Class 10 - Science
Sample Paper - 05 (2022-23)

Maximum Marks: 80
Time Allowed: : 3 hours

General Instructions:

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

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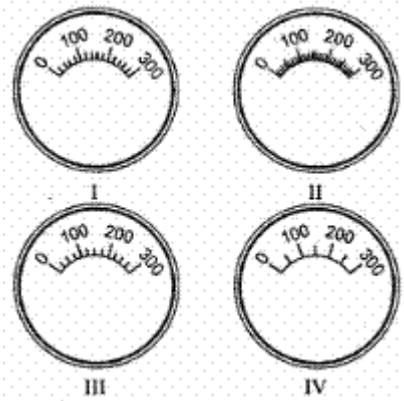
Section A

1. which one of the given four milliammeters would you use for measurement of current flowing in a circuit ?



a) III
b) II
c) IV
d) I

2. A Mendelian experiment consisted of breeding tall pea plants bearing violet flowers with short pea plants bearing white flowers. The progeny all bore violet flowers but

almost half of them were short. This suggests that the genetic make-up of the tall parent can be depicted as.
a) TtWW
b) TTWW
c) TTww
d) TtWw

3. Select the correct statement
   a) Heterotrophs do not synthesise their own food
   b) Heterotrophs synthesise their own food
   c) Heterotrophs are capable of converting carbon dioxide and water into carbohydrates
   d) Heterotrophs utilise solar energy for photosynthesis
4. The most important safety device method used for protecting electrical appliances from short circuiting or overloading is
   a) fuse
   b) earthing
   c) use of stabilizer
   d) use of electric meter
5. Metal always found in free state is
   a) Sodium
   b) Lithium
   c) Copper
   d) Gold
6. Which of the given statement is correct or wrong:
   Statement A: Oxyacetylene flame is used for welding purposes.
   Statement B: Ethyne reacts with HCl in the presence of $HgCl_2$ to form vinyl chloride.
   a) Both the statements A and B are true.
   b) Neither statement A nor statement B is true.
   c) Statement B is true; Statement A is false.
   d) Statement A is true; Statement B is false.
7. One of the constituents of baking powder is sodium hydrogencarbonate, the other constituent is
   a) Acetic acid
   b) Sulphuric acid
   c) Tartaric acid
   d) Hydrochloric acid
8. Where does the embryo develop in a human female?
   a) Seminal vesicles
   b) Fallopian tube
   c) Vagina
   d) Uterus
9. Four student studied reactions of zinc and sodium carbonate with dilute hydrochloric acid and dilute sodium hydroxide
   solutions and presented their results as follows. The fig ✓ represents evolution of

gas, whereas '×' represents absence of any reaction.

	Zn	Na_2CO_3
HCl	✔	✔
NaOH	✔	✘

A

	Zn	Na_2CO_3
HCl	✔	✘
NaOH	✔	✔

B

	Zn	Na_2CO_3
HCl	✘	✘
NaOH	✔	✔

C

	Zn	Na_2CO_3
HCl	✔	✔
NaOH	✘	✘

D

The right set of observation is that of student

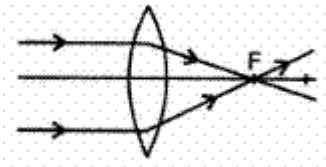
a) A
b) C
c) B
d) D

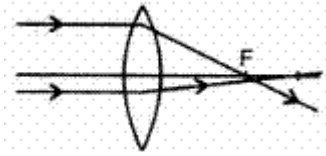
10. In Rhizopus, tubular thread-like structures bearing sporangia at their tips are called
a) filaments
b) roots
c) rhizoids
d) hyphae

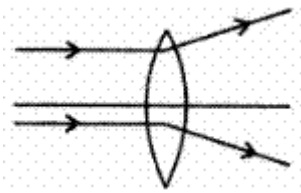
11. The maleness of a child is determined by
a) the Y chromosome in zygote
b) the cytoplasm of germ cell which determines the sex
c) the X chromosome in the zygote
d) sex is determined by chance

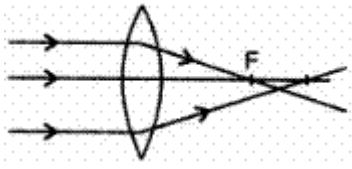
12. In a house, two 60W electric bulbs are lighted for 4 hours and three 100W bulbs for 5 hours every day. The electric energy is consumed in 30 days:
a) 59.4 kWh
b) None of these
c) 100 kWh
d) 45 kWh

