Class- X Session - 2022-23

Subject - Science (086)

Sample Question Paper - 30

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. When students observed a stained epidermal peel of a leaf under the microscope, it appeared pinkish red. The stain used was **[1]**

   a) iodine b) colchicine

   c) safranin d) acetocarmine

2. Which rule determines the direction of flow of current in the conductor? **[1]**

   a) Fleming's left hand rule b) Fleming's right hand rule

   c) Maxwell's right hand grip rule d) Left hand thumb rule

3. Which of the following organism has only one type of sex chromosome called X-chromosome? **[1]**

   a) Cricket b) Lizard

   c) Bee d) Ant

4. Consider the room temperature is 24°C in summer, the electrical resistance of thermocoil which is used in the AC unit is 150 Ω. Then calculate the temperature of the thermocoil if the electrical resistance is 175 Ω. Given the temperature coefficient of the thermocoil is $2.98 \times 10^{-4}\ ^{\circ}C^{-1}$ **[1]**

   a) 583 °C b) 512 °C

   c) 597 °C d) 546 °C

5. Chemical formula of sulphurous acid is: [1]

a) H_2SO_4 b) H_2SO_3

c) SO_3 d) SO_2

6. Which one of the following solutions would you use to test the pH of a given sample? [1]

a) Universal indicator solution b) Blue litmus solution

c) Red litmus solution d) Mixture of red and blue litmus solution

7. What is another name for tissue culture? [1]

a) None of these b) Artificial vegetative propagation

c) Micropropagation d) Natural vegetative propagation

8. Which of the following are called soft soaps? [1]

a) Potassium salts b) Calcium salts

c) Magnesium salts d) Sodium salts

9. A Yeast cell in which budding occurs, it can have [1]

a) One bud cell b) Two bud cell

c) A chain of bud cells d) Three bud cell

10. The egg of an animal contains 10 chromosomes, of which one is X-chromosome. How many autosomes would be there in the karyotype of this animal? [1]

a) 9 b) 18

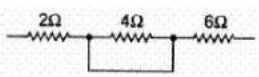
c) 8 d) 20

11. Which of the following is used for dissolution of gold? [1]

a) Aqua regia b) Sulphuric acid

c) Hydrochloric acid d) Nitric acid

12. Ramesh connects three resistors as shown below to find the equivalent resistance in series. The value measured by him should be close to [1]



a) 12 Ω b) 8 Ω

c) 15 Ω d) 10 Ω

13. $2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO$. In the given reaction **C** acts as: **[1]**

a) Dehydrating agent
b) Reducing agent
c) Oxidising agent
d) Catalyst

14. Under the high power objective of a microscope, an epidermal peel of a leaf shows **[1]**

a) stomata surrounded by several guard cells each
b) stomata surrounded by several epidermal cells
c) stomata surrounding by a pair of guard cells each
d) stomata surrounding many guard cells

15. A sharp image of a distant object is obtained on a screen by using a convex lens. In order to determine the focal length of the lens, you need to measure the distance between the **[1]**

a) lens and the object
b) object and the screen
c) lens and the screen
d) None of these

16. State which of the following statement is correct or wrong: **[1]**
Statement A: Estrogen is responsible for bringing changes in appearance seen in boys at the time of puberty.
Statement B: Plasmodium divides into many daughter cells by regeneration.

a) Both are true
b) A is true and B is false
c) B is true and A is false
d) Both are false

17. **Assertion (A):** No net force acts on a rectangular coil carrying a steady current when suspended freely in a uniform magnetic field. **[1]**
Reason (R): Force on coil in magnetic field is always non-zero.

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):** Males have more stature than females during puberty. **[1]**
Reason (R): This is because of presence of thyroxin in the blood of females.

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):** Man is an omnivore. **[1]**
Reason (R): Man eats food products obtained from both plants and animals.

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):** Plaster of Paris is used by doctors by setting fractured bones. **[1]**
Reason (R): When Plaster of Paris is mixed with water and applied around the fractured limbs, it sets into a hard mass.

