Class X Session 2023-24
Subject - Science
Sample Question Paper - 8

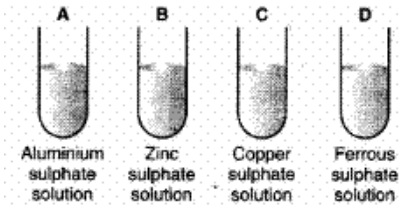
Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective-type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. Zinc granules are placed in each of the four solutions A, B, C and D as shown below decolourisation would be observed in **[1]**



a) [B] and [D]
b) [A] and [C]
c) [C] and [D]
d) [A] and [B]

2. $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$. It is type of: **[1]**

a) Both Precipitation reaction and Double displacement reaction
b) Double displacement reaction
c) Decomposition reaction
d) Precipitation reaction

3. Which of the following conducts electricity? **[1]**
Rainwater, distilled water, potable water.

a) rain water, distilled water
b) rain water, potable water
c) distilled water, potable water
d) Rain water, distilled water, potable water

4. A hydrocarbon with molecular formula C_4H_{10} has: **[1]**

a) 10 covalent bonds
b) 7 covalent bonds
c) 13 covalent bonds
d) 6 covalent bonds

5. During smelting, an additional substance is added which combines with impurities to form a fusible product known as: **[1]**

a) Flux
b) Slag
c) Gangue
d) Mud

6. Dried fruit plastic bags sold in the market are filled with: **[1]**

a) Hydrogen gas
b) All of these
c) Helium gas
d) Nitrogen gas

7. Ethane - with the molecular formula C_2H_6 has **[1]**

a) 9 covalent bonds
b) 8 covalent bonds
c) 7 covalent bonds
d) 6 covalent bonds

8. Which liquid did a student use for putting a drop on the slide before placing the coverslip while preparing a temporary mount of leaf epidermal peel? **[1]**

a) Water
b) Iodine
c) Glycerine
d) Safranin

9. A zygote which has an X-chromosome inherited from the father will develop into a **[1]**

a) either boy or girl
b) girl
c) X- chromosome does not determine the sex of a child
d) boy

10. A bisexual flower contains: **[1]**

a) Stamens only
b) Both stamens and carpels
c) Carpels only
d) Either stamens or carpels

11. Two pink colored flowers on crossing resulted in 1 red, 2 pink, and 1 white flower progeny. The nature of the cross will be **[1]**

a) self pollination
b) double fertilisation
c) no fertilisation
d) cross fertilisation

12. During deficiency of oxygen in tissues of human beings, pyruvic acid is converted into lactic acid in the **[1]**

a) Golgi body
b) Mitochondria
c) Chloroplast
d) Cytoplasm

13. Fleming's Right-hand rule gives **[1]**

a) both, direction and magnitude of the induced current
b) direction of the induced current
c) magnitude of the magnetic field
d) magnitude of the induced current

14. Let us consider the current flowing through a metallic wire if the temperature of the entire system increases. What will happen from the following options? **[1]**

a) Resistance (R) decreases
b) Potential difference (V) decreases
c) Potential difference (V) increases
d) V and R remains the same

15. A food chain consists of: **[1]**

a) Producers, consumers and decomposers
b) Producers and primary consumers
c) Producers, herbivores and carnivores
d) Producers, carnivores and decomposers

16. Accumulation of non-biodegradable pesticides in the food chains in increasing amount at each higher trophic level is known as**:** **[1]**

a) Biological magnification
b) Accumulation
c) Eutrophication
d) Pollution

17. **Assertion (A):** Copper spoon is used to stir silver nitrate solution. **[1]**
Reason (R): Copper is less reactive than silver.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

18. **Assertion (A):** Sexual reproduction increases genetic diversities and plays a role in origin of new species. **[1]**
Reason (R): Sexual reproduction involves the formation of gametes and fusion of gametes.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

19. **Assertion (A):** The strength of the magnetic field produced at the centre of a current-carrying circular coil increases on increasing the number of turns of the circular coil. **[1]**
Reason (R): Magnetic field strength is directly proportional to the number of turns of the circular coil.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

20. **Assertion (A):** DDT can pass along food chain from crops to man or other animals and harm them. **[1]**
Reason (R): DDT is non-biodegradable and cannot be metabolised within bodies of living organisms and accumulates in their bodies.

a) Both A and R are true and R is the correct
b) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

Section B

21. An organic compound A is a constituent of many medicines and used as an antifreeze and has the molecular formula C_2H_6O. Upon reaction with alk. $KMnO_4$, compound A is oxidised to another compound B with formula $C_2H_4O_2$. Identify the compounds A and B. Write the chemical equation for the reaction which leads to the formation of B. **[2]**

22. How does reproduction help in providing stability to populations of species? **[2]**

23. How many pairs of salivary glands are there in humans ? Where do they open? **[2]**

OR

What are the functions of chloroplast? List some of them.

