Grade 10 Andhra Pradesh Science 2016 Paper – I

Physical Sciences

Part A

Section- I

5x2=10

Notes:

1. Answer any five questions, choosing at least two from each group.
2. Each question carries two marks.

Group A

Q1. If a light ray does not deviate at the interface of two media, what are the possibilities?

Solution:

If a light ray does not deviate at the interface of two media the two possibilities are:
The refractive index of both the mediums are the same.
It coincides with normal at the point of incidence.

Q2. What happens to the water molecules when the wet clothes are dried up?

Solution:

When wet clothes dry, the water molecules within them gradually evaporate. Evaporation is the process in which liquid molecules escape from the surface into the air at any temperature. Water molecules in the fabric move randomly, colliding with each other and transferring energy in the process. When molecules from the liquid's interior collide with those at the surface, some surface molecules gain enough energy to break free and enter the air. Some of these released molecules may return to the liquid upon colliding with air particles. However, if more molecules escape than return, the liquid level decreases. This continues until all the

liquid has evaporated. As evaporation occurs, the remaining molecules lose energy, slowing down as they transfer energy to those escaping.

Q3. Explain the reason for the blue colour of the sky briefly.

Solution:

When light of a specific frequency interacts with a free atom or molecule in space, the response depends on whether the size of the atom or molecule is comparable to the light's wavelength. If this condition is met, the atom absorbs the light and begins to vibrate. These vibrations cause the atom to release a portion of the absorbed energy in various directions with varying intensities. This emitted light is known as scattered light, and the phenomenon of redistributing light in multiple directions with different intensities is called light scattering.

In Earth's atmosphere, various molecules and atoms contribute to scattering based on their sizes. The blue color of the sky results from the scattering of blue light by nitrogen (N_2) and oxygen (O_2) molecules, as their sizes are like the wavelength of blue light. These molecules serve as scattering centers, leading to the predominant scattering of blue light in the atmosphere.

Q4. Give any two applications of Faraday's Law of Induction in daily life?

Solution:

Some applications for Faraday's Law of Induction are given below:

- The tape recorder that we use to listen to songs (or) record voices works on the principle of electromagnetic induction. It consists of a piece of plastic tape coated with iron oxide. The tape recorder is also magnetized more in some parts than in others. Hence, when the tape is moved past a small coil of wire (head of the tape recorder), the magnetic field produced by the tape changes. The result of this is the generation of current in the small coil of wire.
- An induction stove works on the principle of electromagnetic induction with a metal coil, kept just beneath the cooling surface. It carries alternating current (AC) so that AC produces an alternating magnetic field. Now, keep a metal pan containing water, the varying magnetic field beneath it crosses the bottom surface

of the pan and an EMF is induced in it. Because the pan is metal, the induced EMF generates an induced current in it. Since the pan has a finite resistance, the flow induces a current in it. In result, it produces heat, and this heat is conducted to the water. That is why we call this stove an induction stove.

Q5. Why does acetic acid not conduct electricity?

Solution:

Acidic and basic solutions in water can conduct electricity due to the presence of hydrogen ions and hydroxide ions. However, pure acetic acid, known as glacial acetic acid, does not conduct electricity because it lacks water and, therefore, cannot dissociate into hydronium and acetate ions.

Q6. What is nl × method? How is it useful?

Solution:

The arrangement of electrons within an atom's shells, sub-shells, and orbitals is referred to as its electronic configuration. In shorthand notation, this configuration is expressed using the principal energy level (n), the sub-level symbol (l), and the number of electrons (x) in that sub-shell as a superscript, written as **nl^x**. Understanding how electrons are distributed across atomic orbitals helps explain an atom's electronic properties and reactivity.

Q7. How does the metallic character change when we move (i) across a period from left to right, (ii) down a group?

Solution:

(i) The metallic nature of elements gradually decreases as we move from left to right across a period in the periodic table.

(ii) Within a group, the metallic character increases as we move downward from top to bottom.

Q8. Draw the simple figure of a soap molecule.

Solution:

A soap molecule

Section- II

4x1=4

Q9. Define the Latent heat of Fusion.

Solution:

Latent heat of Fusion is the heat energy required to convert 1 gm of solid ultimately into a liquid at a constant temperature.

Q10. What is the relationship between the focal length (f) and the radius of curvature (R)?

Solution:

First, hold a concave mirror such that sunlight falls on it. Then, take a small piece of paper and slowly move it in front of the mirror and find out the point where you get the smallest and brightest spot, which will be the image of the sun. The rays coming from the sun parallel to the principal axis of the concave mirror converge to a point called Focus or focal point (F) of the concave mirror. Measure the distance of this spot from the pole of the mirror. This distance is the focal length (f) of the mirror. Now, the radius of curvature will be twice this distance (R = 2f). Thus, we can conclude that the radius of curvature (R) is equal to twice the focal length (2f).

