wider field of view.

Q4. Does the focal length of a spherical mirror change when it is completely immersed in the water? Predict and write the reason.

Solution:

No, the focal length does not change. This is because the focal length of a mirror depends solely on its radius of curvature and is independent of the medium surrounding it.

Q5. What happens if the household electric appliances are connected in series?

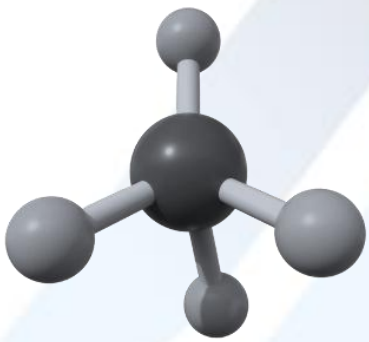
Solution:

Connecting household electrical appliances in series is impractical because if one appliance fails or is turned off, it interrupts the circuit, causing all connected devices to stop working.

Q6. Draw the structure of Methane molecule and mention the bond angle.

Solution:

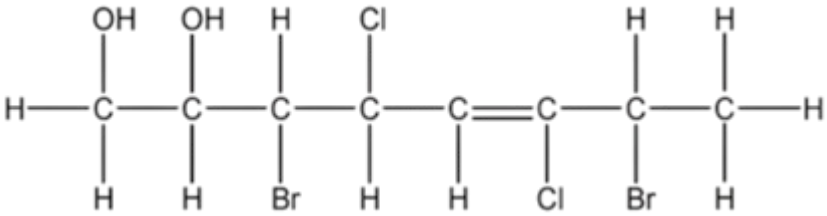
Structure of methane molecule:



Methane (CH_4) has a tetrahedral molecular geometry, with the carbon atom at the center and four hydrogen atoms at the corners. The bond angle between any two hydrogen atoms is approximately 109.5°.

Q7. Write the atomic structure of the following carbon compound. 3, 7-dibromo-4, -6 dichloro-oct-5-ene 1, 2 diol.

Solution:



The atomic structure of 3,7-dibromo-4,6-dichloro-oct-5-ene-1,2-diol consists of an 8-carbon chain with a double bond between the 5th and 6th carbons, bromine on the 3rd and 7th carbons, chlorine on the 4th and 6th carbons, and hydroxyl (-OH) groups on the 1st and 2nd carbons.

Section -II

6*2= 12

Q8. Write any four uses of washing soda.

Solution:

Washing soda, or sodium carbonate, serves multiple purposes across various industries:

- Manufacturing: It's integral in producing glass, soap, and borax.
- Water softening: Utilized to reduce water hardness by precipitating calcium and magnesium ions.
- Analytical chemistry: Acts as a key reagent in both qualitative and quantitative analyses.
- Industrial applications: Employed in the paper, paint, and textile sectors for diverse processes.

Q9. Write the electronic configuration of Na^+ and Cl^-

Solution:

Sodium (Na): Atomic number = 11. Its electronic configuration is 2,8,1. When sodium loses one electron, it forms Na^+, with an electronic configuration of 2,8.

Chlorine (Cl): Atomic number = 17. Its electronic configuration is 2,8,7 . When chlorine gains one electron, it forms Cl^- , with an electronic configuration of 2,8,8.

Q10. List out the materials required for the Oersted experiment and mention the precautions to be taken in the experiment.

Solution:

Material Required for Oersted Experiment:

a. A long straight conductor (like a copper wire)

b. A power supply (such as a battery or a DC power source)

c. A magnetic compass

d. Connecting wires

e. Switch

f. A support stand (to hold the conductor)

g. A ruler (optional, for measuring distances)

Precautions to be Taken:

1. Ensure that the current flowing through the conductor is direct current (DC), as AC will cause fluctuating magnetic fields.
2. The compass should be placed carefully near the conductor without touching it.
3. Avoid using high voltage as it may cause damage or danger.
4. Check the connections of the wires to ensure they are secure to prevent any short circuit.
5. The wire should be held in a straight line, without kinks, for accurate results.
6. Keep the experimental setup away from other magnetic materials to avoid interference with the magnetic field produced.