24. Draw a ray diagram to represent the nature, position and size of the image formed by a convex lens for the object placed at **[2]**

i. infinity

ii. Between F_1 and optical centre (O)

25. What is biological magnification? Will the levels of this magnification be different at different levels of the ecosystem? **[2]**

OR

i. Will the impact of removing all the organisms in a trophic level be different for different trophic levels?

ii. Can the organisms of any trophic level be removed without causing any damage to the ecosystem?

26. Why cats/ bats are able to see at night ? **[2]**

Section C

27. 'M' is an element which may be one out of Cu, Fe, Al, Na. It shows the following properties: **[3]**

(i) One of its ore is rich in M_2O_3.

(ii) M_2O_3 is not affected by water.

(iii) It corrodes easily.

(iv) It form to chlorides MCl_2 and MCl_3. Identify 'M'.

28. i. How is the method of extraction of metals high up in the reactivity series different from that for metals in the middle? Why cannot the same process be applied for them Name and explain the process of extraction of sodium? **[3]**

ii. Draw a labelled diagram of electrolytic refining of copper.

OR

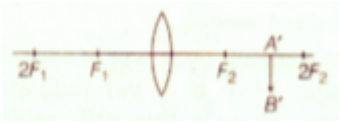
Give two examples each of the metals that are good conductors and poor conductors of heat respectively.

29. i. Write the correct sequence of steps followed during journey of oxygen rich blood from lungs to various organs of human body. **[3]**

ii. What happens when the system of blood vessels develop a leak?

30. An individual inherits different traits from his parents. On what basis classification of traits as dominant and recessive is done? **[3]**

31. Observe the following incomplete ray diagram of an object where the image A'B' is formed after refraction from a convex lens. **[3]**



On the basic of above information fill in the blanks.

i. The position of object AB would have been...

ii. Size of the object would have been ... than the size of image.

32. i. A hot plate of an electric oven connected to a 220 V line has two resistance coils A and B, each of 24Ω resistance, which may be used separately, in series, or in parallel. What are the currents in the three cases? **[3]**

ii. Calculate the resistance of an electric bulb that allows a 10A current when connected to a 220V power source?

33. a. List the factors on which the resistance of a uniform cylindrical conductor of a given material depends. **[3]**

b. The resistance of a wire of 0.01 cm radius is 10Ω. If the resistivity of the wire is 50×10^{-8} Ωm, find the length of this wire.

Section D

34. Discuss the formation of covalent bonds in molecules of **[5]**

i. Ammonia

ii. Ethylene

iii. Carbon dioxide.

OR

i. Distinguish between esterification and saponification reactions with the help of chemical equation for each.

ii. Write an activity to show the formation of an ester in a school laboratory.

35. Write two differences between self-pollination and cross-pollination. **[5]**

OR

i. What are animal hormones? List their two characteristics.

ii. Name the hormone.

a. Which brings change in male humans during the beginning of adolescence.

b. Which coordinates the level of sugar in blood?

36. A student places a candle flame at a distance of about 60 cm from a convex lens of focal length 10 cm and focuses the image of the flame on a screen. After that he gradually moves the flame towards the lens and each time focuses the image on the screen. **[5]**

i. In which direction: toward or away from the lens, does he move the screen to focus the image?

ii. How does the size of the image change?

iii. How does the intensity of the image change as the flame moves towards the lens?

iv. Approximately for what distance between the flame and the lens, the image formed on the screen is inverted and of the same size?

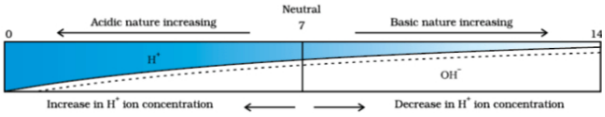
OR

Find the size, nature and position of image formed when an object of size 1 is placed at a distance of 15 cm from a concave mirror of focal length 10 cm.