13. Which of the following diagrams give a correct picture?

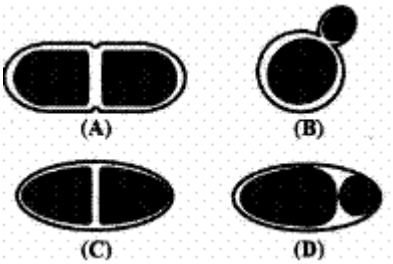
a) 

b) 

c) 

d) 

14. Food cans are coated with tin and not with zinc because:
    a) Zinc is costlier than tin.
    b) Zinc has a higher melting point than that of tin.
    c) Zinc is more reactive than tin.
    d) Zinc is less reactive than tin.
15. The chemical used to test the starch:
    a) Methyl alcohol
    b) Safranin
    c) Glycerine
    d) Iodine
16. The budding in Yeast is illustrated by the diagram:



    a) C
    b) B
    c) D
    d) A
17. **Assertion (A):** In Fleming's Left-Hand Rule, the direction of magnetic field, force and current are mutually perpendicular.
    Reason (R): Fleming's Left-hand Rule is applied to measure the induced current.
    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):** Gas bubbles are observed when sodium carbonate is added to dilute hydrochloride acid.
    Reason (R): Carbon dioxide is given off in the reaction.
    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):** Units that make up the nervous system are called neurons.
    Reason (R): Nerve impulses are carried by dendrites towards the cell body.
    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):** Ozone is both beneficial and damaging.
    Reason (R): Stop the release of chlorofluorocarbons to protect the ozone.
    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.

Section B

21. Give chemical reaction of acetic acid (ethanoic acid) with sodium metal.

OR

What is the role of concentrated H_2SO_4 in the esterification reaction?

22. "Nervous and hormonal systems together perform the function of control and coordination in human beings." Justify the statement.
23. Why is improper disposal of waste a curse to environment?
24.
    i. Write two harmful effects of using plastic bags on the environment. Suggest alternatives to the usage of plastic bags.
    ii. List any two practices that can be followed to dispose off the waste produced in our homes.
25. Ravi is given lenses with powers + 5 D, - 5 D, + 10 D, - 10 D and - 20 D. Considering a pair of lenses at a time, which two lenses will he select to have a combination of total focal length when two lenses are kept in contact in each case:

    i. -10 cm
    ii. 20 cm
    iii. -20 cm

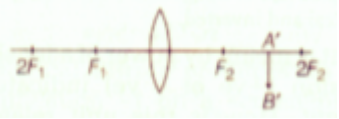
OR

    i. What is the visible spectrum?
    ii. Why is red used as the stopping light at traffic signals?
    iii. Two triangular glass prisms are kept together connected through their rectangular side. A light beam is passed through one side of the combination. Will there be any dispersion? Justify your answer.
26.

    i. Write the name of the following compounds:
        a. HCOOH
        b. $CH_3COCH_2CH_3$
    ii. Explain why carbon generally forms compounds by covalent bonds.

Section C

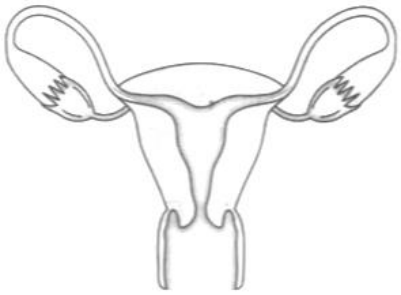
27. Explain the following in terms of gain or loss of oxygen with two examples each:
    a. Oxidation
    b. Reduction
28. Observe the following incomplete ray diagram of an object where the image A'B' is formed after refraction from a convex lens.



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.

29. Answer the following by carefully studying the figure:



i. Identify the image shown above.
ii. Label in the figure the ovary, oviduct, uterus, vagina.
iii. State the functions of the labeled parts in part b.

OR

Ravi took three bread slices and kept them in the following conditions

i. Slice 1 in a dry and dark place
ii. Slice 2 in moist and dark place
iii. Slice 3 in moist and in refrigerator
What would he observe in each of the above conditions? Give reasons for your answer.