Q11. Observe the given table and answer the following question.

SI. 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.	$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$

a. Mention the divalent element name.

b. Name the element that belongs to the 3rd period and VA group.

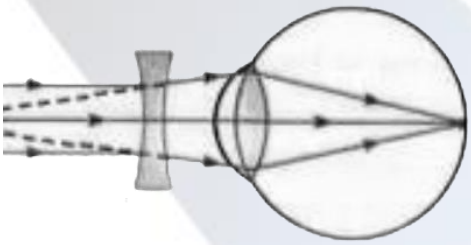
Solution:

a. Ca^{2+} or Calcium is the divalent element with electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2$

b. The element belonging to the 3rd period and VA group is Phosphorous(P) with electronic configuration $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$.

Q12. Draw a ray diagram showing the correction of myopia eye defect.

Solution:



To correct myopia (nearsightedness), a concave lens (a lens with a negative focal length) is used.

Q13. What will happen if dispersion and scattering of light do not occur?

Solution:

If dispersion and scattering of light did not occur, many natural phenomena would not be visible to us. For instance, the blue color of the sky, which is caused by the scattering of sunlight, would not be seen. We would also miss the red hues during sunrise and sunset, the formation of rainbows, and the colorful oil spills on the road due to light dispersion.

Additionally, traffic lights, particularly the red signal, would not be as clearly visible, as their visibility relies on light scattering. Therefore, these phenomena would be absent without the effects of dispersion and scattering.

Section -III

4 x 4=16

Q14. Write the precautions to be taken in the experiment to show air and water are essential for rusting iron articles, and also write the experimental procedure.

Solution:

Precautions:

1. Ensure the test tubes and other apparatus are clean to avoid contamination.

2. The corks must be sealed tightly to prevent unwanted air or moisture from entering or escaping.

3. Use fresh water in the test tubes to ensure accurate results.

4. The anhydrous calcium chloride must be kept dry to absorb moisture effectively.

5. Make sure to label the test tubes clearly to avoid confusion.

Experimental Procedure:

1. Take three test tubes labeled A, B, and C, and place an iron nail in each test tube.

2. In test tube A, fill the tube with water and seal it with a cork. This allows both water and air to be present for rusting.

3. In test tube B, pour some boiled water (to remove dissolved air) and add a layer of oil to prevent the entry of air, then seal it with a cork. This prevents both air and water from reaching the nail.

4. In test tube C, add anhydrous calcium chloride to absorb any moisture in the air and seal the tube with a cork. This ensures no moisture or air will be present.

5. Leave the test tubes undisturbed for several days and observe the changes.

Observations:

1. After a few days, the nail in test tube A will be rusted because it is exposed to both air and water.

2. The nail in test tube B will remain unaffected because there is no water, even though air is present.

3. The nail in test tube C will also remain rust-free as the dry air and absence of water prevent rusting.

OR

List out the material required in the experiment to show that the electric resistance depends upon the nature of the material and write experimental procedure.

Solution:

Materials Required:

1. Nichrome wire

2. Torch bulb

3. 10 W bulb

4. Ammeter (0-5 A range)

5. Plug key

6. Connecting wires

7. 4 dry cells (1.5 V each)

8. Circuit setup tools (e.g., battery holder)

Experimental Procedure:

1. Set up a circuit by connecting four 1.5 V dry cells in series along with an ammeter. Leave a gap between points XY in the circuit.

2. To start, insert the nichrome wire in the gap XY and complete the circuit by plugging in the key. Record the current reading from the ammeter.

3. After noting the reading, remove the key from the plug to disconnect the circuit.

4. Now, replace the nichrome wire with the torch bulb in the gap XY and close the circuit again by plugging in the key. Record the ammeter reading for the torch bulb.

5. Repeat the process using different materials in the gap to observe how the current (and thus resistance) varies with the material used.