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. Compare and contrast nervous system and hormonal control and coordination in animals. **[2]**

22. Give three characteristics of a food chain. **[2]**

23. How can you help in reducing the problem of waste disposal, give any two methods? **[2]**

24. How will you bring about the following conversions: Ethanoic acid to ethanol ? **[2]**

OR

When ethanol reacts with ethanoic acid in the presence of conc. H_2SO_4, a substance with fruity smell is produced Answer the following.

i. State the class of compounds to which the fruity smelling compounds belong. Write the chemical equation for the reaction and write the chemical name of the product formed.

ii. State the role of conc. H_2SO_4 in this reaction.

25. Size of image of an object by a mirror having a focal length of 20cm is observed to be reduced to 1/3rd of its size. At what distance the object has been placed from the mirror? What is the nature of the image and the mirror? **[2]**

OR

A convex lens forms a real and inverted image of a needle at a distance of 50 cm from it. Where is the needle be placed in front of the convex lens if the image is equal to size of the object? Also, find the power of the lens.

26. Give the name and the formula of a compound having one double bond and four single bonds. **[2]**

Section C

27. What happens when dilute hydrochloric acid is added to iron filings? **[3]**

28. The embryo gets its nutrition from the mother's blood with the help of special tissue. **[3]**

i. What is this special tissue called?

ii. Give any other function of this tissue apart from one mentioned above.

iii. Explain the structure of this special tissue.

OR

An individual may have a good health even when the whole of reproductive system is removed. What then is the function of the reproductive system?

29. How can changes of size of eyeball be one of the reason for **[3]**

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?

30. What should be the position of an object with respect to focus of a convex lens of focal length 20cm, so that its real and magnified image is obtained? **[3]**

31. Identify the substance oxidized and substance reduced in the following reaction. Write the ionic equation for the substance oxidized and reduced. **[3]**

$H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$

32. Explain Mendel's observation when he crossed a homozygous tall (TT) plant with homozygous dwarf (tt) plant followed by self-cross. **[3]**

OR

Show how man has been able to produce crop plants by selective breeding.

33. 1. Write the function of each of the following parts of human eye : cornea, iris, crystalline lens, ciliary muscles. **[3]**

2. Millions of people of the developing countries of world are suffering from corneal blindness. These people can be cured by replacing the defective cornea with the cornea of a donated eye.
A charitable society of your city has organised a campaign in your neighbourhood in order to create awareness about this fact.
If you are asked to participate in this mission how would you contribute in this noble cause?

1. State the objective of organising such campaigns.
2. List two arguments which you would give to motivate the people to donate their eyes after death.
3. List two values which are developed in the persons who actively participate and contribute in such programme.

Section D

34. What chemical process is used for obtaining a metal from its oxide. **[5]**

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. Describe an experiment to demonstrate that CO_2 is essential for photosynthesis. **[5]**

OR

a. Define excretion.

b. Name the basic filtration unit present in the kidney.

c. Draw excretory system in human beings and label the following organs of excretory system which perform following functions;

i. form urine.

ii. is a long tube which collects urine from kidney.

iii. store urine until it is passed out.

36. i. State Fleming's Left-hand rule. **[5]**

ii. List three characteristic features of the electric current used in our homes.

iii. What is a fuse? Why is it called a safety device?

iv. Why is it necessary to earth metallic electric appliances?

Section E

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

We know that a battery or a cell is a source of electrical energy. The chemical reaction within the cell generates the potential difference between its two terminals that sets the electrons in motion to flow the current through a resistor or a system of resistors connected to the battery. To maintain the current, the source has to keep expanding its energy. Where does this energy go? A part of the source energy in maintaining the current may be consumed for useful work (like in rotating the blades of an electric fan). The rest of the source energy may be expended in heat to raise the temperature of the gadget. We often observe this in our everyday life. For example, an electric fan becomes warm if used continuously for a long time, etc. On the other hand, if the electric circuit is purely resistive, that is, a configuration of resistors only connected to a battery; the source energy continually gets dissipated entirely in the form of heat. This is known as the heating effect of electric current. This effect is utilized in devices such as an electric heater, electric iron, etc.

(i) Explain Joule's heating law.

(ii) In practical situations, when an electric appliance is connected to a known voltage source, then how does the heating effect of electric current can be calculated?