Section E

37. **Read the text carefully and answer the questions:** **[4]**

A scale for measuring hydronium ion in a solution is called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH- ion concentration in solution i.e a basic solution.



(i) What is the pH range of the Human Body?

(ii) The strength of acid and bases depends on which factor?

OR

If the pH of soil X is 7.5 while that of soil Y is 4.5, then which soil should be treated with powdered chalk to adjust its pH?

38. **Read the text carefully and answer the questions:** **[4]**

We have seen that the different parts of our body have specific functions. Our mouth waters when we see the food we like without our meaning to. Our heart's beat without our thinking about it. In fact, we cannot control these actions easily by thinking about them even if we wanted to. So, in between the simple reflex actions like change in the size of the pupil, and the thought out actions such as moving a chair, there is another set of muscle movements over which we do not have any thinking control. Many of these involuntary actions are controlled by the mid-brain and hind-brain. All these involuntary actions including blood pressure, salivation and vomiting are controlled by the medulla in the hind-brain. Think about activities like walking in a straight line, riding a bicycle, picking up a pencil. These are possible due to a part of the hind-brain called the cerebellum. It is responsible for the precision of voluntary actions and maintaining the posture and balance of the body. Imagine what would happen if each of these events failed to take place if we were not thinking about it.

(i) Identify the part of the nervous system which controls the reflex action.

(ii) Does reflex action involve all parts of the voluntary nervous system?

(iii) Identify the part of the autonomic nervous system which controls involuntary actions.

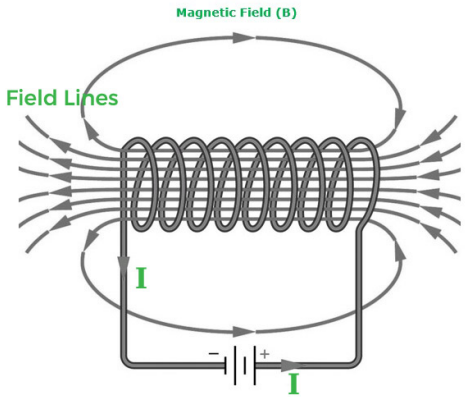
OR

Beating of heart muscles, which type of action is this? Out of voluntary and involuntary action which is slower?

39. **Read the text carefully and answer the questions:** **[4]**

An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetize a piece of a magnetic material like soft iron when placed inside the solenoid. The strength of the magnetic field produced by a current-carrying solenoid

is directly proportional to the number of turns and strength of the current in the solenoid.



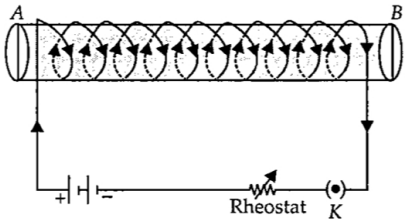
(i) What would be the strength of the magnetic field inside a long current-carrying straight solenoid?

(ii) Which end is north and which end is south pole when current flows through a solenoid?

(iii) A long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and the number of turns per cm is halved, then what will be the new value of the magnetic field?

OR

A soft iron bar is enclosed by a coil of insulated copper wire as shown in the figure. When the plug of the key is closed, then where would the face B of the iron bar be marked?



Solution

Section A

1.

(c) [C] and [D]

Explanation: Zn will displace copper from copper sulphate solution. The solution will change colour from blue to colourless.

$$\underset{\text{Blue}}{\text{zn} + \text{CuSO}_4} \longrightarrow \underset{\text{Colourless}}{\text{ZnSO}_4 + \text{Cu}}$$

Zn will displace iron from iron sulphate and solution will change colour from green to colourless, due to formation of zinc sulphate.

$$\underset{\text{Pale green}}{\text{Zn} + \text{FeSO}_4} \longrightarrow \underset{\text{Colourless}}{\text{ZnSO}_4 + \text{Fe}}$$

2. **(a)** Both Precipitation reaction and Double displacement reaction

Explanation:

- Double decomposition takes place, due to the exchange of ions between the 2 substances. A white precipitate of barium sulphate is formed.
- $BaCl_2$ + Na_2SO_4 $\rightarrow$ $BaSO_4$ + 2NaCl
- $BaSO_4$ is insoluble in water. NaCl dissolves in water.
- $BaSO_4$ is Barium Sulphate
- NaCl is common salt of Sodium Chloride

3.