Note: Materials with lower resistivity allow current to flow more easily, resulting in a higher current reading.

This experiment demonstrates how the electric resistance of a material depends on its nature. Materials with lower resistivity conduct electricity better than those with higher resistivity.

Q15. Explain the formation of the Rainbow.

Solution:

A rainbow is a multicolored arc that forms when light, usually sunlight, interacts with water droplets in the atmosphere. The process involves the following steps:

1. Refraction: When sunlight enters a water droplet, it slows down and bends (refracts) due to the change in medium from air to water.

2. Reflection: After refraction, the light reflects off the inner surface of the water droplet.

3. Refraction Again: As the light exits the droplet, it refracts again, spreading into different colors due to the varying wavelengths of light.

4. Dispersion: The different colors of light (such as red, orange, yellow, green, blue, indigo, and violet) separate as they pass through the droplet, forming the spectrum of colors that make up the rainbow.

OR

Explain the working process of an induction stove.

Solution:

An induction stove operates using electromagnetic induction to heat cookware directly. Beneath the stove's smooth ceramic surface lies a coil of wire. When an alternating electric current passes through this coil, it generates a fluctuating magnetic field. This magnetic field induces electric currents, known as eddy currents, in the base of ferromagnetic cookware placed on the stove. The resistance within the cookware to these eddy currents produces heat, which cooks the food. This method ensures that only the cookware and its contents are heated, while the stove's surface remains relatively cool, enhancing both energy efficiency and safety.

Q16. How many grams of O_2 is required for combustion of 480 grams of Mg? Find the mass of "MgO" formed in the reaction. (Mg= 24 u, O=16 u)

Solution:

Given:

The balanced equation is: $2Mg+O_2 \rightarrow 2MgO$

Mass of Mg = 480 g

Molar mass of Mg = 24 g/mol

Molar mass of O = 16 g/mol (so, O_2 has a molar mass of 32 g/mol)

To calculate the moles of Mg used in the reaction:

Moles of Mg = Mass of Mg / Molar mass of Mg

=480/24

= 20 moles of Mg

From the balanced equation, 2 moles of Mg react with 1 mole of O_2.

Therefore, the moles of O_2 required = (20 moles of Mg) × (1 mole of O_2 / 2 moles of Mg)

= 10 moles of O_2.

To calculate the mass of O_2 required:

Mass of O_2 = Moles of O_2 × Molar mass of O_2 =10×32=320 g of O_2

To calculate the mass of MgO formed:

From the equation, 2 moles of Mg produce 2 moles of MgO.

Therefore, the moles of MgO formed = moles of Mg = 20 moles of MgO.

The molar mass of MgO = 24 (for Mg) + 16 (for O) = 40 g/mol.

Mass of MgO formed = Moles of MgO × Molar mass of MgO =20×40=800 g of MgO

320 g of O_2 is required for the combustion of 480 g of Mg.

The mass of MgO formed is 800 g.

OR

Write the factors that influence ionization energy and explain any three of them.

Solution:

Ionization energy is the minimum energy required to remove the most loosely bound electron from an isolated gaseous atom or ion. Several factors influence this energy:

1. **Nuclear Charge (Atomic Number):** A higher nuclear charge, due to an increased number of protons, results in a stronger attraction between the nucleus and electrons. This makes it more difficult to remove an electron, thereby increasing the ionization energy.
2. **Atomic Radius (Distance of Outer Electrons from the Nucleus):** As the atomic radius increases, the outermost electrons are farther from the nucleus. This greater distance reduces the electrostatic attraction between the nucleus and these electrons, making them easier to remove and thus decreasing the ionization energy.
3. **Shielding Effect (Screening by Inner Electrons):** Inner-shell electrons can shield outer electrons from the full attraction of the nucleus. As the number of inner electron shells increases, this shielding effect becomes more significant, reducing the effective nuclear charge felt by the outermost electrons. Consequently, these electrons are more easily removed, leading to a decrease in ionization energy.