Q11. What is electric shock?

Solution:

The current passing through our body when we touch a live wire of 240 V is given by $I = 240/100000 = 0.0024$ A. When this quantity of current flows through the body, the functioning of organs inside the body gets disturbed. This disturbance inside the body is felt like an electric shock.

Q12. Why do we apply paint on iron articles?

Solution:

Iron articles corrode easily when exposed to air. One of the simplest methods of preventing corrosion is to prevent the surface of the metallic object from meeting the atmosphere. This can be done by covering the surface with paint. Hence, we apply paint on iron articles to prevent it from rusting.

Q13. Which group elements are called Carbon family?

Solution:

Carbon family can be found towards the right side of the periodic table. The members of this family include carbon (C), silicon (Si), germanium (Ge), tin (Sn), lead (Pb), and flerovium (FI). It lies within the p-block. In modern IUPAC notation, it is called Group 14, while in the field of semiconductor physics, it is still universally called Group IV.

Q14. Define Isomerism.

Solution:

Isomerism is the phenomenon of possessing the same molecular formula but different properties by the compounds. Meanwhile, the compounds that exhibit Isomerism are called isomers.

Section-III

4x4=16

Group-A

Q15. (a) How much energy is transferred when 1 gm of boiling water at 100°C condenses to water at 100°C?

Solution:

Assume latent heat of vaporisation for water is 540 cal/g

Given, Mass of water (m) $= 1$ g

Energy Transfer $(Q) = mL = 1 \times 540$ cal

Thus, the energy transferred when 1 gm of boiling water at 100°C condenses to water at 100°C is 540 cal/g.

(b) How much energy is transferred when 1 gm of boiling water at 100˚C cools to water at 0˚C?

Solution:

Given Mass of water (m) = 1 g

Initial Temperature (T_1) = 0˚C

Final Temperature (T_2) = 100˚C

Specific heat of water (s) = 1 cal/g − 0˚C

Heat energy transferred (Q) = ms ($T_2 - T_1$) = $1 \times 1 \times (100 - 0) = 100$ cal

Thus, energy transferred when 1 gm of boiling water at 100˚C cools to water at 0˚C is 100 cal.

(c) How much energy is released or absorbed when 1 gm of water at 0˚C freezes to ice at 0˚C?

Solution:

Assume that Latent heat of Ice = 80 cal

Mass of ice = 1 g

Heat Energy Released (Q)= mL= $1 \times 80 = 80$ Cal

Thus, the energy released or absorbed when 1 gm of water at 0˚C freezes to ice at 0˚C is 80 cal.

(d) How much energy is released or absorbed when 1 gm of steam at 100˚C turns to ice at 0˚C?

Solution:

Given that Latent heat of Steam (L_s) = 540 cal/g

Latent heat of ice (L_i) = 80cal/g

Meanwhile, Specific heat of water (S_w) = 1cal/g − ˚C

Mass of steam (m) = 1 g

Now, there are stages for the formation of ice

Step 1:100˚C Steam to 100˚C Water

Heat released (Q_1) = $mL_s = 1 \times 540 = 540$ cal

Step 2: 100˚C Water to 0˚C of Water

Heat released $(Q_2) = \text{ms}(T_2 - T_1) = 1 \times 1 \times (100 - 0) = 100$ cal

Step 3: 0°C of Water to 0°C of Ice

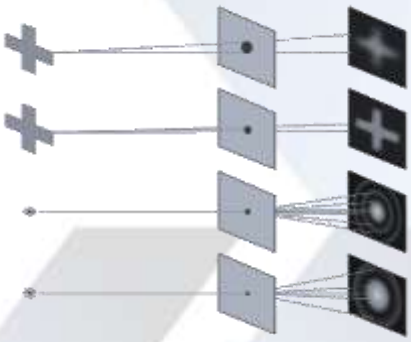
Heat released $(Q_3) = mL = 1 \times 80 = 80$ cal

Therefore, the total heat energy released $(Q) = Q_1 + Q_2 + Q_3 = 540 + 100 + 80 = 720$ cal

Hence, the energy released when 1 gm of steam at 100°C turns to ice at 0°C is 720 cal.

Q16. Draw and explain the process of formation of image with a Pinhole camera.