(b) rain water, potable water

Explanation:

- Distilled water is the purest form of water and it does not contain any acids dissolved in it, so it does not conducts electricity.
- Potable water has minute impurities present in it which results in its low conductivity.
- Rainwater, on combining with CO_2 gas in the atmosphere produces carbonic acid (H_2CO_3) which reacts with to form hydrogen ions, and then conducts electricity.

4.

(c) 13 covalent bonds

Explanation: Butane C_4H_{10} has 3 C-C covalent bonds and 10 C-H covalent bonds. Thus, it has 13 covalent bonds.

5.

(b) Slag

Explanation: During the smelting of iron, limestone is added as a flux. The temperature inside the blast furnace decomposes limestone to calcium oxide which removes silicate impurity. Impurities like silicon are passed into the slag. The metal is separated from the molten slag.

$CaCO_3 \rightarrow CaO + CO_2$

$CaO + SiO_2 \rightarrow CaSiO_3$ (Slag)

6.

(d) Nitrogen gas

Explanation: Nitrogen prevents the oxidation of dried fruits. It is used to prevent rancidity.

7.

(c) 7 covalent bonds

Explanation: Ethane - with the molecular formula C_2H_6 - has 7 covalent bonds. 1 covalent bond (C - C) exists between the two carbon atoms. 3 C - H covalent bonds are formed by 3 hydrogen atoms with each carbon atom.

8.

(c) Glycerine

Explanation: Glycerine is used to temporarily mount the specimen as it prevents the specimen from drying.

9.

(b) girl

Explanation: A zygote which has an X-chromosome inherited from the father will develop into a girl child.

10.

(b) Both stamens and carpels

Explanation: A bisexual flower consists of both the male and the female reproductive parts. The male part is known as the stamen and the female is the carpel/pistil.

11.

(d) cross fertilisation

Explanation: Two pink colored flowers on crossing resulted in 1 red, 2 pink, and 1 white flower progeny. The nature of the cross will be cross-fertilization. Cross-fertilization is the transfer of pollen grains from one plant to the stigma of the flower borne of a different plant of the same species.

12.

(d) Cytoplasm

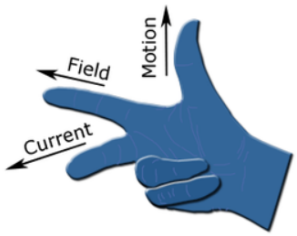
Explanation: When there is a lack of oxygen Breakdown of Pyruvate takes place in the cytoplasm of muscle cells leading to the formation of Lactic acid.

13.

(b) direction of the induced current

Explanation:

Fleming's right-hand rule shows the direction of the induced current when a conductor moves in a magnetic field. It can be used to determine the direction of current in a generator's winding. The thumb is pointed in the direction of motion of the conductor.



14.

(b) Potential difference (V) decreases

Explanation: Potential difference (V) decreases

15.

(c) Producers, herbivores and carnivores

Explanation: A food chain consists of producers, herbivores and carnivores. Organisms in a food chain are arranged in order of who eats whom and form a chain. Producers (plants) are eaten by herbivores and herbivores are eaten by carnivores.

16. **(a)** Biological magnification

Explanation:

The chemicals used to protect crops from diseases and pests are washed down into the soil or the water bodies. From the soil, these are absorbed by the plants along with water and minerals. From the water bodies, these are taken up by aquatic plants and animals. The non-biodegradable chemicals thus enter the food chain. They get accumulated progressively at each trophic level. As human beings occupy the top level in any food chain, the maximum concentration of these chemicals gets accumulated in human bodies. This phenomenon is known as biological magnification.

17.

(c) A is true but R is false.

Explanation: Silver's reactivity according to the reactivity series is lesser than that of copper (Cu). So, we cannot stir the solution as the solution would be displaced by copper. We should instead use a glass rod for this. Thus assertion is true, but reason is false.

18. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Sexual reproduction involves two parents that result in offspring that are not identical to the parents. It causes variations; which are essential for evolution as well as the survival of species under unfavorable conditions.

19. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Both A and R are true and R is the correct explanation of A.

20. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Both A and R are true and R is the correct explanation of A.