Q17. The magnification of the image formed by the spherical mirror is M= -1.25. Based on this information, answer the following questions.

i) Which kind of mirror forms such an image?

ii) Write the characteristics of the image.

iii) If the size of the object is 2 cm, then what is the size of the image?

iv) Write the position of the object on principle axis.

Solution:

i) A negative magnification indicates that the image formed is real and inverted, which is characteristic of a concave mirror.

ii) The image formed as a result of the concave mirror will be real, inverted and 1.25 times larger than the object.

iii) The image height is calculated as:

Image Height = Magnification × Object Height

= −1.25 × 2 cm

= −2.5 cm

The negative sign indicates the image is inverted, making it 2.5 cm tall and inverted

iv) For a concave mirror, a magnification of -1.25 suggests that the object is positioned between the center of curvature (C) and the focal point (F) along the principal axis. In this position, the concave mirror produces a real, inverted, and magnified image.

OR

Organic compound	Methane	Ethane	Propene	Butene	Pentyne	Hexyne
Formula	CH_4	C_2H_6	C_3H_6	C_4H_8	C_5H_8	C_6H_{10}

Observe the above table and answer the following questions.

1. Write the general formula of Alkanes.
2. Mention the names of unsaturated hydrocarbons
3. Write the homologous series of Alkynes
4. Write the formula of Hexyne.

Solution:

1) Alkanes are saturated hydrocarbons with only single bonds between carbon atoms. The general formula for an alkane is C_nH_{2n+2}. If n is the number of atoms of carbon, then 2n+2 is the number of atoms of hydrogen. Methane and ethane from the table are examples of simple alkanes.

2) Unsaturated hydrocarbons are compounds containing at least one carbon - carbon double bond (alkenes) or triple bond (alkynes). Examples include:

Alkenes**:** Propene (C_3H_6) and Butene (C_4H_8).

Alkynes**:** Pentyne (C_5H_8) and Hexyne (C_6H_{10}).

3) Alkynes have general formula C_nH_{2n-2} . These unsaturated hydrocarbons have at least one carbon-carbon triple bond. Pentyne and Hexyne are examples for homologous series of Alkynes.

4) Hexyne is an alkyne with six carbon atoms and has the molecular formula C_6H_{10}.

Part- B

Q1. A bi-convex lens converges the parallel rays on the principle axis at 10 cm , then the focal length is:

(a) 5 cm

(b) 10 cm

(c)) 20 cm

(d) 25 cm

Solution:

(c) 20 cm

Q2. Which part of the human eye controls the entering of the light rays into the eyes?

(a) Iris

(b) Aqueous Humour

(c) Cornea

(d) Eye Lens

Solution:

(a) Iris

Q3. Which of the following is used to purify drinking water.

(a) Plaster of Paris

(b) Washing Soda

(c) Baking Soda

(d) Bleaching Powder

Solution:

(d) Bleaching powder is used to disinfect drinking water

Q4. Which of the following shells have a maximum of 32 electrons?

(a) N

(b) M

(c) L

(d) K

Solution:

(a) N

Q5. IUPAC name of the compound CH_3CCl_2- CBr_2-CH= CH_2 is:

(a) 2, 2 dichloro-3, 3-dibromo pent 1-ene

(b) 3, 3 dibromo pent-1-ene

(c) 3, 3 dibromo-4, 4-dichloro pent-2-ene

(d) 3, 3 dibromo-4, 4 dichloro pent 1-ene

Solution:

(d) 3, 3 dibromo-4, 4 dichloro pent 1-ene

Q6. The chemical is used in fire extinguishers

(a) Sodium chloride

(b) Bleaching powder

(c) Sodium bicarbonate

(d) Plaster of Paris

Solution:

(c) Sodium bicarbonate

Q7. Which of the following is a balanced equation?