30. What are the common defects of vision that can be corrected by the use of suitable eyeglasses or spectacles?
31. Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions.

a. Zinc reacts with silver nitrate to produce zinc nitrate and silver.
b. Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide.

32. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?

OR

i. In humans, if gene B gives brown eyes and gene b gives blue eyes, what will be the colour of eyes of the persons having the following combination of genes? (a) Bb (b) bb (c) BB
ii. What do you class this trait of eye colour in human? Explain.

33. How can changes of size of eyeball be one of the reason for

i. myopic and
ii. hypermetropic eye?

Compare the size of eyeball with that of a normal eye in each case. How does this changes of size affect the position of image in each case?

Section D

34.

i. Define non-metals. Give five examples of non-metals.
ii. Name a non-metal which conducts electricity.
iii. Name a non-metal having lustre (shining surface).
iv. Name a non-metal which is extremely hard.
v. How do non-metals react with oxygen? Explain with an example. Give equation of the reaction involved. What is the nature of the product formed? How will you demonstrate it?

OR

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

35. The diagram shows the mechanism of blood circulation in the human body.

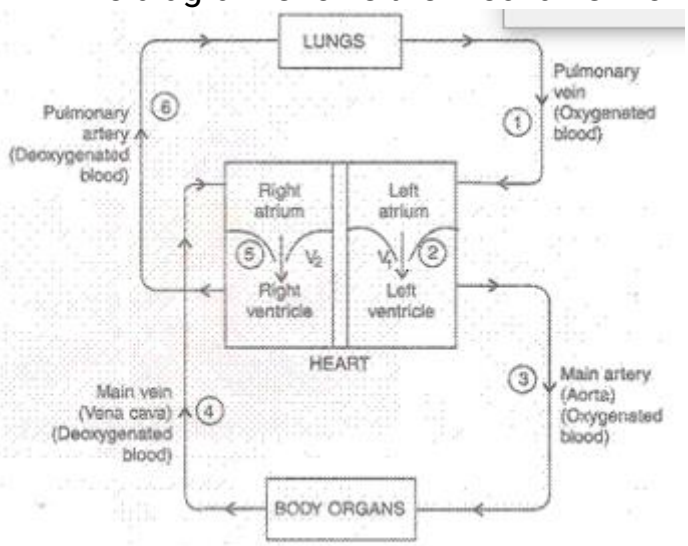


Diagram to show blood circulation in human body.

Using the above diagram, answer the following questions:

i. What happens when the left atrium contracts?
ii. What is the function of the main artery?
iii. How the heart behaves like a pump?
iv. What prevents the backflow of blood into atria when the ventricles contract to pump blood out of the heart to the rest of the body?
v. What happens when the muscles of all the four chambers are relaxed?

OR

a. Write the reaction that occurs when glucose breaks down anaerobically in yeast.
b. Write the mechanism by which fishes breath in water.
c. Name the balloon likes structures present in lungs. List its two functions.
d. Name the respiratory pigment and write its role in human beings.

36.

i. Draw the magnetic field lines through and around a single loop of wire carrying electric current.
ii. State whether an alpha particle will experience any force in a magnetic field, if :
    a. It is placed in the field at rest.
    b. It moves in the magnetic field parallel to field lines.
    c. It moves in the magnetic field perpendicular to field lines.

Justify your answer in each case.

Section E

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

The heating effect of current is obtained by transformation of electrical energy into heat energy. Just as mechanical energy used to overcome friction is covered into

heat, in the same way, electrical energy is converted into heat energy when an electric current flows through a resistance wire. The heat produced in a conductor, when a current flows through it is found to depend directly on (a) strength of current (b) resistance of the conductor (c) time for which the current flows.
The mathematical expression is given by $H = I^2Rt$.
The electrical fuse, electrical heater, electric iron, electric geyser etc. all are based on the heating effect of current.