Section B

21. The organic compound A which is a constituent of many medicines and act as antifreeze with the molecular formula C_2H_6O is ethanol (CH_3CH_2OH). Ethanol is oxidised to ethanoic acid (B) upon reaction with alk. $KMnO_4$.

$$\underset{\underset{A}{Ethanol}}{CH_3CH_2OH} \xrightarrow{Alk.\ KMnO_4 + Heat} \underset{Ethanoic\ acid}{CH_3COOH}$$

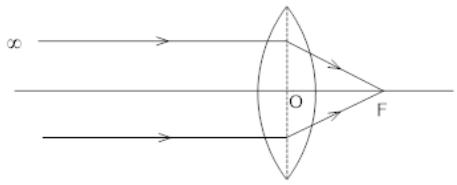
22. Every species has to constantly struggle for its survival. Natural predators and vagaries of nature keep on removing a large section of the population of a particular species. Moreover, the natural cycle of life and death also removes a section of the population. Reproduction is a way to replenish the lost section of population. Thus, it can be said that reproduction is linked to the stability of population of a species.

23. There are three pairs of salivary glands in human beings. They open into the buccal cavity.

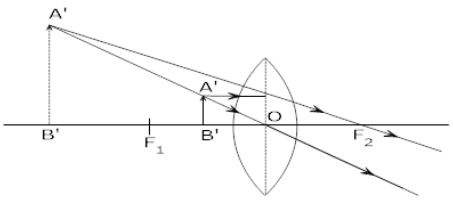
OR

Functions of chloroplast-
1) It plays major role in photosynthesis.
2) ATP synthesis also takes place in chloroplast.
3) Absorption of light energy and conversion of it into biological energy.
4) Production of $NAPDH_2$ and evolution of oxygen through the process of photosys of water.
5) Breaking of 6-carbon atom compound into two molecules of phosphoglyceric acid by the utilization of assimilatory powers.

24. i. Size – Point sized
Position – At focus
Nature – Real & Inverted



ii. Size – highly magnified
Position – same side of the lens where the object is placed
Nature – virtual & erect.



25. The phenomenon of progressive increase in concentration of certain harmful non-biodegradable chemicals such as DDT at different levels of food chain is called biological magnifications.
The concentration of harmful chemicals will be different at different trophic levels as the amount of such substances go on increasing progressively at each trophic level. It will be lowest in the first trophic level and highest in the last trophic level of the food chain.

OR

i. Yes, the impact of removing all the organisms in a trophic level will be different for different trophic levels. The lower trophic level of an ecosystem has a greater number of individuals then the higher trophic levels. Removal of producers will affect all the organisms of successive trophic levels and it will threat their survival. The removal of higher trophic levels will lead to an increase in organisms of lower tophic level and the organisms of a higher trophic level will die due to the shortage of food.

ii. No, the removal of all organisms of a trophic level will disturb the ecosystem. The killing of higher trophic level organisms will cause an explosion in the population of lower-level organisms. This will adversely affect the ecosystem.

26. They have very large number of rods on retina. Hence they are able to see even a small quantity of light. In humans, number of rods and number of cones are equal.

Section C

27. (i) As the metal 'M' forms oxide M_2O_3 it is trivalent. Out of the metals listed, only Fe and Al are trivalent.
(ii) M_2O_3 is not affected by water, so 'M' can be out of Fe or Al.
(iii) Fe and Al both corrode easily.
(iv) Out of Al and Fe, only Fe can form divalent chloride, so the element 'M' is Fe.

28. i. Metals placed high in the reactivity series are extracted by electrolytic reduction.
While those in the middle are extracted first by converting into oxide and then reducing by carbon. The same method cannot be used because metals have more affinity for oxygen than carbon.
Molten sodium chloride is taken for electrolytic reduction. The metals are deposited at the cathode and chlorine is liberated at the anode.