(a) $Mg+O_2 \rightarrow MgO$

(b) $C + O_2 \rightarrow CO_2$

(c) $H_2 + O_2 \rightarrow H_2O$

(d) $CaCO_3 \rightarrow CaO+ O_2$

Solution:

(b) $C + O_2 \rightarrow CO_2$ is a balanced equation

Q8. 11, 12, 13 and 14 are the atomic numbers of the elements Na, Mg, Al, and Si respectively. Which element has more atomic radius?

(a) Na

(b) Mg

(c) Al

(d) Si

Solution:

(a) Na

Q9. Which of the following compounds is formed by the ionic bond?

(a) H_2O

(b) NH_3

(c) MgO

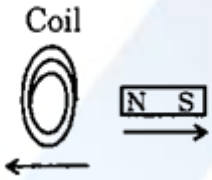
(d) HCl

Solution:

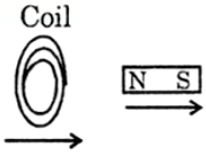
(c) MgO is a compound formed by the ionic bond

Q10. In which of the following situations will the current be induced?

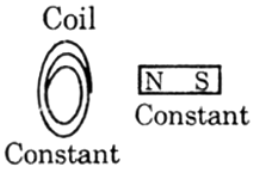
(a)



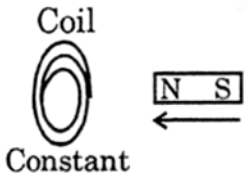
(b)



(c)

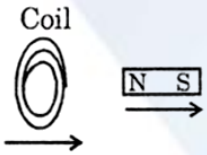


(d)



Solution:

(b)



Biological Science

Part – A

Section-I

$7 \times 1 = 7$

Q1. Write two examples of non-renewable resources.

Solution:

Non-renewable energy sources consist primarily of fossil fuels like coal and petroleum, which are finite and diminish over time. These energy sources are derived from fossil deposits formed over millions of years. Examples include coal, crude oil, natural gas, and uranium.

Q2. The two questions which you can ask the doctor to know more details about high blood pressure.

Solution

Given here are some questions to ask the doctor to know more about high blood pressure:

1. What are the common causes of high blood pressure?
2. How does high blood pressure affect overall health?
3. What lifestyle changes can help manage high blood pressure?
4. Are there any side effects of the medicines prescribed for high blood pressure?

Q3. Write two slogans for the campaign on malnutrition.

Solution

Some slogans for the campaign on malnutrition are:

1. "Eat Right, Live Strong" or
2. "Eat Well and Live Well"
3. "Your Health is Your Wealth"

Q4. Why do we call the appendix as a vestigial organ?

Solution

The appendix is considered a vestigial organ because its original role in food digestion has been lost or is now almost negligible in the human body. Vestigial organs are those that have little to no function or use. Hence, the appendix is classified as a vestigial organ.

Q5. Write two secondary metabolites, which you use in your daily life.

Solution

Secondary metabolites play significant roles in protection, competition, and interactions between species. In our daily lives, we utilize secondary metabolites in various forms, such as medicines for treating diseases, natural flavorings to enhance food taste, pigments for coloring, and substances with recreational uses.

Q6. What happens if there is no peristaltic movement in Oesophagus?

Solution

If peristaltic movement in the esophagus is absent, the food we eat will not be able to move down into the stomach. This would hinder the entire process of digestion, as food would not reach the stomach for further breakdown, nor would it proceed to the small intestine for nutrient absorption.

Q7. Identify the figure.

Solution

The figure shows a forest wildfire, an uncontrolled fire that spreads quickly through vegetation, causing destruction but also aiding forest regeneration by clearing dead matter.

Section II

$6 \times 2 = 12$

Q8. Write two voluntary functions and two involuntary functions you have observed in your body.

Solution

Functions like walking, eating, jumping or running, etc., are voluntary actions while heartbeats, digestion, or sneezing are all involuntary functions. Learn more about voluntary and involuntary actions here.

Q9. Write two chemicals and two materials required to conduct the experiment "Heat and Carbon dioxide are evolved during anaerobic respiration."

