Class- X Session - 2022-23

Subject - Science (086)

Sample Question Paper - 2

with Solution

Max. Marks: 80 **Time Allowed: 3 hours**

General Instructions:

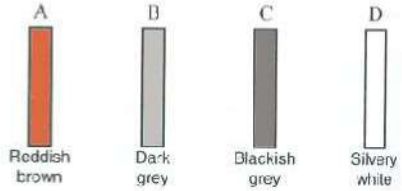
i. *This question paper consists of 39 questions in 5 sections.*
ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
iii. ***Section A** consists of 20 objective type questions carrying 1 mark each.*
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.*

Section A

1. Which one of the following properties is not generally exhibited by ionic compounds? **[1]**

a) Electrical conductivity in solid state
b) Electrical conductivity in molten state
c) Solubility in water
d) High melting and boiling points

2. Four strips labelled A, B, C and D along with their corresponding colours are shown below. Which of these could be made up of aluminium? **[1]**



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

3. Match the following with correct response. **[1]**

(1) Phenotype	(A) Gene complement of an individual
(2) Genotype	(B) Factor which cannot express its effect
(3) Dominant factor	(C) Factor which can express its effect
(4) Recessive factor	(D) Observable characteristics

a) 1-C, 2-B, 3-D, 4-A
b) 1-A, 2-C, 3-B, 4-D

c) 1-B, 2-D, 3-A, 4-C

d) 1-D, 2-A, 3-C, 4-B

4. Which of the following hydrocarbons undergo addition reactions? **[1]**
C_3H_8, C_3H_6, C_2H_5OH, CH_4, C_2H_2

a) C_3H_6,C_2H_2

b) C_3H_8, CH_4

c) C_3H_8, C_2H_5OH

d) C_3H_8, C_3H_6

5. Offspring formed as a result of sexual reproduction exhibit more variations because **[1]**

a) genetic material comes from two parents of different species

b) genetic material comes from many parents

c) sexual reproduction is a lengthy process

d) genetic material comes from two parents of the same species

6. If two lenses of power P_1 and P_2 are put in contact, what will be the net power? **[1]**

a) $P_1 \times P_2$

b) $P_1 - P_2$

c) $\frac{P_1}{P_2}$

d) $P_1 + P_2$

7. Which of the following is the correct statement regarding bile? **[1]**

a) Secreted by bile duct and stored in liver

b) Secreted by gall bladder and stored in liver

c) Secreted by liver and stored in bile duct

d) Secreted by liver and stored in gall bladder

8. The image formed by a concave mirror is real, inverted, and highly diminished (much smaller than the object). The object must be: **[1]**

a) at infinity

b) at the centre of curvature

c) between pole and focus

d) at focus

9. Which of the following is due to the parasympathetic system: **[1]**

A. Dilation of blood vessels

B. Contraction of urinary blood vessels

C. Inhibits gastric secretion

D. Constrict the eye pupil

a) A, B and D

b) A and C

c) All of these

d) A and B

10. Match the following with correct response. **[1]**

Column A	Column B
(i) Cretinism	(a) Over secretion of growth hormone

(ii) Gigantism	(b) Under secretion of ADH
(iii) Exophthalmia	(c) Over secretion of thyroxin
(iv) Diabetes insipidus	(d) Deficiency of thyroxin

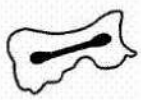
a) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)

b) (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)

c) (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)

d) (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)

11. The diagram given below illustrates **[1]**



a) pseudopodia formation in Amoeba

b) formation of daughter cells in Yeast

c) binary fission in Amoeba

d) bud formation in Yeast

12. Which of the following are not ionic compounds? **[1]**

i. KCl

ii. HCl

iii. CCl_4

iv. NaCl

a) (ii) and (iii)

b) (i) and (iii)

c) (i) and (ii)

d) (iii) and (iv)

13. The bond between two identical non-metallic atom has a pair of electron: **[1]**

a) with identical spins.

b) unequally shared between two atoms.

c) transferred completely from one atom to another.

d) equally shared between them.