OR

Write the relation between heat energy produced in a conductor when a potential difference V is applied across its terminals and a current I flows through for **t**.

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

Following questions are based on the two tables given below. Study these tables related to blood sugar levels:

Table A (Blood glucose chart)

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115
	80
	50

Table B (Blood Report of Patient X and Y)

Time of check	**Blood Glucose ranges** (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	<100	70-130
Before lunch, supper and snack	<110	70-130
Two hours after meals	<140	<180
Bedtime	<120	90-15

(i) Refer to Table B showing the blood report of the levels of glucose of patients X and Y. Infer the disease which can be diagnosed from the given data.

(ii) Identify the hormone whose level in the blood is responsible for the above disease.

(iii) High/low sugar and a low/high-fat diet What would you recommend to the affected patient?

OR

Refer to Table A and suggest the value of the mean blood glucose level beyond which doctor's advice is necessary.

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

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?

SOLUTION

Section A

1. **(c)** safranin
   Explanation: Safranin is pinkish red in colour.
2. **(b)** Fleming's right hand rule
   Explanation: The direction of induced current in a straight conductor is given by Fleming's right-hand rule.
   It states that if we stretch the thumb, forefinger and the middle finger of the right hand at right angles to one another in such a way that the forefinger points in the direction of the magnetic field.
   Then, thumb gives the direction of motion of conductor (force), forefinger indicates the direction of magnetic field, and the middle finger points the direction of induced current.
3. **(a)** Cricket
   Explanation:
   - The X0 sex-determination system is a system that determines the sex of offspring among grasshoppers, crickets, cockroaches, and some other insects. In this system, there is only one sex chromosome, referred to as X. Males only have one X chromosome (X0), while females have two (XX).
   - The zero (sometimes, the letter O) signifies the lack of a second X. Maternal gametes always contain an X chromosome, so the sex of the animals' offspring depends on whether a sex chromosome is present in the male gamete. Its sperm normally contain either one X chromosome or no sex chromosomes at all.
4. **(a)** 583 °C
   Explanation: 583 °C
5. **(b)** H_2SO_3
   Explanation: H_2SO_3
6. **(a)** Universal indicator solution
   Explanation: Universal indicator is used to test the pH of a given sample.
7. **(c)** Micropropagation
   Explanation: The propagation of plants by growing plantlets in tissue culture and then planting them out.
8. **(a)** Potassium salts
   Explanation: Potassium salts
9. **(c)** A chain of bud cells
   Explanation: Yeast is an example of a unicellular organism which reproduces by budding. In yeast cell, the budding process continuous three-four times resulting in a chain of the yeast cell.
10. **(b)** 18
    Explanation: Karyotype is the number and appearance of chromosomes in a nucleus of somatic cell. Somatic cells are diploid cells which make up the body. They have two sets of chromosomes. So, if an egg cell (gamete cell) which is a haploid cell (with single set of chromosomes)has 10 chromosome, then number of chromosomes

present in a somatic cell will be 20 chromosomes . As egg cells are produced by female body, then among 20 chromosomes, two X chromosomes will be sex chromosome. So, karyotpe of that animals will be showing 18 autosomes.

11. **(a)** Aqua regia
Explanation: Gold is a noble metal and does not react with even concentrated acids. Aqua regia is made by mixing nitric acid and hydrochloric acid in a 1 :3 ratio. It can dissolve even gold and platinum.
12. **(b)** 8 Ω
Explanation: 4Ω is short circuited. So 2 + 6 = 8 Ω
13. **(b)** Reducing agent
Explanation: Carbon acts as a reducing agent and gets oxidized in the process of reducing iron oxide to iron.
14. **(c)** stomata surrounding by a pair of guard cells each
Explanation: Onion peel possesses stomata, guard cells, and epidermal cells. The nuclei are present in both epidermal and guard cells. Stomata is a pore surrounded by guard cells, so it does not possess any nucleus.
15. **(c)** lens and the screen
Explanation: The focal length of the lens, image distance should be known which is the distance between the lens and the screen.
16. **(d)** Both are false
Explanation: Estrogen is the primary female sex hormone. It is responsible for the development and regulation of the female reproductive system and secondary sex characteristics.
Plasmodium reproduces by binary fission and not by regeneration.
17. **(c)** A is true but R is false.
Explanation: Force acting on each pair of the opposite sides of the coil are equal.
18. **(c)** A is true but R is false.
Explanation: Males has more stature than females because of action of male sex hormone called testosterone, which is secreted by testis in males. Testosterone controls the development of secondary sexual characters in males. Thyroxin increases the metabolic rate of the body and maintains BMR.
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: Plaster of Paris when mixed with water and applied around the fractured limbs, sets into a hard mass and keeps the bone joints in a fixed position. So, it is commonly used for setting fractured bones.