Solution

The chemicals required for the experiment include potassium hydroxide (KOH) solution and Vaseline. The materials needed are a conical flask, a beaker, a test tube

bent at two angles, germinating seeds, and other basic laboratory apparatus to set up the experiment.

Q10. When does parthenogenesis occur? Write the names of two animals in which parthenogenesis takes place.

Solution

Parthenogenesis is a form of asexual reproduction where an embryo develops from an unfertilized egg cell, eliminating the need for fertilization. This phenomenon is observed in various species, including honeybees, certain wasps, ants, and some birds.

Q11. What happens if there is no evolution?

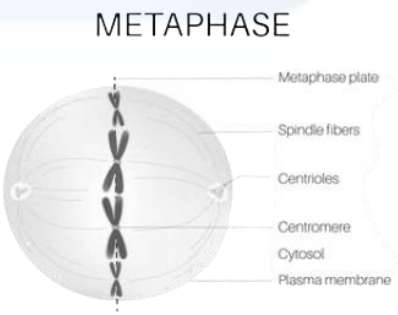
Solution

Evolution is the fundamental process that drives the diversity of life on Earth. Without evolution, species would lack the ability to adapt to environmental changes, leading to widespread extinction. The absence of evolutionary mechanisms would result in a static biosphere, unable to respond to challenges such as climate shifts, habitat alterations, or emerging diseases. Consequently, the rich biodiversity we observe today would not exist, and life would be limited to the most basic forms, incapable of developing the complex ecosystems that sustain various life forms.

Q12. Draw the figure of metaphase in Mitosis and write about it.

Solution

Metaphase is the third stage of Mitosis, where the duplicated genetic material is carried from the nucleus of the parent cell to the two identical daughter cells.



Q13. Observe the following table:

Name of the phylum/ organism	Excretory system/ organ
Protozoa	Diffusion
Porifera	Water bathes all their cells
Platyhelminthes	Flame cells
Annelida	Nephridia
Arthropoda	Green Glands
Reptiles. Aves and Mammals	Kidney

Based on the above table, write the answers to the following questions.

(i) In the above table, which living organisms contain kidneys as excretory organs like human beings?

(ii) Write the excretory organs present in the Earthworm and Cockroach.

Solution

(i) From the above table, you can see that Reptiles, Aves (birds), and Mammals have kidneys as excretory organs, the same as human beings.

(ii) Earthworms, classified under the phylum Annelida, utilize nephridia as their excretory organs. These segmentally arranged coiled tubules filter waste from the coelomic fluid, aiding in excretion and osmoregulation. In contrast, insects such as cockroaches possess Malpighian tubules for excretion. These tubules extend into the hemolymph and function by transporting waste products into the digestive tract, from where they are expelled from the body.

Section III

$4 \times 4 = 16$

Q14. Explain the process of coagulation of blood.

Solution

Blood coagulation is a critical process to prevent excessive blood loss from the body. It involves the formation of a clot, known as thrombus, through the interaction of platelets and fibrin.

1. **Primary Hemostasis**: When a blood vessel is injured, the vascular walls constrict (vasoconstriction) to reduce blood flow, initiating the first response to the injury.
2. **Platelet Plug Formation**: Platelets are activated and gather at the site of injury, forming a temporary plug. They release chemicals like serotonin, ADP, and thromboxane, which further activate more platelets.
3. **Secondary Hemostasis**: This step involves the clotting cascade, where clotting factors activate one another, leading to the conversion of fibrinogen (a soluble plasma protein) into fibrin. The fibrin threads form a mesh that stabilizes the platelet plug, creating a solid blood clot.

If red blood cells are trapped within the fibrin mesh, the clot is called a red thrombus; otherwise, it is a white thrombus. This entire process ensures that bleeding is controlled and prevents further blood loss.

OR

Explain in brief any two pieces of evidence of evolution.