14. In Amoeba, binary fission takes place by the following steps. The correct sequence is: **[1]**

A. The cellular constriction increases and divides the whole body into equal halves and form two daughter Amoeba.

B. A constriction appears in the cell membrane and nuclear membrane.

C. Each daughter Amoeba contains a nucleus surrounded by cytoplasm and cell membrane.

D. Nuclear constriction increases and divides the nucleus into two daughter nuclei.

a) B, D, A, C

b) D, A, B, C

c) C, D, A, B

d) A, B, C, D

15. Identify the unsaturated compounds from the following **[1]**

i. Propane

ii. Propene

iii. Propyne

iv. Chloropropane

a) (ii) and (iv)

b) (i) and (ii)

c) (iii) and (iv)

d) (ii) and (iii)

16. **Assertion (A):** H_3PO_4 and H_2SO_4 are known as polybasic acids. **[1]**
Reason (R): They have two or more than two protons per molecule of the acid.

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.

17. A chemical reaction is characterised by: **[1]**

a) Change in state

b) Evolution and absorption of energy

c) Formation of new products

d) All of these

18. **Assertion (A):** Walls of the intestine have numerous villi. **[1]**
Reason (R): These villi increase the surface area of digestion.

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):** Gold is isolated from other impurities by the Arndt Forrest cyanide process. **[1]**
Reason (R): The cyanide which is used here dissolve all possible impurities.

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):** Tungsten metal is used for making filaments of incandescent lamps. **[1]**
Reason (R): The melting point of tungsten is very low.

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. Explain an agricultural practice that has a harmful effect on ecosystem. **[2]**

22. Explain why the planets do not twinkle? **[2]**

OR

Draw a labelled diagram to show

i. reddish appearance of the sun at the sunrise or the sunset and

ii. white appearance of the sun at noon when it is overhead.

23. A concave lens has a focal length of 10 cm. An object 2.5 cm high is placed 30 cm from the lens. Determine the position and size of the image. **[2]**

24. Differentiate between the Transpiration and Evaporation. **[2]**

25. What are covalent compounds? Why are they different from ionic compounds? List their three characteristics properties. **[2]**

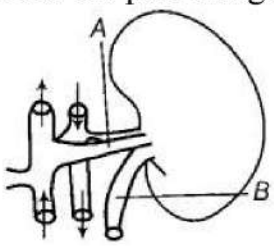
26. A white powder having an odour of chlorine is used to remove yellowness of white clothes in laundries. Name this powder. How is it prepared ? Write the chemical reaction involved in its preparation. **[2]**

Section C

27. Differentiate between food chain and food web. **[3]**

28. A cleaned aluminium foil was placed in an aqueous solution of zinc sulphate. When the aluminium foil was taken out of the zinc sulphate solution after 15 minutes, its surface was found to be coated with a silvery grey deposit. From the given observation, what can be concluded? **[3]**

29. A figure given below shows a diagram of a kidney and its associated structures. The table list the percentage of certain components found within the structures A and B. **[3]**



In Structure A	
Components	**Concentration %**
Urea	0.03
Glucose	0.10
Amino acids	0.05
Salts	0.75
Proteins	8.00

In Structure B	
Components	**Concentration %**
Urea	2.00
Glucose	0.00

Amino acids	0.00
Salts	1.50
Proteins	0.00

i. Using only the information given in the tables, deduce the functions of the kidney.

ii. Explain how the proportions of components present in part B would change if a person is suffering from diabetes mellitus.

30. i. Name the spherical mirror used as: **[3]**

a. shaving mirror

b. Rear view mirror in vehicles

c. Reflection in search-light.

ii. Write any three difference between a real and a virtual image.

OR

An object is kept at a distance of 18 cm, 20 cm and 30 cm, from a lens of power+5D. (i) In which case or cases would you get a magnified image? (ii) Which of the magnified image can we get on a screen? (b) List two widely used applications of a convex lens.

31. What are the common defects of vision that can be corrected by the use of suitable eyeglasses or spectacles? **[3]**

32. Mahesh bought an electric iron and connected its wires into the two-pin plug. Obviously, the green wire was not connected anywhere. Few days later, his wife got a severe electric shock while ironing the clothes. The electrician told Mahesh that this situation could be averted, if he had connected the green wire also, using the three-pin plug. Mahesh learnt a lesson for a life-time. **[3]**

Read the above passage and answer the following questions:

i. Which terminal was to be connected using green wire?

ii. What qualities does Mahesh need to incorporate in himself to avoid such mistakes?

iii. If you were the electrician, what else would you do than explaining to Mahesh?