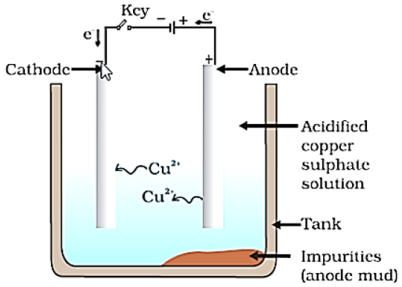
At cathode : $Na^+ + e^- \rightarrow Na$

At anode : $2Cl^- \rightarrow Cl_2 + 2e^-$

ii. In the electrolytic refining of metal following reactions take place at the anode and cathode

At Anode : $Cu \rightarrow Cu^{+2} + 2e^-$

At Cathode : $Cu^{+2} + 2e^- \rightarrow Cu$

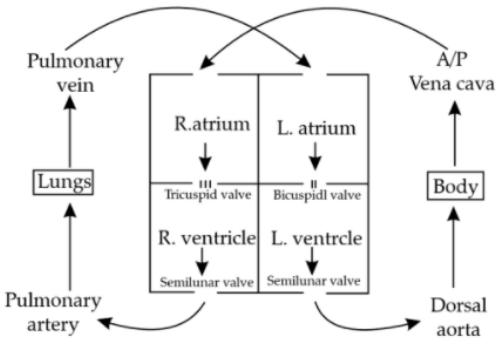


OR

Metals in general, are conductors of heat. Some are good conductors whereas some are poor conductors of heat. Owing to the number of free electrons they have, they are classified into good or poor conductors of heat. Those metals that have more number of free electrons are good conductors and those that have less number of free electrons are poor conductors of heat. For example,

i. Metals that are good conductors of heat - Silver (Ag) and Copper (Cu).
ii. Metals that are bad conductors of heat - Lead (Pb) and Mercury (Hg).

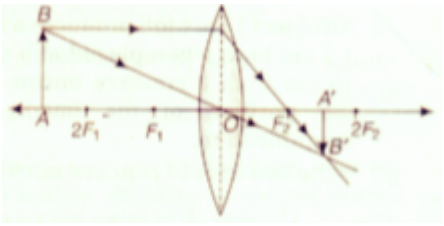
29. i. The correct sequence is blood flow from the Lungs $\xrightarrow[vein]{Pulmonary}$ Left sides of the heart $\rightarrow$ Ventricle $\rightarrow$ Aorta $\rightarrow$ Body organs



ii. The leaked blood flows into surrounding tissues leading to accumulation of blood. This condition is known as hematoma.

30. A trait which is able to express itself both in homozygous condition as well as heterozygous conditions is called a dominant trait. A trait which expresses itself only in homozygous condition is called recessive trait.

31. i. The position of object AB would have been beyond $2F_1$.



ii. Size of the object would have been bigger than the size of image.

32. i. It is given that potential difference (V) = 220 V.

Resistance of coil A (R_A) = Resistance of coil B (R_B) = 24Ω

When either coil A or B is used separately, the current (I) $= \frac{V}{R} = \frac{220\text{ V}}{24\Omega}$ = 9.2 A

When two coils are used in series, total resistance, $R_S = R_A + R_B$

$= R_A + R_B = 24 + 24 = 48\Omega$

Current flowing (I) $= \frac{V}{R_S} = \frac{220\text{ V}}{48\Omega} = 4.6\text{ A}$

When the two coils are joined in parallel, total resistance (R_p) $= \frac{1}{24} + \frac{1}{24} = \frac{2}{24}$

ii. I = 10 A, V = 220 V

$R = \frac{V}{I}$

$= \frac{220}{10}$

= 22 Ω

33. a. (i) Length of the conductor (l)

(ii) Area of cross-section of the conductor (A)

b. Radius of wire, r = 0.01 cm = 0.01×10^{-2} m

Resistance, R = 10 Ω

Resistivity, $\rho = 50 \times 10^{-8}$ Ωm

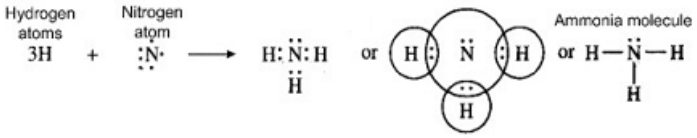
$R = \rho\frac{l}{A} = \rho\frac{l}{\pi r^2} \Rightarrow l = \frac{R\pi r^2}{\rho}$

$l = \frac{10\Omega \times 22 \times (0{\cdot}01 \times 10^{-2})^2\text{ m}}{7 \times 50 \times 10^{-8}\Omega\text{m}}$

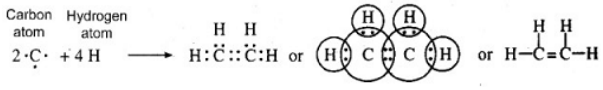
$= \frac{22}{35}$ m = 0.629 m = 0.628 m = 0.62 m