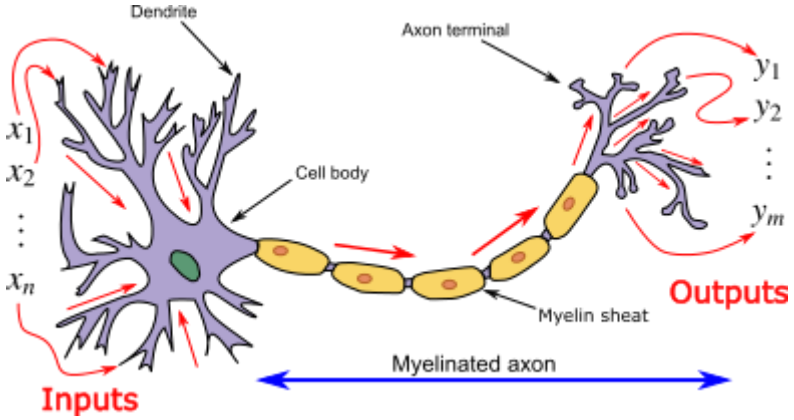
i. What are the properties of heating element?
ii. What are the properties of electric fuse?

OR

When the current is doubled in a heating device and time is halved, what will be the heat energy produced?

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

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell, see figure, sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end.



i. Name the largest cell present in the body.
ii. What is an axon ?
iii. Name one gustatory receptor and one olfactory receptor present in a human beings.

OR

Name the following parts of a neuron:

a. Where information is acquired.

b. Through which information travels as an electrical impulse.

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

Salt of a strong acid and strong base is neutral with a pH value of 7. NaCl common salt is formed by a combination of hydrochloride and sodium hydroxide solution. This is the salt that is used in food. Some salt is called rock salt, bed of rock salt was formed when seas of bygone ages dried up. The common salt thus obtained is an important raw material for various materials of daily use, such as sodium hydroxide, baking soda, washing soda, and bleaching powder.

i. If given acids are phosphoric acid, carbonic acid, hydrochloric acid and sulphuric acid, then which acid does not form an acidic salt?
ii. What is the formula of baking soda?
iii. Name the substance which on treatment with chlorine to obtain bleaching powder.

OR

Which salt is used for removing the permanent hardness of water?

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Solution

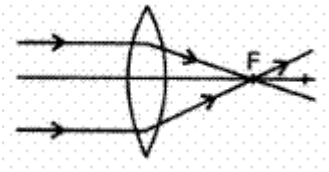
Section A

1. (b) II
Explanation: Least count is less and so more accurate. (The range of current also to be considered)
2. (a) TtWW
Explanation: Since all the progeny has violets flowers so the genotype of tall plant for violet flower colour should WW.Secondly,since almost half of the progeny is short which suggests that the tall plant is not pure and possesses the genotype Tt.
3. (a) Heterotrophs do not synthesise their own food
Explanation: Hetcrocrophs cither dependent on Phototrophs or other organisms for their food.
4. (a) fuse
Explanation: The most important safety, method used for protecting home appliances from short circuiting or overloading is the electric fuse. This is a safety device having thin wire of short length made of tin (25%) and lead (75%) alloy having low melting point around 200°*C*. The fuse wire is of chosen thickness, so as to fix its resistance and hence amount of heating on passage of a particular amount of current. Whenever current through the fuse exceeds the set limit, the fuse wire melts and breaks the circuit. This saves the main circuit components from damage.

5. (d) Gold
Explanation: Gold, platinum, copper, silver are few metals that can be found in the free state because they are unreactive in normal conditions with air, water, and other chemicals.
6. (a) Both the statements A and B are true.
Explanation:
   - **The oxyacetylene flame** is used for welding purposes. The oxyacetylene welding process uses a combination of oxygen and acetylene (C_2H_2) gas to provide a high-temperature flame. It is commonly used to join mild steel permanently.
   - Ethyne (C_2H_2) reacts with HCl in the presence of $HgCl_2$ to from vinyl chloride or chloroethane H_2C=CHCl. This colourless compound is an important industrial chemical. It is chiefly used to produce polyvinyl chloride (PVC).
7. (c) Tartaric acid
Explanation: Tartaric acid used in baking powder where it serves as the source of acid that reacts with baking soda. This reaction produces carbon dioxide gas and lets products rise using active yeast cultures as a source of carbon dioxide gas.
8. (d) Uterus
Explanation: The fertilized embryo gets attached to the uterus and all the developmental process of the embryo takes place in the uterus.
9. (a) A
Explanation: Zinc reacts with dilute HCl and NaOH, whereas Na_2CO_3 reacts only with dilute HCl.
$Zn + 2HCl \rightarrow ZnCl_2 + H_2$
$Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2$
$Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$