33. Mention three important features of fossils which help in the study of evolution. **[3]**

OR

Answer the following:

i. With the help of a diagram demonstrate the process of regeneration as seen in Planaria?

ii. Which type of cells are used by such multicellular organisms to regenerate?

Section D

34. i. What is salt? Give the names and formulae of any two salts. Also, name the acids and bases from which these salts may be obtained. **[5]**

ii. What is meant by **a family of salts**? Explain with examples.

iii. What is meant by **hydrated** and **anhydrous** salts? Explain with examples.

iv. Write the names, formulae, and colours of any two hydrated salts.

v. What will be the colour of litmus in an aqueous solution of ammonium chloride salt?

OR

For making a cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake,

i. How will it affect the taste of the cake and why?

ii. How can baking soda be converted into baking powder?

iii. What is the role of tartaric acid added to baking soda?

35. What is the function of safety fuse ? How it connected in circuit ? **[5]**

36. List some functions of the human brain. **[5]**

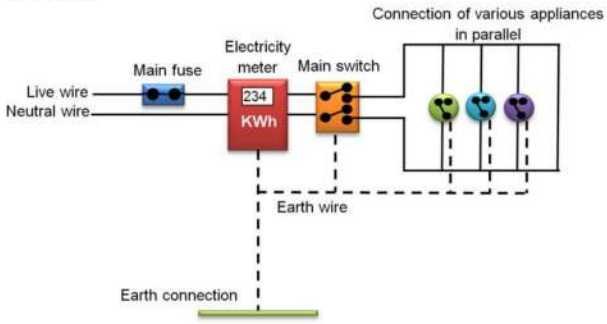
OR

Explain the reflex action by means of reflex arc with diagram.

Section E

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

In our homes, either the overhead electric poles or underground cables support the power supply flowing through the mains supply. One of the wires in this supply is covered with insulation in the colour red, and another wire colored black. At the meter board, these wires pass into an electric meter through the main fuse. The main switch, live wire, and the neutral wire are in connection to the line wires in our homes; these wires then supply electricity to separate electric circuits within the house.



(i) What is the colour of the live wire?

(ii) Where is the fuse placed in the electric supply in the above-given figure?

(iii) What is the commercial unit of the power supply?

OR

What is the role of the fuse in series with any electrical appliance in an electric circuit?

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

In a redox reaction, both oxidation, as well as reduction, takes place together, oxidation involves loss of electrons while reduction involves the gain of electrons. The redox- reaction may involve a combination of atoms and molecules,

displacement of metals, or non-metals.
Example: $CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$
displacement of Cu metal from its compound.

(i) In the below equation, which gets reduced?
$CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

(ii) The oxidising agent generally loses or gains an electron.

(iii) Identify the oxidising agent and reducing agent in the above reaction.
$CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

OR

Identify the type of given reaction.
$CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

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

In fruitflies, the gene for wing shape has two alleles, an unusual allele for curled wings (c) and the normal allele for straight wings (C). The given phenotypes are observed for each genotype.

Genotype	Phenotype
CC	Normal, straight wings
Cc	Wings curled up at the ends, has difficulty flying
cc	Unable to hatch from egg

(i) Which of the following crosses would produce live offspring from 50% of the eggs?

(ii) Which of the following crosses would be able to produce offspring that would fly normally from 50% of the egg?

OR

Normal straight-winged flies are self-crossed and they produce 120 eggs. What is the proportion of curly-winged flies expected among the live offspring?