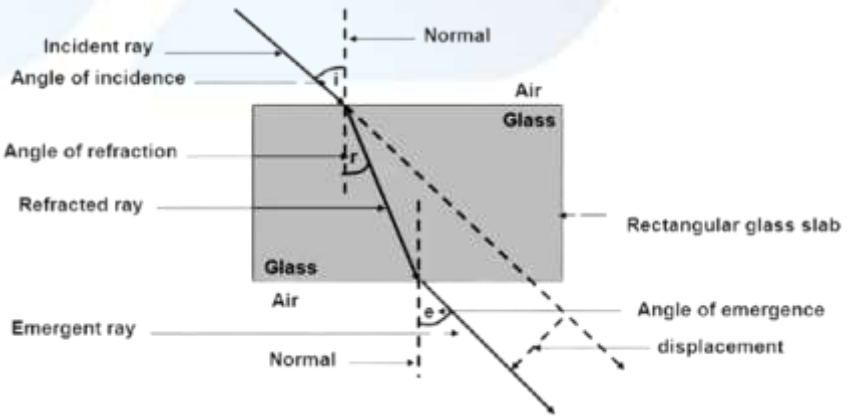
Solution:



If the hole in a pinhole camera is as large as a green gram, the image loses sharpness, becoming thicker and blurred. An increase in the hole's size allows more light to enter, disrupting the image formation. To understand the process of image formation using a pinhole camera in detail, refer to the relevant sources.

Q17. Explain the refraction of light through a glass-slab with a neat ray diagram.

Solution:



Refraction of Light in air and glass medium

Q18. How do you verify that the resistance of a conductor is proportional to the length of the conductor for constant cross-section area and temperature?

Solution:

Electrical resistance is directly proportional to length (L) of the conductor and inversely proportional to the cross-sectional area (A). It is given by the following relation $R = \rho L/A$, where ρ is the resistivity of the material (measured in Ωm, ohm meter).

Group-B

Q19. How do chemical displacement reactions differ from chemical decomposition reactions? Explain with an example for each.

Solution:

In a displacement reaction, the atom or a set of atoms is displaced by another atom in a molecule. One element takes place with another element in the compound. For instance, when Iron is added to a copper sulphate solution, it displaces the copper metal.

$A + B - C \rightarrow A - C + B$

$\mathrm{Fe(s) + CuSO_{4(x)} \rightarrow Cu + FeSO_4}$

The above equation exists when A is more reactive than B.

A and B have to be either:

Halogens where C indicates a cation.

Different metals wherein C indicate an anion.

Meanwhile, in a chemical decomposition reaction, one reactant breaks down into two or more products. The opposite of a combination reaction - a complex molecule breaks down to make simpler ones. The general format of a decomposition reaction is provided below.

$AB \rightarrow A + B$, where AB is the parent molecule (reactant) and $A\&B$ are the product molecules.

One example for this is the reaction, $NaCl \rightarrow Na + Cl$.

Q20. Explain Hund's rule with an example.

Solution:

Hund's rule states that:

1. In a sublevel, each orbital is singly occupied before it is doubly occupied.
2. The electrons present in singly occupied orbitals possess identical spin.

Q21. Explain the formation of BF_3 molecule using hybridisation.

Solution:

Hybridisation is the concept of mixing two atomic orbitals with the same energy levels to give a degenerated new type of orbitals. This intermixing is based on quantum mechanics. Learn more about the hybridisation of BF_3 from here.

Q22. Suggest a test to find the hardness of water and explain its procedure.

Solution:

Hard water has high mineral content and is formed when water percolates through the deposits of chalk and limestone, which are made up of magnesium and calcium carbonates. It does not make lather with soap, so it is not suitable for laundry purposes. Now, below is the procedure for a test to find the hardness of water:

i) Take 10 ml of distilled water and 10 ml of hard water (from hand pump) in separate test tubes.

ii) Add a couple of drops of soap solution to both.

iii) Shake the test tubes vigorously for an equal period of time and observe the foam formed.

iv) The test tube containing distilled water shows more foam. This is because the whole of soap is available to form foam.

v) The test tube containing hand-pump water may show a white curd like precipitate, indicating the presence of soluble salts of calcium or magnesium.

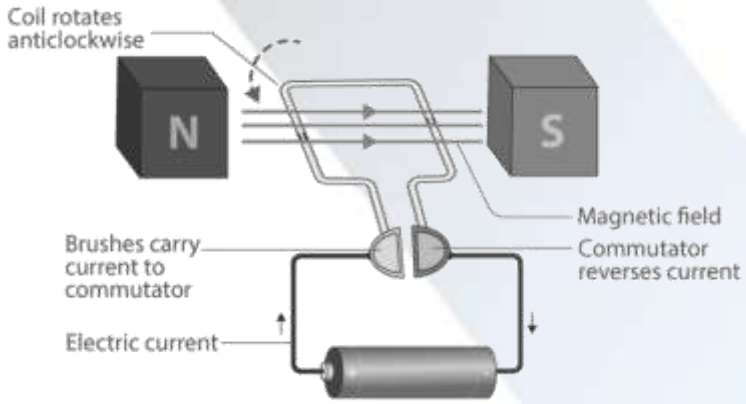
vi) Calcium and Magnesium ions form precipitate with soap and this indicates that water is hard water.