10. (d) hyphae
Explanation: Rhizopus is a saprobic fungus that feeds on the dead decaying organic matter. Its body is made up of branching mycelia composed of three types of hyphae- rhizoids, stolons, and unbranched sporangiophores. Rhizoids are root-like hyphae that grow downward into the soil and help in the absorption of water. A stolon is a special slender horizontal hypha that helps in the propagation of an organism. Sporangiophores are straight, unbranched tubular thread-like hyphae which bear rounded sporangia at its tips. sporangia produce non-motile multinucleate spores for asexual reproduction.
11. (a) the Y chromosome in zygote
Explanation: The maleness of a child is determined by the Y-chromosome in zygote inherited from the father. If X-chromosome is inherited from the father, the zygote will develop into a girl.
12. (a) 59.4 kWh
Explanation: Case 1:
Power, P_1 = 60W
Number, n_1 = 2
Time for use, T_1 = 4 hours everyday

Energy consumed, $E_1 = n_1 \times P_1 \times T_1$
$E_1 = 2 \times 60 \times 4 = 480$ watt-hour = 0.48kWh
Therefore, energy consumed for 30 days = 30 × 0.48 = 14.4 watt-hour
Case 2:
Power, $P_2 = 100W$
Number, $n_2 = 3$
Time for use T_2 = 5 hours everyday
Energy consumed, $E_2 = n_2 \times P_2 \times T_2$
$E_2 = 3 \times 100 \times 5 = 1500 = 1.5kWh$
Therefore, energy consumed for 30 days = 30 × 1.5 = 45kWh
Therefore, overall energy consumed = 14.4 + 45 = 59.4kWh

13. (a) 

Explanation: All rays passing parallel to the axis will pass through the focus after refraction in the lens.
14. (c) Zinc is more reactive than tin.
Explanation: Food cans are coated with tin and not zinc because zinc is more reactive than tin. If food cans are coated with zinc, zinc may react with food items and make them unfit for human consumption.
15. (d) Iodine
Explanation: Iodine makes starch blue-black.
16. (b) B
Explanation: The bud in the yeast appears as a protuberance.
17. (c) A is true but R is false.
Explanation: It is used to find the direction of force in a current-carrying conductor in the presence of magnetic field.
18. (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.
19. (b) Both A and R are true but R is not the correct explanation of A.
Explanation: The nervous system is the system of conducting tissues that receive the stimulus and transmits it to other parts of the body forming a network of nerves. It is involved in receiving information (sensation) and generating responses to that information (motor response). The units which make up the nervous system are called nerve cells or neurons. Nerve impulses are always transmitted across a synapse from the axon terminals of one neuron to the dendrite/cell body of the next neuron.
20. (b) Both A and R are true but R is not the correct explanation of A.
Explanation: Ozone is damaging as it is a deadly poison. It is beneficial as it shields the surface of the earth from UV radiations of the Sun. We should stop the release of Chlorofluorocarbons (CFCs) to protect the ozone.

Section B

21. The reaction of ethanoic acid with sodium metal results in the formation of sodium ethanoate or commonly known as sodium acetate and hydrogen gas is liberated . The reaction is represented as -
$2CH_3COOH + 2Na \rightarrow 2CH_3COONa + H_2$

OR

During esterification reaction, a carboxylic acid reacts with an alcohol to form a sweet smelling ester, and water in the presence of concentrated sulphuric acid. Esterification reaction is a reversible reaction and will not reach completion if a dehydrating agent is not used to remove water from the reaction mixture. The reverse reaction is called ester hydrolysis.
Concentrated sulphuric acid is a strong dehydrating agent. It removes water from the reaction mixture. As a result, the reaction proceeds only in the forward direction to form an ester. If a dehydrating agent is not used and water is not removed from the reaction mixture, hydrolysis of the final product (ester) will happen.

$$\underset{Acid}{RCOOH} + \underset{Alcohol}{ROH} \xrightarrow{Conc.H_2SO_4} \underset{Ester}{RCOOR} + H_2O$$