Solution

Section A

1. **(a)** Electrical conductivity in solid state
   Explanation: Ionic compounds such as NaCl have a high melting point and high boiling point.
   They are generally soluble in water than other organic solvents since water being polar covalent in nature breaks the ionic bonds.
   Ionic compounds are good conductors of electricity in their molten state but not in their solid-state.
2. **(d)** D
   Explanation: Aluminum is a silvery-white, ductile metallic element, the most abundant in the earth's crust but found only in combination, chiefly in bauxite. Having good conductive and thermal properties, it is used to form many hard, light, corrosion-resistant alloys.
3. **(d)** 1-D, 2-A, 3-C, 4-B
   Explanation: A) phenotype is the expressed physically visible trait in an organism.
   B) genotype is the coding of the physically visible expressions.
   C) dominant factor are the genotypes which express them in homozygous as well as heterozygous condition.
   D) recessive factor are the genotypes which are not able to express them in heterozygous condition.
4. **(a)** C_3H_6,C_2H_2
   Explanation: Unsaturated hydrocarbons undergo addition reactions. Hence, saturated hydrocarbons like C_3H_8 and CH_4 (propane and methane) will not undergo addition reactions. Propene (C_3H_6) and Ethyne (C_2H_2) will undergo addition reactions.
5. **(d)** genetic material comes from two parents of the same species
   Explanation: Sexual reproduction involves two parents of the same species. Thus, both of them contribute to the genetic material of the offspring and bring about the variations.
6. **(d)** $P_1 + P_2$
   Explanation: The net power of the lenses placed in contact is given by the algebraic powers of the individual powers.
   Net power of the lens combination, $P = P_1 + P_2$
7. **(d)** Secreted by liver and stored in gall bladder
   Explanation: Secreted by liver and stored in gall bladder
8. **(a)** at infinity
   Explanation: at infinity
9. **(a)** A, B and D
   Explanation:
   - When blood vessels dilate, the flow of blood is increased due to a decrease in vascular resistance.
   - The urinary bladder is a hollow elastic organ that functions as the body's urine storage tank.
   - The pupil is a hole located in the centre of the iris of the eye.
10. **(a)** (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
    Explanation:
    - It is a condition of severely stunted physical and mental growth owing to untreated congenital deficiency of thyroid hormone.

- Gigantism is a rare condition that causes abnormal growth in children caused by growth hormones.
- Protrusion of the eyeball from the orbit, caused by disease, especially hyperthyroidism, or injury.
- A disorder of salt and water metabolism marked by intense thirst and heavy urination.

11. **(c)** binary fission in Amoeba
    Explanation: In binary fission, the nucleus elongates first. Amoeba is a very good example of the organism which reproduces by binary fission.
12. **(a)** (ii) and (iii)
    Explanation: Carbon tetrachloride is a covalent compound and dissolves in ether and alcohol like organic compounds. Hydrochloric acid is the gas dissolved in water while hydrogen chloride is the gaseous compound that is covalent in nature by its molecular structure. NaCl and KCl are ionic compounds that dissociate into its ions in the aqueous solution.
13. **(d)** equally shared between them.
    Explanation: equally shared between them.
14. **(a)** B, D, A, C
    Explanation: The correct sequence is B, D, A, C.
    Amoeba is a unicellular organism. They reproduce by fission asexually, different from the human's method. It has a porous cell membrane that encloses the cell organelles and cytoplasm. After replicating its genetic material through mitotic (equal) division, the cell divides into two equal-sized daughter cells. The genetic material is also equally partitioned; therefore the daughter cells are genetically identical to each other and the parent cell. In this process, the nucleus of the Amoeba first divides to form two daughter nuclei by the process of Karyokinesis (a division of cell nucleus). After the nucleus has divided into two, the process of Cytokinesis(a division of the cytoplasm) takes place in which the cytoplasm in the mother cell divides into two daughter cells. This leads to the formation of the two daughter Amoebae cell having a nucleus and its own cell organelles.
15. **(d)** (ii) and (iii)
    Explanation: Propene has one double bond, while propyne has one triple bond. Hence, they are unsaturated compounds.
16. **(a)** Both A and R are true and R is the correct explanation of A.
    Explanation: $H_3PO_4 \rightleftharpoons H_2PO_4^- + H^+$
    $H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{2-}$
    $HPO_4^{2-} \rightleftharpoons H^+ + PO_4^{3-}$
    Similarly, bases that give two or more two hydroxyl ions per molecule are known as poly acidic bases.
17. **(d)** All of these
    Explanation: All of these
18. **(c)** A is true but R is false.
    Explanation: All the digested food is taken up by the walls of the intestine, which has numerous villi. These increase the surface area of absorption.
    A is true but R is false.
19. **(c)** A is true but R is false.
    Explanation: A is true but R is false.
20. **(c)** A is true but R is false.
    Explanation: A is true but R is false.

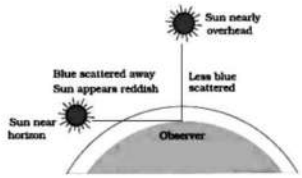
Section B

21. Agriculture is the process of cultivation of food plants, fibre, etc.
Increased use of pesticides and other insect or disease repellents for soils and standting crops is a harmful practice that adversely affects the environment and its components. These chemicals gets mixed with soil and water and are absorbed by growing plant. Through food chain they reach all the trophic levels causing various threats to them.