Section-IV

5x1=5

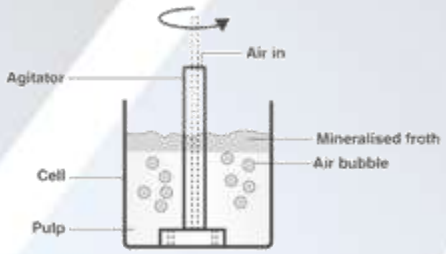
Q23. Draw a neat diagram of the electric motor and name the parts.

Solution:



Q24. Draw a diagram showing froth floatation method and label its parts.

Solution:



Part-B

20x0.5=10

Q25. The boiling point of water at normal atmospheric pressure is

(A) 0°C

(B) 100°C

(C) 110°C

(D) −4°C

Solution:

(B) 100°C

Q26. Magnification(m)=

(A) v/u

(B) u/v

(C) h_0/h'

(D) h/h_0

Solution:

(D) h/ho

Q27. If an object is placed at 'C ' of a concave mirror, the position of the image is

(A) at infinity

(B) between F and C

(C) at C

(D) beyond C

Solution:

(C) at C

Q28. The refractive index of glass with respect to air is 2. Then, the critical angle of glass air interface is

(A) 0 °C

(B) 45°C

(C) 30°C

(D) 60°C

Solution:

(C) 30°C

Q29. Which one of the following materials cannot be used to make lens?

(A) Water

(B) Glass

(C) Plastic

(D) Clay

Solution:

(D) Clay

Q30. During refraction _____ will not change.

(A) Wavelength

(B) Frequency

(C) Speed of light

(D) All the above

Solution:

(B) Frequency

Q31. A charge is moved from point A to point B. The work done to move unit during this process, is

(A) Potential at A

(B) Potential at B

(C) Current from A to B

(D) Potential difference between A to B

Solution:

(D) Potential difference between A to B

Q32. A thick wire has _____ resistance than a thin wire

(A) more

(B) less

(C) equal

(D) A and B

Solution:

(B) less

Q33. What converts mechanical energy into electrical energy?

(A) Motor

(B) Battery

(C) Generator

(D) Switch

Solution:

(A) Motor

Q34. The SI unit of magnetic field induction is _____

(A) .Tesla

(B) Weber

(C) Weber/m

(D) Weber.m

Solution:

(A) Tesla

Q35. $C_6H_{12}O_6 \rightarrow C_2H_5OH + CO_2$ is _____ chemical reaction.

(A) combination

(B) decomposition

(C) displacement

(D) double decomposition

Solution:

(B) decomposition

Q36. _____is used for treating indigestion.

(A) antibiotic

(B) analgesic

(C) antacid

(D) antiseptic

Solution:

(C) antacid

Q37. Colour of Methyl orange in alkali condition is

(A) orange

(B) yellow

(C) red

(D) blue

Solution:

(B) yellow

Q38. The maximum number of electrons present in the K shell are

(A) 2

(B) 4

(C) 6

(D) 8

Solution:

(A) 2

Q39. The value of Planck's constant is

(A) 6.023×10^{34}Js

(B) 6.626×10^{34}Js

(C) 6.626×10.36Js

(D) None

Solution:

(D) None

Q40. Number of elements present in period 1 are

(A) 2

(B) 4

(C) 6

(D) 8

Solution:

(A) 2

Q41. Which of the following elements is electronegative?

(A) Sodium

(B) Oxygen

(C) Magnesium

(D) Calcium

Solution:

(A) Oxygen

Q42. The bond angle in Methane

(A) $104°31'$

(B) $107°48'$

(C) $180°$

(D) $109°28'$

Solution:

(D) $109°28'$

Q43. The reducing agent in Thermite process is _____

(A) Al

(B) Mg

(C) Fe

(D) Si

Solution:

(A) AI

Q44. Which of the following hydrocarbons can show isomerism?