Section B

21. Difference between nervous control and hormonal control:

Nervous control	Hormonal control
(i) Consists of nerve impulses conducted by neurons from one organ to another organ.	(i) It consists of endocrine system which secretes chemical messenger's hormones secreted directly in blood.

(ii) Nervous impulses produce rapid short lasting responses.	(ii) Hormones produce longer lasting responses.
(iii) Nervous impulses are not specific in their action.	(iii) Action of hormones is highly specific.

22.

(i) The energy flow in a food chain is unidirectional.
(ii) The energy at each trophic level goes on decreasing at each trophic level,i.e. only 10% energy is available to the next trophic level from the previous level. Hence the no.of organisms go on decreasing as we proceed to a higher trophic level.
(iii) The amount of non biodegradable toxic substances like pesticides increases progressively in a food chain leading to Biomagnification.

23. i. Recycling of wastes.
ii. Reduction at source.
iii. Better management.
iv. Vermicomposting.
v. Use of eco-friendly products such as disposable paper cups in place of plastic cups.

24. By using reagent Lithium aluminum hydride (LiAlH4) and $NaBrH_4$ too. Both of them can reduce ethanoic acid to ethanol. But $LiAlH_4$ is more good. It can reduce all types of carboxylic acid .

$$CH_3COOH \xrightarrow[Reduction]{LiAlH_4} CH_3CH_2OH$$

OR

i. The fruity smelling compounds belong to Esters group. Ethyl ethanoate which is a ester of ethanoic acid and ethanol.

$$\underset{Ethanoic\ acid}{CH_3COOH} + \underset{Ethanol}{CH_2CH_3OH} \xrightarrow{Conc.\ H_2\ SO_4} \underset{Ethyl\ ethanoate}{CH_3COOCH_2CH_3} + H_2O$$

ii. Concentrate H_2SO_4 is used as a catalyst and as a dehydrating agent thus yeilding more amount of ester.

25. We have to do calculations for both the concave and convex mirror as the type of mirror is not specified here.

For concave mirror:

Focal length, f = -20cm

Magnification, $m = -\frac{1}{3}$

Since, magnification, $m = -\frac{v}{u}$

Magnification, $m = -\frac{1}{3} = -\frac{v}{u}$

$\Rightarrow v = \frac{u}{3}$

By mirror formula,

$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

$\frac{1}{f} = \frac{3}{u} + \frac{1}{u} = \frac{4}{u} \Rightarrow u = 4f$

= 4(-20) = -80cm

The placement of object should be at 80cm in front of the concave mirror.

For convex mirror:

Focal length, f = +20cm

Magnification, m = $+\frac{1}{3}$

Since, magnification, m = $-\frac{v}{u}$

Magnification, m = $\frac{1}{3} = -\frac{v}{u}$

$\Rightarrow$ v = $-\frac{u}{3}$

By mirror formula,

$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

$\frac{1}{f} = \frac{-3}{u} + \frac{1}{u} = \frac{-2}{u} \Rightarrow -2f$

= -2(20) = -40cm

The placement of an object should be at 40cm in front of the concave mirror, to get a diminished, virtual and erect image.