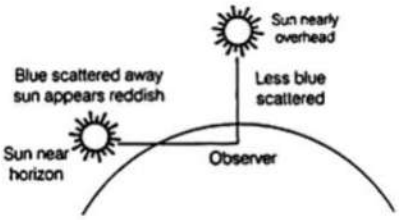
22. As Planets can be considered as a collection of a large number of point-size sources of light, Planets do not twinkle because they appear larger in size than the stars as they are relatively closer to earth. The different parts of these planets produce either brighter or dimmer effect in such a way that the average of brighter and dimmer effect is zero. Hence, the twinkling effects of the planets are nullified and they do not twinkle.

OR

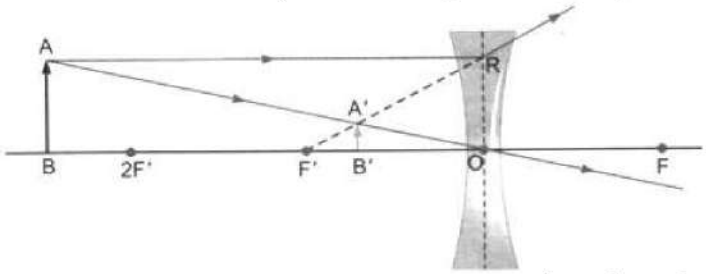
i. During sunrise and sunset, the rays have to travel a larger part of the atmosphere because they are very close to the horizon. Therefore, light other than red is mostly scattered away. Most of the red light, which is the least scattered, enters our eyes. Hence, the sun and the sky appear red.



ii. At noon, the sun is overhead in the sky and the light coming from the sun travels a relatively shorter distance through the atmosphere to reach the earth. As the light coming from the overhead sun contains almost all its component colours in the right proportion, the sun appears white to us at noon.



23. Since the lens is concave, hence f is negative
Given: u = - 30 cm; f= - 10 cm; h = 2.5 cm; v = ?; h' = ?



The lens formula for concave lens is $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$\frac{1}{v} - \frac{1}{-30} = \frac{1}{-10}$

$\frac{1}{v} = \frac{1}{10} - \frac{1}{30}$

$\frac{1}{v} = \frac{-3-1}{30}$

v = -7.5 cm

The negative sign indicates the virtual nature of the image.

The image is at a distance of 7.5 cm from lens (in front of lens).

The magnification m = $\frac{v}{u} = \frac{-7.5}{30}$

$= \frac{1}{4}$

= +0.25

The positive sign with the magnification indicates that the image formed erect.
The size of the image is determined by h'.

$\frac{h'}{h}$ = m

h' = $h \times m$

= 2.5×0.25

= 0.625 m

Thus the image formed is virtual and erect. It is at a distance of 7.5 cm from lens and its size is 0.625 cm.

24.

Transpiration	Evaporation
1) Transpiration is a physiological process.	1) Evaporation is a physical process.
2) It occurs from the surface of aerial parts of plants.	2) It occurs directly from the free surface of water.
3) Transpiration is loss of water from surface of living cells.	3) Evaporation is loss from free surface of water.
4) It involves living tissues.	4) Evaporation involves non-living matter.
5) Transpiration is a slow process.	5) Comparatively a fast process.

25. The compounds which are formed by sharing of electrons between two or more same atoms or between two or more non-metals are called covalent compounds. They are different from ionic compounds as:
   a. Covalent compounds are bad conductors of electricity whereas ionic compounds are good conductors of electricity in molten state.
   b. Covalent compounds are directional and ionic compounds are non-directional.
   Characteristics of Covalent compounds:
      i. They have low melting and boiling point.
      ii. These compounds are generally insoluble in water.
      iii. These compounds are bad conductors of electricity.

26. The white powder is bleaching powder, $CaOCl_2$.
   It is prepared by passing Cl_2 gas over dry slaked lime.

   $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2$

   Slacked lime Bleaching powder

Section C

27.

Food chain	Food web
1) Food chain is the sequential list of one organism consuming the other.	1) Food web is the interconnected network of food chains operating in an ecosystem.
2) Trophic level of each organism in a food chain is fixed. Therefore, each organism in a trophic level gets food from one group of organisms.	2) Several food chains are interconnected in a food web. Therefore, each organism in a trophic level gets food from more than one group of organisms.
3) It is having 4-5 population of different species.	3) It is having numerous population of different species.
4) It is part of food web.	4) It contains many food chains.