(A) C_2H_4

(B) C_2H_8

(C) C_3H_8

(D) C_4H_{10}

Solution:

(D) C_4H_{10}

Q45. The geometric centre of mirror is _____

Solution:

Pole of the mirror

Q46. At critical angle of incidence, the angle of refraction is _____

Solution:

90°

Q47. The lens which can form real and virtual images is _____

Solution:

Convex lens

Q48. The kilowatt hour is the unit of _____

Solution:

Energy

Q49. Faraday's Law of Induction is the consequence of _____

Solution:

Conservation of energy

III Match the Following **5x0.5=2**

26. Plaster of Paris	(A)Na2CO3
27. Gypsum	(B)NaHCO3
28. Bleaching Powder	(C)Na2HCO2
29. Baking Soda	(D) CaSO4. ½ H20
30. Washing Soda	(E) CaOCl2
	(F) CaCl2. 2H2O
	(G) CaSO4. 2H2O

Solution:

26. Plaster of Paris	(D) $CaSO_{4.}1/2H_2O$

27. Gypsum	(G) $CaSO_4 \cdot 2H_2O$
28. Bleaching Powder	(E) $CaOCl_2$
29. Baking Soda	(B) $NaHCO_3$
30. Washing Soda	(A) Na_2CO_3

GENERAL SCIENCE, Paper - II

Parts A and B

Time: 2.5 Hours **Max. Marks: 50**

Instructions:

1. Answer the questions under Part-A in a separate answer book.
2. Write the answers to the questions under Part-B on the Question Paper itself and attach it to the answer book of Part-A.

Q50. Write the names of any two excretory organs in human beings.

Solution:

Lungs and Kidney are the two excretory organs that are found in human beings.

Q51. Write the names of producers and consumers in the food chain you have observed.

Solution:

In a food chain including grass, grasshopper, frog, snake and hawk, the grass is the producer in a food chain. Consumers can be of three types, primary, secondary and tertiary. Grasshoppers can be a primary consumer. Here, the frog will be the secondary consumer and snake the tertiary consumer.

Q52. Which blood vessels carry blood from the heart to the body parts?

Solution:

There are two kinds of blood vessels, arteries and veins. The arteries carry blood from the heart to the body parts.

Q53. Which plants in your surroundings are useful to produce medicines?

Solution:

Papaver somniferum (Opium) plant is used as a good painkiller, while *Nicotiana tobacum* (Tobacco) and *Chrysanthemum* are used as insecticides. *Azadirachta indica*(neem) is also a good antiseptic.

Q54. How do you get the characters from your parents and grandparents?

Solution:

Transmission or passing of characters or traits from parent to offspring is called 'Heredity' and the process in which traits are passed from one generation to another generation is called 'Inheritance'

Characters are inherited via the genes present in chromosomes. It is seen that traits are passed to gametes, which fuse during fertilisation. One set of chromosomes come from father and another set from mother. From grandparents, it is passed to parents and then to us.

Every individual possesses a pair of alleles (assuming only a pair is present) for any particular trait. Also, each parent is expected to pass a randomly selected copy (allele) of only one of these to an offspring. The offspring then receives its own pair of alleles for that trait, one each from both parents.

Q55. Write the functions of the spinal cord from the information collected from your school library and the internet.

Solution:

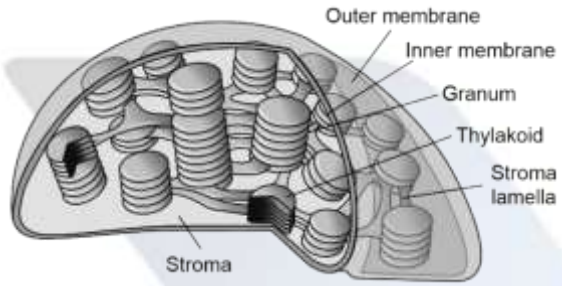
The spinal cord helps the brain to communicate with different parts of the body, and vice versa.

Meanwhile, important functions of the Spinal Cord are mentioned below:

- Forms a connecting link between the brain and the PNS
- Provides structural support and builds a body posture
- Facilitates flexible movements
- Myelin present in the white matter acts as an electrical insulation
- Communicates message from the brain to different parts of the body
- Coordinates reflex
- Receives sensory information from receptors and approaches towards the brain for processing.

Q56. Explain the structure of a chloroplast with the help of a rough diagram

Solution:



Q57. Which characters in the pea plant were selected by Mendel, for his experiments?

Solution:

Mendel had chosen 7 pairs of contrasting characters in the plants to be used for his study:

- The difference in the form of the ripe seeds. These are either round or deeply wrinkled.
- The difference in the colour of the seed albumen (endosperm). The albumen of the ripe seeds is either pale yellow, bright yellow and orange coloured, or it possesses a more or less intense green tint. This difference of colour is easily seen in the seeds as their coats are transparent.
- The difference in the colour of the seed coat. This is either white with the character of white flowers are constantly correlated, or it is grey, grey-brown, leather-brown, with or without violet spotting.
- The difference in the form of the ripe pods. These are either simply inflated, not constricted in places, or they are deeply constricted between the seeds and more or less wrinkled.
- The difference in the colour of the unripe pods. They are either light to dark green, or vividly yellow.