22. Control and coordination of functioning of various organ and organ system of the body is under the direct control of nervous system in close coordination with endocrine(hormonal) system. This control is achieved by a complex network of neurons which carry signals in the form of electric impulses; to and from the brain and controls the body function directly whereas, the endocrine system are the ductless glands which release chemical substances directly into the blood and reaching the target site for action.
Nervous and hormonal systems are complementary to each other. Thus, it can be said that nervous and hormonal system together perform the function of control and coordination in human beings.
23. Wastes pollute air, soil and water, and cause harmful effects on all living organisms . If waste is not properly segregated into biodegradable and non-biodegradable it will pollute environment and also, hamper the process of decomposition. If the waste is disposed off near a residential area and is not covered properly, it can create a problem of stench in the surrounding and lead to various health issues.
24.

i. Harmful effects of plastic bags:
   a. Plastics do not undergo degradation, thus stay in soil for many years. This may affect the soil fertility and degrades the soil quality.
   b. When plastic artifacts enter the drainage and sewerage system, they block the pipes and drains causing water logging.
   c. Littering of plastics in open spaces creates unhygienic conditions, as it acts as breeding ground for insects and mosquitoes.

We can reduce the use of plastic bags and carry jute bags and paper bags to carry items from the market.

ii. Measures taken for proper disposal of waste produced at our homes are:-

a. Prepare a compost pit for kitchen wastes.
b. Safe disposal of plastic bags.
c. Segregation of biodegradable and non-biodegradable wastes.
d. Fruit peels can be placed near trees or plants, which on decomposition will enrich the soil with nutrients.
e. Recycling of paper wastes.

25.

i. When lenses of 10 D and - 20 D are taken, total power,
$P = 10\ D - 20\ D = -10\ D$ [$\because P = P_1 + P_2$]
Total focal length,
$f = 100 - 10 = -10$ cm

ii. When lenses of 10 D and - 5 D are taken, total power
$P = 10\ D - 5\ D = 5\ D$
Total focal length,
$f = 1005 = 20$ cm

iii. When lenses of + 5 D and -10 D are taken, total power,
$P = +5D - 10D = -5D$
Total focal length,
$f = 100 - 5 = -20$ cm

OR

i. Visible spectrum is the band of coloured components of a white light beam.
ii. Red light is scattered the least by air molecules and has longer wavelength. It travels the longest distance.
iii. The given setup will behave like a glass slab, resulting in recombination of the seven colours to produce white light.

26.

i.
a. Methanoic acid
b. Butan-2-one

ii. Carbon generally forms covalent bond because of tetra valency of carbon. It has four electrons in its valence shell. It can neither donate nor accept four electrons due to energy consideration. Therefore, it shares its four electrons with other atoms and forms covalent bond.

Section C

27. Oxidation- Addition of oxygen or removal of hydrogen in a chemical reaction is called oxidation reaction. For example:

$2Cu + O_2 \rightarrow 2CuO$

$4Al + 3O_2 \rightarrow 2Al_2O_3$

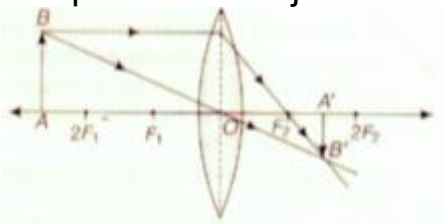
Reduction- Addition of hydrogen or removal of oxygen in a chemical reaction is called reduction reaction. For example:

$CuO + H_2 \rightarrow Cu + H_2O$

$H_2S + Cl_2 \rightarrow 2HCl + S$

28.

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

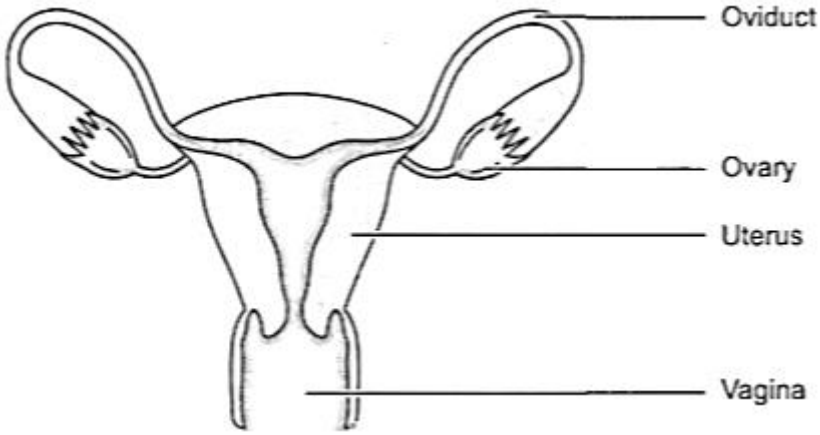


ii. Size of the object would have been bigger than the size of image.