Section D

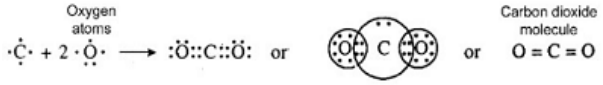
34. i. Covalent bonds in ammonia (NH_3) molecule: The atomic number of nitrogen is 7. Its electronic configuration is 2, 5. This means that nitrogen atom has five valence electrons. In order to have eight electrons in the valence shell, the nitrogen atom shares three electrons with the electrons of three hydrogen atoms. Thus, nitrogen atom gets linked to three hydrogen atoms by three covalent bonds. The formation of ammonia molecule may be shown as follows:



ii. Covalent bonds in ethylene (C_2H_4) molecule: Ethylene molecule has two carbon atoms. Each carbon atom shares two electrons with the two hydrogen atoms. At the same time, both the carbon atoms mutually share two electrons each. Thus both the carbon atoms get linked by double bond. Each carbon atom also gets linked to two hydrogen atoms by single bonds. The formation of ethylene molecule may be shown as follows:



iii. Covalent bonds in carbon dioxide (CO_2) molecule: Carbon atom has four electrons. Each oxygen atom has six valence electrons (2, 6). The carbon atom shares its electrons with the electrons of the two oxygen atoms. As a result, the carbon atoms gets linked to the oxygen atoms by double bonds. The formation of carbon dioxide molecule may be shown as follows:



OR

a.

Esterification	Saponification

Carboxylic acid reacts with alcohols in the presence of a little conc. sulphuric acid to form esters.	On treating an ester with a base such as NaOH, it is converted back to alcohol and sodium salt of carboxylic acid,
Esters are used in synthetic flavours, perfumes, cosmetics, lacquers, paints and varnishes.	It is used in the preparation of soaps on a commercial basis.
Example: Ethanoic acid reacts with ethanol in the presence of a little conc. sulphuric acid to form esters. $C_2H_5OH + CH_3COOH \xrightarrow{Conc.\ H_2SO_4} CH_3COOC_2H_5 + H_2O$	Example: Ethyl ethanoate on reaction with sodium hydroxide gives ethanol and sodium ethanoate $CH_3COOC_2H_5 + NaOH \rightarrow C_2H_5OH + CH_3COONa$

b.
- Takes 1 ml of ethanol and 1 ml of glacial acetic along with a few drops of concentrated sulphuric acid (H_2SO_4) in a test tube.
- Warm into a beaker containing 20-20 ml of water and fruity smell the remelting mixture.
- We will notice that the resulting mixture is a sweet odoured substance.
- This substance is nothing but ethyl acetate, an ester.

35.

Self pollination	Cross pollination
1) It occurs within a flower or between two flowers of the same plant.	1) It occurs between two flowers borne on different plants of the same species.
2) Flowers do not depend on the other agencies for pollination.	2) Agents such as insects, water and wind are required ensuring pollination.
3) The self pollination can be seen in legumes like sunflowers, orchids, peanuts, oats, peas, potatoes, wheat, peaches, and more.	3) The process take place in several plants like tulips, grapes, plums, apples, pears, strawberries, daffodils, raspberries and others. While, by wind for different grasses, maples trees, dandelions, catkins, and others.
4) Transfers small number of pollen grains.	4) Transfers large number of pollen grains.
5) Autogamy and Geitonogamy are types of reproduction.	5) Allogamy is a type of reproduction.

OR

i. Hormones are the chemical substances that regulate the biological processes in the living organisms.
Characteristics of Hormones
   a. They are poured directly into the bloodstream in very small amounts and are carried throughout the body by circulatory system.
   b. They act only on the specific target organs.

ii. a. Testosterone(produced by testes) is the hormone which brings the change in the male during adolescence.
   b. Insulin (decrease blood sugar) and glucagon (increase blood sugar), secreted by pancreas coordinates the sugar level in blood.

36. i. He should move the screen away from the convex lens to focus the image.
ii. The size of the image increases.
iii. The intensity of the image decreases as the flame moves towards the lens.
iv. The flame should be placed at 20 cm from the convex lens on its left side to form inverted image of same size.