- The difference in the position of the flowers. They are either axial, that is, distributed along the main stem, or they are terminal, that is, bunched at the tip of the stem.
- The difference in the length of the stem. The length of the stem is varied in some forms. In experiments with this character, in order to discriminate with certainty, the long axis of 6 to 7 feet. was always crossed with the short one of 3/4 to 1 and 1/2 feet. (Popularly called the tall and dwarf varieties).

Q58. What are the control measures for the eradication of mosquito population?

Solution:

Given here are some control measures for the eradication of the mosquito population:

- Remove the stagnant water in the surrounding areas.
- Keep gutters clean and unclogged.
- In case it is impossible to remove complete water, treat the remaining water and refresh the necessary water frequently.
- Make your yard inhospitable for mosquitoes.
- Use suitable pesticides.
- Apply insect repellent and protect yourself from mosquitoes.

Q59. What will happen if a plant is placed near the window of your classroom? What is this process called?

Solution:

If you observe the growth of a plant placed near the window of a classroom, you will see that the plant will bend towards sunlight. Such type of response of a plant to light is called phototropism (photo means light, tropism means movement).

Group-B

Q60. What questions do you ask a doctor to know about different birth control methods?

Solution:

These are the questions to ask a doctor to know about different birth control methods:

- How do you know if you are pregnant?
- What are the birth control methods that we can adapt?
- What is the most effective method of birth control?
- What is contraceptive?
- Is birth control safe for me to follow? What are the expected side effects?
- What is the failure rate of birth control?
- When do I need to take the medication for birth control?
- What will happen, if I fail to take birth control?

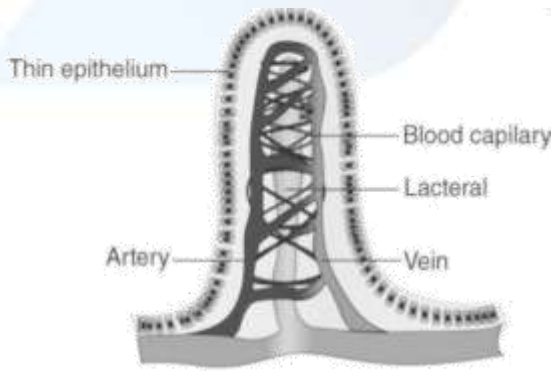
Q61. How did you prepare a matchstick stethoscope in your school?

Solution:

It is effortless to prepare a matchstick stethoscope with the help of a button and matchstick. For this, first, take a shirt button and insert a matchstick into it. Then place it on the wrist and observe movements in the matchstick to get the pulse rate.

Q62. Draw the diagram of villi in the small intestine and label its parts.

Solution:



Q63. How do you appreciate the role of spinal cord in reflex actions?

Solution:

Reflex actions are sudden responses or involuntary actions that do not involve thinking. For example, when we touch a hot object, we withdraw our hand immediately without thinking. In such actions, the spinal cord has a significant role to play. The reflex arc shows the pathway through which the reflex action occurs. In a reflex action, the spinal cord, along with the brain stem is responsible for the reflex movements. The sensory nerves that detect the heat are connected to the nerves that move the muscles of the hand. Such a connection of detecting the signal from the nerves (input) and responding to it quickly (output) is known as a reflex arc. Reflex arcs are formed in the spinal cord but the information is still sent to the brain. The brain does not have a significant response to it. Learn more about the role of the brain in reflex actions.

Q64. What is the role of Epiglottis and Diaphragm in respiration?

Solution:

The **epiglottis** is a flap-like muscular structure that regulates the movement of food and air, ensuring they enter their respective pathways. Air from the nasal cavity passes into the **pharynx**, which then branches into two passages—one leading to the **lungs** and the other to the **stomach**. It is crucial that air enters the respiratory tract while food is directed toward the digestive system. To prevent food from entering the airway, the **epiglottis** acts as a protective valve. During swallowing, this flap partially closes, directing food to the stomach while preventing it from entering the **trachea** (windpipe). When breathing, the epiglottis opens fully, allowing air to pass into the lungs. The function of the epiglottis is controlled by **nervous regulation**, ensuring proper coordination of food and air passage. Another important muscle involved in breathing is the **diaphragm**, a flexible, flattened muscle that assists in moving air in and out of the lungs. If the **chest cavity** is thought of as a "room," the diaphragm acts as its "floor." When relaxed during **exhalation**, it takes on a dome shape with its convex side extending into the chest

cavity. During **inhalation**, the diaphragm contracts and flattens, increasing the volume of the chest cavity and reducing internal pressure, allowing air to rush into the lungs. When the diaphragm relaxes, it returns to its dome shape, decreasing lung volume and increasing pressure, forcing air out through the **nose**. This cycle of air movement—**inspiration** (inhalation) and **expiration** (exhalation)—is essential for respiration.