28. Aluminium is more reactive than zinc hence it displaces zinc from zinc sulphate solution and forms silvery white zinc metal. The reaction is as follows:

$3ZnSO_4(aq) + 2Al(s) \rightarrow Al_2(SO_4)_3(aq) + 3Zn(s)$

Zinc sulphate *Aluminium* *Aluminium sulphate*

29.

i. The urea content is higher in structure B, whereas the concentration of useful components such as glucose is low. This shows that the kidney performs the function of filtration. It filters out useful substances, e.g. glucose, amino acids into the blood, while throwing out nitrogenous waste, e.g. urea and urine.

ii. There would be glucose in B as without insulin, blood glucose would not be converted to glycogen for storage. The kidney attempts to reduce the blood glucose level by excreting it in urine.The glucose in digested food is absorbed by the intestinal cells into the bloodstream, and is carried by blood to all the cells in the body. However, glucose cannot enter the cells alone. It needs assistance from insulin to penetrate the cell walls

30. i. a) Shaving mirror- Concave mirror
b) Rear view mirror - Convex mirror
c) Reflection in search-lights - Concave mirror.

ii. The three differences are:
a) Real image can be obtained on screen but a virtual image cannot be obtained.
b) Reflected/Refracted rays actually meet where the real image is formed while for virtual they only appear to meet.
c) A Real image is always inverted while the virtual image is always erect.

OR

(i) Focal length = 1/power = 1/5D = 1/5m = 20cm
It is convex lens of focal length 20cm.
So, the Magnified image will be formed in all cases, 20cm is focus, 18 cm is on focal length, 22 cm and 30 cm is between focus and focus and center of curvature. In all cases, magnified image is formed.
(ii) In case of 22 cm and 30 cm image formed is real and hence can be obtained on screen.

31. 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

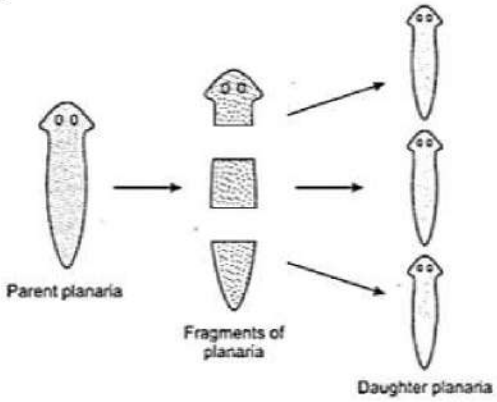
32. i. The terminal to be connected by green wire is the earthing terminal.
ii. Mahesh needs to be more careful, concerned about safety measures and be less ignorant about simple safety practices.
iii. I would have checked all other devices to ensure the further safety.

33. i. Fossils represent modes of preservation of ancient species.
ii. Fossils help in establishing evolutionary traits among organisms and their ancestors that is their phylogeny.
iii. The age of the fossil helps in determining the time period in which that species lived and how old are the fossils.

OR

i. Regeneration is the process by which an organism has the ability to regenerate its lost parts of the body that might have been removed by injury or by some other methods. Planaria have the ability to give rise to new individuals from their body parts. When Planaria is cut into many pieces, each piece grows into a complete organism. Regeneration is carried out by specialized cells which have the capacity to develop,

proliferate and differentiate into various cell types and tissues.



ii. A single pluripotent adult stem cell type (neoblasts) is used by such multicellular organisms to regenerate.

Section D

34. i. A salt is a compound formed from an acid by the replacement of the hydrogen in the acid by a metal.
Example: Sodium chloride - NaCl; It is obtained from hydrochloric acid and sodium metal.
Ammonium chloride - NH_4Cl; It is obtained from ammonia and hydrochloric acid.

ii. The salts having the same positive ions are said to belong to a family of salts.
Example: Sodium chloride and sodium sulphate belong to the same family of salts called sodium salts.

iii. The salts which contain water of crystallisation are called hydrated salts.
Example: Copper sulphate crystals contain 5 molecules of water of crystallisation.
The salts which have lost their water of crystallisation are called anhydrous salts.
Example: On strong heating, copper sulphate crystals lose all the water of crystallisation and form anhydrous copper sulphate.

iv. Copper sulphate crystals - Its chemical formula is $CuSO_4.5H_2O$. It is a blue ion colour.
Iron sulphate crystals - Its chemical formula is $FeSO_4.7H_2O$. It is green in colour.

v. The aqueous solution of ammonium chloride salt turns blue litmus red.