OR

Object distance, u = - 15 cm
Focal length, = - 10 cm
Object size, h = 1 cm
Image distance, v= ?
(i) Position of image
From mirror formula, $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$
We have, $\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$
Putting values, we get $\frac{1}{v} = \frac{1}{-10} - \frac{1}{-15}$
$= \frac{-3-(-2)}{3} = -\frac{1}{30}$
The image is formed at a distance 30 cm on the side of the object Negative sign indicates that object and image are on the same side.

(ii)Nature of image: The image is in front of the mirror, its nature is real and inverted.

Size of image: From the expression for magnification,

m = $\frac{h'}{h} = -\frac{v}{u}$

We have h' = $-h \times \frac{v}{u}$

putting values, we get h' = $-1 \times \frac{-30}{-15}$

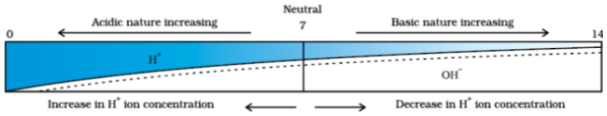
= -2

The image formed has size 2 cm and negative sign means inverted and real and enlarged.

Section E

37. **Read the text carefully and answer the questions:**

A scale for measuring hydronium ion in a solution is called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH- ion concentration in solution i.e a basic solution.



(i) The pH range of the Human Body is 7 to 7.8.

(ii) The strength of acids and bases depends on the number of H^+ ions produced and the number of OH^- ions produced.

OR

Soil Y is acidic. Hence, it should be treated with powdered chalk to reduce its acidity.

38. **Read the text carefully and answer the questions:**

We have seen that the different parts of our body have specific functions. Our mouth waters when we see the food we like without our meaning to. Our heart's beat without our thinking about it. In fact, we cannot control these actions easily by thinking about them even if we wanted to. So, in between the simple reflex actions like change in the size of the pupil, and the thought out actions such as moving a chair, there is another set of muscle movements over which we do not have any thinking control. Many of these involuntary actions are controlled by the mid-brain and hind-brain. All these involuntary actions including blood pressure, salivation and vomiting are controlled by the medulla in the hind-brain. Think about activities like walking in a straight line, riding a bicycle, picking up a pencil. These are possible due to a part of the hind-brain called the cerebellum. It is responsible for the precision of voluntary actions and maintaining the posture and balance of the body. Imagine what would happen if each of these events failed to take place if we were not thinking about it.

(i) Reflex Action is an unconscious, automatic and involuntary response of efforts, i.e., muscles and glands, to a stimulus, which is monitored through the spinal cord. Reflex action is controlled by the spinal cord.

(ii) Yes, reflex action involves all parts of the voluntary nervous system.

(iii)The part of the autonomic nervous system that controls involuntary actions are controlled or regulated by medulla (hindbrain).

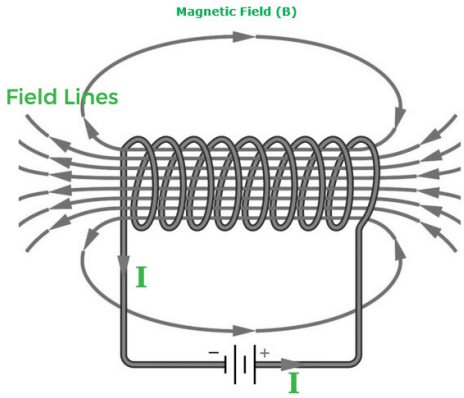
OR

'Beating of heart muscle' is an example of involuntary action. Involuntary actions are slower than reflex actions.

39. **Read the text carefully and answer the questions:**

An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetize a piece of a magnetic material like soft iron when placed inside the solenoid. The strength of the magnetic field

produced by a current-carrying solenoid is directly proportional to the number of turns and strength of the current in the solenoid.



(i) Magnetic field inside the infinite solenoid is uniform. Hence it is the same at all points.

(ii) The end of the current carrying solenoid at which the current flows anti-clockwise behaves as a north pole while that end at which the direction of current clockwise behaves as a south pole and this is according to clock wise.

(iii) For a long solenoid, magnetic field $B \propto In$; where I is the flowing current and n is number of turns per unit length in the solenoid. Therefore, in the given case magnetic field will remain unchanged.

OR

For a solenoid, if we imagine gripping the solenoid with your right hand so that your curl fingers follow the direction of the current then your thumb will point towards the north end of the electromagnet.