Q65. What is root pressure? How is it useful to plants?

Solution:

Root pressure is a force or the hydrostatic pressure generated in the roots. This pressure helps in driving the fluids and other ions from the soil in upwards directions into the plant's vascular tissue - Xylem. Root pressure, is one factor that contributes towards the movement of water in the xylem.

Q66. Write the experiment of a bell Jar and pudina plant, performed by Priestley to prove that air plays a crucial role in photosynthesis.

Solution:

In 1770, after a series of experiments, Joseph Priestley concluded, the essentiality of air for photosynthesis and for the growth of plants.

Materials required for the experiment: A bell jar, candle, rat, and a pudina plant.

Experiment:

1. Priestley kept a burning candle and a rat together in the single bell jar.
2. After some time, the candle extinguished, and the rat died.
3. For the second time, he kept a burning candle, rat, and a green plant together in the bell jar.
4. He observed that neither the candle got extinguished, nor did the rat die.

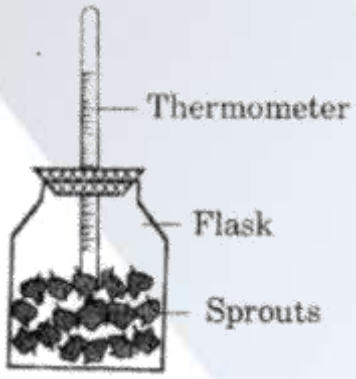
Conclusion: Based on his observations, Priestley concluded that in the first case, the air in the bell jar got polluted by the candle and rat. However, in the second case, the plant reinstated the air that was spoiled by the candle and the rat.

Q67. a. What is the aim of this experiment?

b. What change do you observe in the thermometer reading?

c. In your opinion, where did this heat come from?

d. What precautions should we take while doing this experiment?



Solution:

(a) Aim of the experiment is to prove that heat is evolved during respiration

(b) The thermometer reading for moist seeds will go up as moist seeds respire and produce heat

(c) The heat is produced by the germinating seeds during the process of respiration

(d) During the experiment, make sure to remove the lid and prepare a cork (with thermocol, or rubber or any other material) through which you can bore a hole to insert a thermometer. Take care that the bulb of the thermometer is dipped in the sprouts. Also, close the flask with this tightfitting cork.

Q68. What is mastication? Explain about the teeth used in mastication.

Solution:

During mastication food size becomes convenient to swallow. Food is cut and crushed by our teeth in the mouth and mixed with saliva to make it wet and slippery (also called mastication). The circular muscles of the mouth enable the food to be pushed into the oral cavity and to be moved around. As the food cannot be swallowed directly, the teeth grind, chew and shred it. This process is called mastication. For this purpose the surface muscles of the jaw help in biting and

chewing actions, and move the jaw up, down, forward and backward during food mastication. Your lower jaw moves up and down as you chew food. The teeth help in cutting and grinding while tongue movements evenly spread out the food and help in mixing it with saliva. To learn more about the types of teeth and its functions, check her.

Q69. Write about the 4R's needed for the protection and conservation of environment?

Solution:

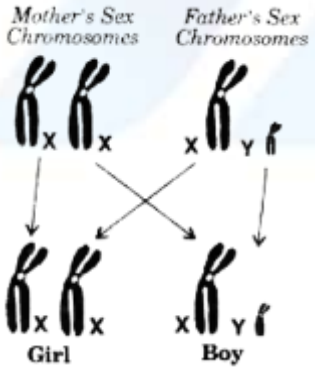
There are essentially 3 R's in the process of creating and maintaining a comprehensive recycling program. Learn more about the 3 R's here.

Reduce: Repair leaky taps and avoid a shower or switch off unnecessary lights and fans. Think of other things that you could reduce usage of.

Reuse: things that you often tend to throw away, like paper and wrapping papers. This would save plants and minimise pollution.

Recycle: may not always be a very good option as recycling plastic is a tricky process and can cause havoc. The chief problem lies in plastics' complexity. There are as many types of plastic as their uses. Since each type can only be recycled with its own kind, plastics need to be carefully sorted before they can be processed. Now, adding to this is the 4th R of environment conservation. This fourth R that is an important part of environment conservation is Recover. It stands for recovering valuable commodities.