Solution

Evolution refers to the gradual change in the characteristics of species over generations. Two key pieces of evidence supporting the theory of evolution are:

Fossil Evidence: Fossils provide a record of past life forms, showing how species have changed over time. By studying fossils, scientists can observe the progression of species and identify the transitional forms that link different groups of organisms. For example, fossils of early birds show the gradual evolution from reptilian ancestors with features like scales to the development of feathers and flight capabilities.

Comparative Anatomy: The study of the anatomical structures of different species provides insight into their evolutionary relationships. Homologous structures, such as the similar bone structures found in the forelimbs of humans, bats, and whales, suggest a common ancestry. Despite differences in function, these structures share a common origin, indicating that these species evolved from a common ancestor.

Q15. Explain the Phytohormones, which controls growth in plants.

Solution

Phytohormones are chemicals produced by plants that regulate their growth and development. There are five major types:

1. **Auxins**: Promote cell elongation, help with phototropism and gravitropism, and control root development and apical dominance.
2. **Gibberellins**: Stimulate stem elongation, seed germination, and flowering, and help break seed dormancy.
3. **Cytokinins**: Promote cell division, delay aging, and enhance lateral bud growth, root and shoot development.
4. **Abscisic Acid (ABA)**: Regulates stress responses, conserves water, inhibits seed germination, and promotes leaf and fruit drop.
5. **Ethylene**: A gas that controls fruit ripening, leaf aging, and responses to mechanical stress, also promoting flowering in some plants.

OR

Explain the importance and implementation of community based interventions and farmer based interventions for water management.

Solution

Importance and Implementation of Community-Based Interventions for Water Management:

- Community-based interventions allow for the efficient use of water through collective planning, ensuring that each household uses only the amount of water needed for their daily activities.
- Water management is approached collaboratively, fostering a strong sense of responsibility within the community, ensuring equitable distribution, and reducing conflicts over water resources.
- Communities also engage in resolving disputes related to water access and share knowledge on effective water conservation methods.
- Educating children about the importance of water helps create awareness from an early age, encouraging responsible water usage among future generations.

Farmer-Based Interventions for Water Management:

- Farmers can optimize water usage by aligning their agricultural practices with the availability of water resources, ensuring efficient irrigation and crop planning.
- Storing rainwater in barrels, wells, or tanks can reduce dependency on external water sources and provide an additional water supply for household needs.
- Effective water management also involves considering different soil types and adjusting irrigation methods accordingly to ensure crops receive adequate water while preventing wastage.

Q16. Explain the procedure and precautions to prove "the presence of starch in leaves" experiment.

Solution

Procedure to Prove the Presence of Starch in Leaves:

1. **Select a Plant**: Choose a healthy plant with green leaves.
2. **Boiling the Leaf**: Boil the leaf in a beaker containing water for about 5-10 minutes. This step helps to kill the leaf and make it soft.
3. **Decolorization**: After boiling, remove the leaf carefully and place it in a beaker containing iodine solution for 10-15 minutes. The iodine stains the starch blue-black.
4. **Rinsing the Leaf**: After the leaf has been stained, rinse it in cold water to soften it further and remove excess iodine solution.
5. **Observe the Color Change**: The leaf is then observed for a color change. If starch is present, the leaf will turn blue-black when exposed to iodine solution.

Precautions:

1. Handle the boiling water and heated materials carefully to avoid burns or injury.
2. Ensure the iodine solution does not spill, as it can stain clothing and skin.
3. Ensure the leaf is thoroughly boiled to stop all cellular activities before testing for starch.
4. When using the iodine solution, ensure it's used in appropriate quantities and for the required duration to get accurate results.
5. Always wear gloves or use tongs to handle the hot materials for safety.

OR

Explain the procedure and observations of the experiment conducted to observe the internal structure of the kidney.

Solution

Aim: To study the external and internal structure of a kidney.