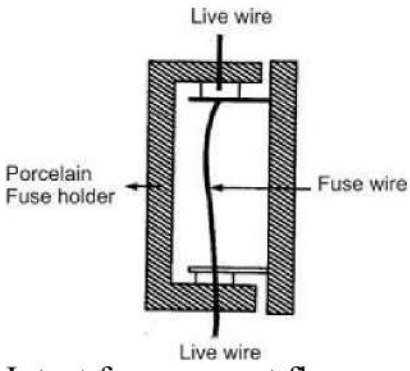
OR

i. When baking soda is heated, it gives carbon dioxide, water, and sodium carbonate. Thus, if baking soda is used in the making of the cake, the formation of sodium carbonate makes the taste of cake bitter. Because sodium carbonate is a base and a base is bitter in taste. On the other hand, baking powder on heating does not form sodium carbonate and hence does not make the taste of cake bitter.

ii. Baking soda can be converted into baking powder by adding tartaric acid and starch.

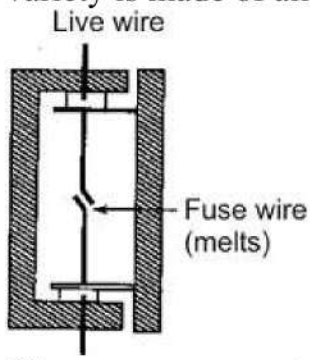
iii. Tartaric acid produces hydrogen ions when it reacts with water. Hydrogen ions produced by tartaric acid react with sodium bicarbonate and gives carbon dioxide which makes the dough soft and fluffy. Tartaric acid also neutralizes sodium carbonate (formed as a result of heating baking soda) to form sodium tartrate that has a pleasant smell and good taste.

35. Usually the wires chosen for electric circuits are such that these allow a certain maximum current to pass through them without excessive heating of the circuits. If however, incidentally there is a short-circuiting or overloading, the current exceeds this maximum permissible value. The wires may get over-heated and catch a fire. Sparking at the points of short circuit may also cause fire. Many precautions and safety measures are taken to protect the circuit against damage due to overheating. All wires used in electric circuits are coated with layer of insulating materials. In addition, these are coated with rubber or plastic layer.



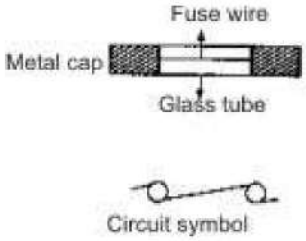
Intact fuse, current flows

The most important safety device used these days is safety fuse. Fuse is piece of wire of a material with a low melting point. Good fuse wire is always made of pure tin but cheaper variety is made of alloy of tin and copper or tin and lead (65% tin and 37% lead)



When excess current flows fuse wire melts and breaks

Fuse is always connected to live wire : When current of value more than maximum permissible is passed through the circuit, the fuse wire melts due to excessive heating. This way the circuit is broken to ensure safety of the circuit. It is due to this fact that the fuse is usually called safety fuse. The thickness, length and material of the fuse wire depends upon the maximum current permitted through the circuit. For proper protection, a fuse of proper value is a must. Fuse of improper rating is a curse instead of being a safety device.



Circuit symbol for fuse

36. Major functions of the human brain are:
    i. The cerebral cortex is greatly enlarged in human brains and is considered the seat of complex thought.It coordinates activities of the body so that mechanism and hormonal reactions of the body work together.
    ii. Visual processing takes place in the occipital lobe, near the back of the skull
    iii. The temporal lobe is located behind our ears and extends to both sides of the brain involved in vision, memory, sensory input, language, emotion.
    iv. The parietal lobe integrates input from different senses and is important for spatial orientation and navigation. It receives information carrying nerve impulses from all the sensory organs of the body.
    v. The primary functions of the brain stem include relaying information between the brain and the body; supplying some of the cranial nerves to the face and head; and performing critical functions in controlling the heart, breathing and consciousness.
    vi. The thalamus relays sensory and motor signals to the cortex and is involved in regulating consciousness, sleep and alertness. The hypothalamus connects the nervous