Q70.



a. If a sperm with a "X" chromosome fertilises with an ovum with "X" chromosome, what will be the gender of the baby?

b. Who determines the sex/gender of the baby, mother or father?

c. Is it correct to blame the mother for giving birth to a baby girl?

d. Do all our characters resemble that of our parents?

Solution:

(a) If a sperm with "X" chromosome fertilises with an ovum with "X" chromosome, then the gender of the baby will be a girl

(b) Father determines the sex/ gender of a baby

(c) No, it is not correct to blame the mother for giving birth to a baby girl. All the gametes (ova) produced by a woman have only X chromosomes. The gametes (sperm) produced by a man are of two types, one with *X* chromosome and other *Y* chromosome. If the sperm carrying Y chromosome fertilises the ovum (X chromosome). Then the baby will have XY condition. So the baby will be a boy. Or if a sperm with X chromosome fertilises an ovum with x chromosome, then the baby will be a girl.

(d) Characters as we know are governed by genes. Thus, there is change in the frequency of genes in small populations. This is known as "Genetic drift', which provides diversity in the population. Character can be acquired, which an offspring has acquired during their lifetime or it can be hereditary, passed on to its offspring i.e. to the next generation. Each character or trait is expressed due to a pair of factors or 'alleles' (contrasting expressions of the same trait). Gene is a segment of a nucleic acid called 'DNA' which is present in the nucleus of every cell. It controls the expression of a trait or character. Traits are determined by the chemical nature of DNA and a slight change in it leads to variations. Colour of the hair, the skin etc. are examples of traits. Slight inheritable changes in the chemical structure of DNA may lead to change in the characteristic or trait of offspring of an organism, which leads to 'Variations'.

Q71. What steps would you like to follow on your part to conserve bio-diversity?

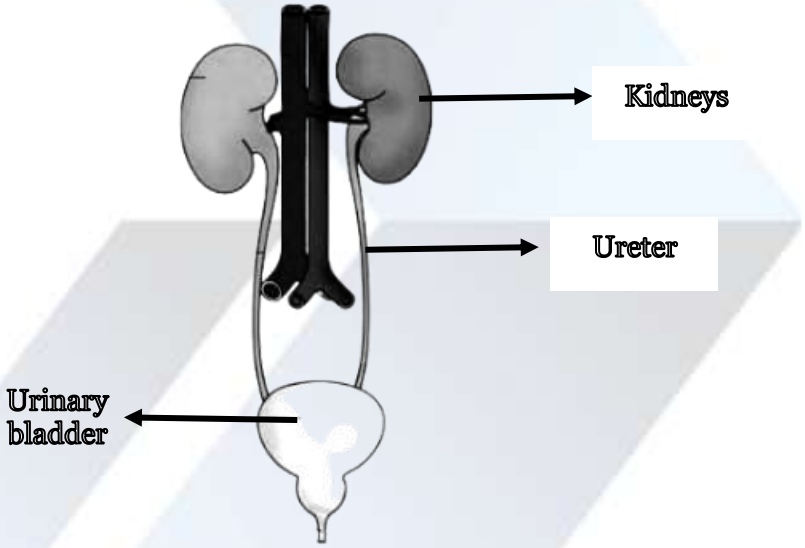
Solution:

Biodiversity conservation refers to the protection, upliftment, and management of biodiversity in order to derive sustainable benefits for present and future generations. Some steps to adopt are given below:

- Stop wastage
- Reduce the use of fossil fuel consumption
- Restore damaged habitats
- Reduce the level of pollutants in the environment and so on.

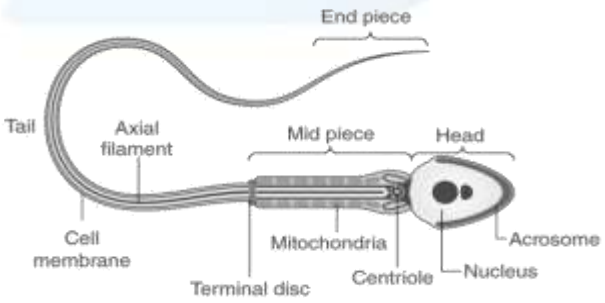
Q72. Draw a neat, labelled diagram of excretory system in human beings.

Solution:



Q73. Draw the diagram of human sperm and label its parts. Write a few lines about it.

Solution:



The human sperm is a microscopic, motile male reproductive cell. It has a streamlined structure specialized for fertilization. The **head** contains genetic material, the **middle piece** provides energy, and the **tail** enables movement. The sperm plays a crucial role in reproduction by fusing with the egg to form a zygote.