29.

i. The figure represents the female reproductive system.

ii. The figure with labelled part is as shown.



iii. The ovary is the female primary sex organ that produces ova or eggs. They secrete female hormones oestrogen and progesterone. The oviduct receives the egg released from the ovum and it is the site of fertilisation. The uterus is a muscular organ where implantation of zygote occurs and it takes care of the developing embryo. The vagina is a muscular tube-like structure which receives the sperms and through which the baby is delivered.

OR

i. In slice 1, no change will be observed or it will remain sterile because it lacks moisture, which is necessary for any organism to thrive.

ii. A white cottony mass surrounded with black pin head-like structures are seen spreading on the surface of slice 2. This is because tiny spores of Rhizopus

present in air will thrive in humid conditions. Thus slice 2 kept in moist and dark place, develops sporangia and spores, which are favourable for the growth of fungus.

iii. In slice 3, also no change is observed (remains sterile) as it is kept at low temperature in the refrigerator. Which does not allow fungal growth. Moisture and warm conditions are necessary for fungal growth.

30. There are mainly four common defect of vision that can be corrected by the use of suitable eyeglasses or spectacles. There are

i. Myopia or near-sightedness,
ii. Hypermetropia or far-sightedness,
iii. Presbyopia, and
iv. Astigmatism

31.

a. It is a displacement reaction.
$Zn + 2AgNO_3 \rightarrow Zn(NO_3)_2 + 2Ag$
b. It is a double displacement reaction.
$2KI + Pb(NO_3)_2 \rightarrow 2KNO_3 + PbI_2$

32. In sexual reproduction, two individuals having different variations combine their DNA to give rise to a new individual. Therefore, sexual reproduction allows more variations, whereas, in asexual reproduction, chance variations can only occur when the copying of DNA is not accurate. Additionally, asexual reproduction allows very less variations because if there are more variations, then the resultant DNA will not be able to survive inside the inherited cellular apparatus. However, in sexual reproduction, more variations are allowed and the resultant DNA is also able to survive, thus making the variations viable.

Variation and Evolution: Variants help the species to survive in all the conditions. Environmental conditions such as heat, light, pests, and food availability can change suddenly at only one place. At that time, only those variants resistant to these conditions would be able to survive. This will slowly lead to the evolution of a better-adapted species.Thus, variation helps in the evolution of sexually reproducing organisms.

OR

i. Bb will have brown eyes.
bb will have blue eyes.
BB will have brown eyes.
ii. Eye colour in humans is an inherited trait. These are traits that are present in the DNA of an organism and are passed on to their progeny.

33.

i. The eye suffering from myopia or short-sightedness, has long eyeball than that of normal eye due to which the retina is at a larger distance from the eye lens thus image formation occurs before retina rather than onto it.
ii. The eye suffering from hypermetropia or long-sightedness has short eyeball than that of normal eye due to which the retina is at smaller distance from the eye lens thus, the formation of the image occurs behind the retina and not on retina.

Section D

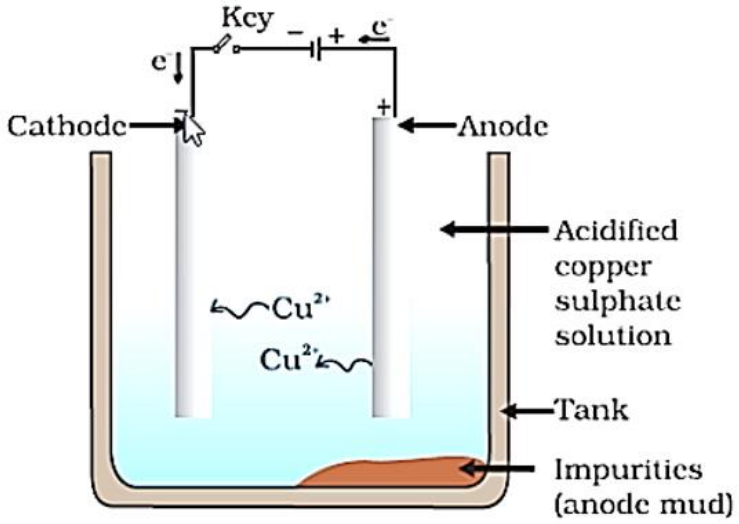
34.