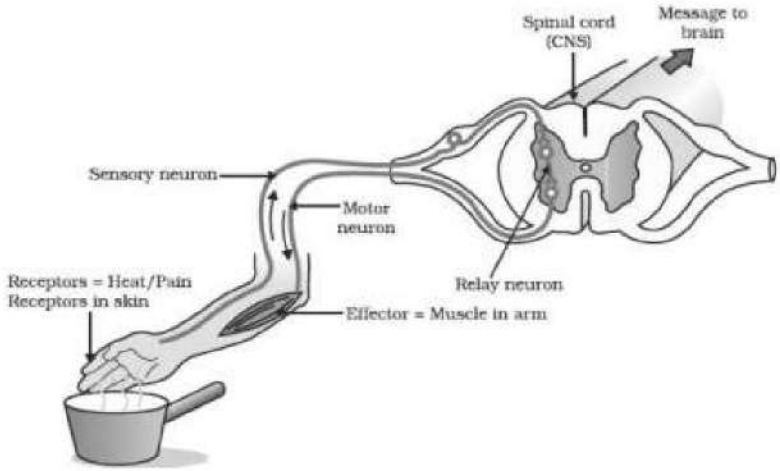
system to the endocrine system where hormones are produced via the pituitary gland.

vii. The cerebellum lies beneath the cerebrum and has important functions in motor control. It plays a role in coordination and balance and may also have some cognitive functions.

OR

In man and other vertebrate animals, there are two types of actions viz. voluntary and involuntary actions. The actions carried out and regulated by brain are voluntary actions. The actions carried out without direct concern of brain are involuntary actions. The involuntary actions are conducted by spinal cord and are known as reflex actions.

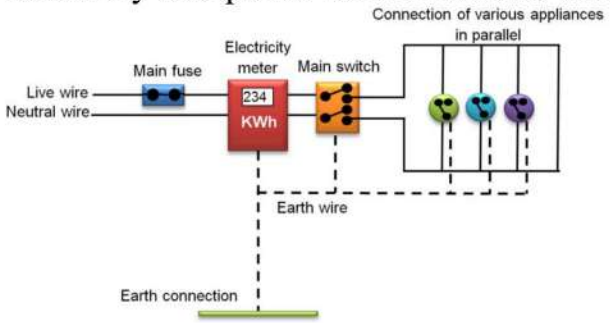
Reflex arc: For a reflex action, the path taken by a stimulus from some reception to one or more effectors is known as reflex arc. Once the sensory organ is excited by some stimuli, the message is carried by the sensory nerves to the spinal cord. From the spinal cord the directions carried by the motor nerve fibres to one or more effector organs. The whole action is completed instantaneously. Some of the examples of reflex actions are blinking of eyes, sneezing, coughing in response to foreign particle that has entered in eye, nose, the throat respectively.



Section E

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

In our homes, either the overhead electric poles or underground cables support the power supply flowing through the mains supply. One of the wires in this supply is covered with insulation in the colour red, and another wire colored black. At the meter board, these wires pass into an electric meter through the main fuse. The main switch, live wire, and the neutral wire are in connection to the line wires in our homes; these wires then supply electricity to separate electric circuits within the house.



(i) Live wire is of Red colour.

(ii) The fuse is connected in between live wire.

(iii) KWh is the commercial unit of power supply.

OR

A fuse wire is a safety device connected in series with the live wire of circuit. It has high resistivity and a low melting point.

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

In a redox reaction, both oxidation, as well as reduction, takes place together, oxidation involves loss of electrons while reduction involves the gain of electrons. The redox-reaction may involve a combination of atoms and molecules, displacement of metals, or non-metals.

Example: $CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$

displacement of Cu metal from its compound.

(i) $CuSO_4$ gets reduced.

(ii) The oxidising agent generally gains the electron.

(iii) Oxidizing agent - Copper,

Reducing agent - Zinc

OR

Displacement reaction

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

In fruitflies, the gene for wing shape has two alleles, an unusual allele for curled wings (c) and the normal allele for straight wings (C). The given phenotypes are observed for each genotype.

Genotype	Phenotype
CC	Normal, straight wings
Cc	Wings curled up at the ends, has difficulty flying
cc	Unable to hatch from egg

(i) Cc × cc

Genotype refers to the genetic constitution of living organisms. A genotype is the total sum of genes transferred from parents to offspring.

(ii) CC × Cc

OR

Normal straight-winged flies are self-crossed and they produce 120 eggs. 0% of curly-winged flies are expected among the live offspring.