Materials Required:

- Fresh sheep/goat kidney or 3D model of a kidney
- Sharp blade/scalpel
- Tray
- Jug of water

Procedure:

1. Wash the kidney thoroughly to remove any blood.
2. Place the kidney in a tray and observe the external features.
3. Take a longitudinal section of the kidney using a sharp blade under the teacher's guidance.
4. Record observations in the observation book.
5. Draw the observed structures and compare them with a goat's kidney.

Observations to make:

- Shape and color of the kidney
- Presence of any attachments on the upper portion of the kidney
- Compare the internal structures with a goat's kidney
- In the longitudinal section, observe the color of the outer region and the dark brown inner area
- Count the tubes emerging from the kidney fissure

Key features of the kidney:

- Kidneys are bean-shaped, reddish-brown organs located in the abdominal cavity, one on each side of the spine.
- The right kidney is positioned slightly lower than the left due to the liver above it.
- Each kidney has a fissure (hilum) where the renal artery enters, and the renal vein and ureter exit.
- The kidney's outer layer is called the **cortex**, and the inner layer is the **medulla**.

- Kidneys are made up of millions of nephrons (functional units) responsible for filtering waste from the blood.

Conclusion: This experiment helps in understanding the structural details of the kidney, including its external and internal features, which are crucial for filtering waste from the blood.

Q17. Observe the following table:

Reproduction system	**Organisms**
Fission	Paramoecium, Bacteria
Budding	Yeast, Hydra
Fragmentation	Flatworms, Spirogyra
Rhizome	Ginger, Turmeric
Cutting	Rose, Hibiscus
Grafting	Citrus, Apple

Based on the information given in the table, write the answers to the following questions.

(i) Write the names of two organisms that show asexual reproduction.

(ii) Write two artificial vegetative propagation methods mentioned in the table.

(iii) Write the names of two plants, which undergo natural vegetative propagation mentioned in the table

(iv) In fission, how many organisms can we get from one organism.

Solution

(i) Fission, Budding, and fragmentation are all asexual methods of reproduction. Hence, two organisms that show asexual reproduction are Bacteria and flatworms.

(ii) Cutting and grafting are the two artificial vegetative propagation methods.

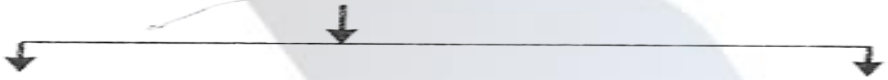
(iii) Ginger and Turmeric are two plants that undergo natural vegetative propagation

(iv) In fission, two or more organisms can be produced from one organism.

OR

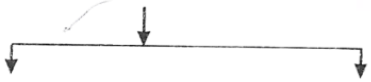
Observe the following:

Glucose → Pyruvic Acid + Energy
(3 Carbon compound)



Absence or low amount of Oxygen (Anaerobic respiration and fermentation)

Presence of Oxygen (Aerobic Respiration)



CO_2+ H_2O+ Energy

Lactic acid + Energy
Eg: Lactobacillus

Ethanol + CO_2 + Energy
Eg: Yeast

Write the answers to the following questions.

(i) How many Pyruvic acid molecules form from one glucose?

(ii) What condition influences Pyruvic acid to participate in Aerobic and Anaerobic respiration?

(iii) In which we get more energy in both Aerobic and Anaerobic respiration?

(iv) The chemical that is formed in human muscles during anaerobic respiration.

Solution

(i) Glucose Breakdown into Pyruvic Acid: A single glucose molecule undergoes glycolysis, resulting in the formation of two pyruvate molecules.

(ii) Anaerobic and Aerobic Respiration of Pyruvic Acid: In the absence or scarcity of oxygen, pyruvate participates in anaerobic respiration or fermentation. Conversely, in the presence of oxygen, pyruvate enters aerobic respiration.

(iii) Energy Yield in Aerobic vs. Anaerobic Respiration: Aerobic respiration is more efficient in energy production compared to anaerobic respiration, leading to a higher energy yield during aerobic processes.

(iv) Lactic Acid Formation in Human Muscles: During anaerobic respiration in human muscles, glucose is converted into lactic acid.