i. Non-metals are the elements that do not conduct heat and electricity and are neither malleable nor ductile. Example: Carbon, sulphur, phosphorus, silicon, and oxygen.
ii. Carbon is a non-metal which conducts electricity.
iii. Iodine is a non-metal having lustre.
iv. Carbon (Diamond) is a hard non-metal.
v. Non-metals react with oxygen to form acidic oxides or neutral oxides. Carbon burns in air to form carbon dioxide.
The nature of the product formed is acidic. When carbon dioxide dissolves in water, it forms carbonic acid. It turns blue litmus to red which shows it is acidic in nature.

OR

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



35.

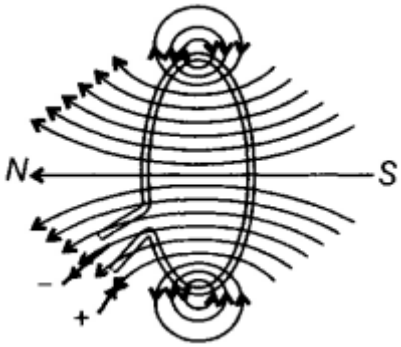
i. When the left atrium contracts, the oxygenated blood is pushed into the left ventricle through valve V_1.
ii. The main artery carries the blood to all the organs of the body head, arms, etc except the lungs.
iii. All the atria and ventricles of the heart contract and relax at appropriate times and make the heart behave like a pump.
iv. The valves prevent the backflow of blood into atria when the ventricles contract to pump blood out of the heart to the rest of the body because when the ventricles contract, the valves V_1 and V_2 close automatically so that the blood may not go back into the atria.
v. When the muscles of all the four chambers are relaxed, the pulmonary vein brings the oxygenated blood from the lungs in the left atrium of the heart.

OR

a. $\text{Glucose} \xrightarrow{\text{In Cytoplasm}} \text{Pyruvate} \xrightarrow{\text{In absence of oxygen}} Ethanol + CO_2 + Energy$
b. Fishes breathe in water through the mouth and force it past the gills where the dissolved oxygen is taken up by the blood.
c. The balloon like structure present in the lungs is Alveoli. Two Functions of Alveoli are:-
(i) They contain an extensive network of blood vessels that exchanges gases.
(ii) They increase the surface area of absorption of gases.
d. The respiratory pigment is Haemoglobin.
Role:- Due to high affinity for O_2, it helps in its transport from alveoli to the tissue.

36.

i. The magnetic fields lines due to a circular coil are shown in the figure given below. At every point on a current carrying circular loop, the magnetic field is in the form of concentric circles around it. As we move away from it, the radii of the circle tend to increase. When we reach the center of the loop, the field appears to be a straight line.



ii.

a. No, it will not experience any force. As, magnetic field exerts force on a moving charged particle only.
b. No, it will not experience any force because magnetic field exerts a force in perpendicular direction to motion of the particle.
c. Yes, it will experience a force in a direction perpendicular to the direction of its own motion and the direction of magnetic field can be determined by Fleming s left hand rule.

Section E

37.

i. Low resistance, high melting point.
ii. High resistance, low melting point
Electric Fuse is based on the principle of the heating effect of Electric current.

OR

Given: $H = I^2Rt$
So, $H' = (2I)^2 \cdot \frac{R}{2}t = 2H$

38. i. Nerve cell is the largest cell present in the body.

ii. Axon is a large, single, unbranched nerve fibre arising from the cyton. It carries impulses from cyton located in CNS to the effectors.

iii. **Gustatory receptor:** Taste buds on the tongue. The receptors for gustation are located in the oral cavity, which brings food and fluids from outside the body into the gastrointestinal tract.
Olfactory receptor: Receptor in the nose. These receptors are common to arthropods, terrestrial vertebrates, fish, and other animals.

OR

a. Dendrites.
b. Axon.

39.

i. Carbonic acid does not form an acidic salt.
ii. Sodium bicarbonate, commonly known as baking soda or bicarbonate of soda, is a chemical compound with the formula $NaHCO_3$.
iii. $Ca(OH)_2$ treatment with chlorine to obtain bleaching powder.
$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$

OR

Washing soda is used for removing the permanent hardness of the water.