OR

Here u = ?, v = + 50 cm, -h' = h, f = ?, P = ?

m = $\frac{h'}{h} = \frac{v}{u}$ *But* $\frac{h'}{h} = -1$

Inverted image is of the size of the object

- 1 = $\frac{50}{u}$ or u = -50 cm

$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{50} - \frac{1}{-50} = \frac{1}{50} + \frac{1}{50} = \frac{2}{50} = \frac{1}{25}$

f = 25 cm = 0.25 m

P = $\frac{1}{f} = \frac{1}{0.25}$

P = 4 dioptre

26. The compound is ethylene, C_2H_4 and its structural formula is

$$H - \overset{H}{\underset{|}{C}} = \overset{H}{\underset{|}{C}} - H$$

Section C

27. Hydrogen gas and Iron chloride are produced.

$2HCl\ (aq) + Fe(s) \rightarrow FeCl_2\ (aq) + H_2(g)$

This is a redox reaction

$Fe(0) - 2e^- \rightarrow Fe(II)$ oxidation loss of electrons

$2H^+ + 2e^- \rightarrow H_2$ reduction: gain of electrons

So it is certainly a chemical reaction: bonds are broken and made.

HCl is not a sufficiently strong oxidizing agent to produce $FeCl_3$ (need Cl2).

28. i. This special tissue that provides nutrition is called the placenta.
    ii. Besides providing nutrition to the embryo, placenta helps in removing waste products from embryo, it also helps in providing oxygen to the embryo and eliminating carbon dioxide from embryo.
    iii. The placenta is a disc-like structure that is attached to the wall of the uterus. It is formed by two sets of a minute finger-like process called villi. One set from uterine wall and other set from the embryo. The blood flows through the fine capillaries of the placenta.

OR

The main function of the reproductive system is to produce the gametes for the sexual reproduction. Reproductive system is not necessary for the survival of the individual. So even if reproductive system is fully removed, the persons may have a good health. That is why the persons who are sterile cannot reproduce but can survive.

29. 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.

30. Given focal length f of lens 20 cm
To obtain real and magnified image, the object should be placed between F_1 and $2F_1$,So the range will be from 20 cm to 40 cm of convex lens.

31. $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$

a. Substance oxidized, H_2

$H_2 \rightarrow 2H^+ + 2e$

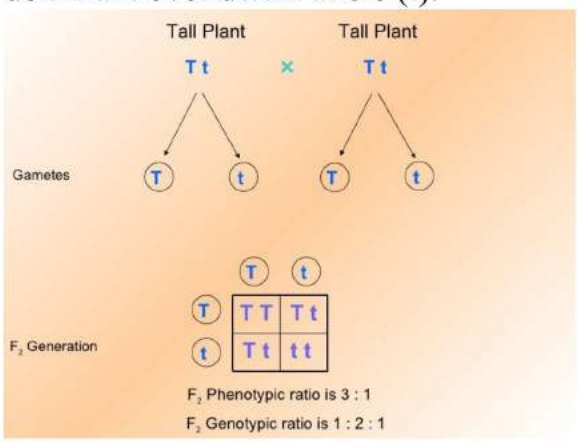
[Substance getting oxidized is H_2]

b. Substance reduced, Cl_2

$Cl_2 + 2e \rightarrow 2Cl$

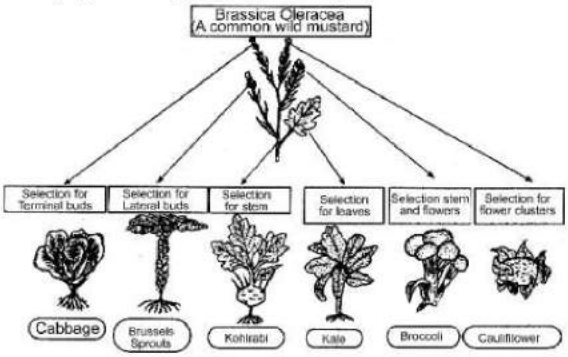
[Substance getting reduced is Cl_2]

32. When Mendel crossed a homozygous tall (TT) plant with homozygous dwarf (tt) plant, all plants in F_1 generation were tall (Tt).
Self crossing of F_1 gives F_2. F_2 generation had 3 tall : 1 recessive plants.
Since presence of dwarf allele was masked by tall allele in F_1, tall allele (T) was dominant over dwarf allele (t).



OR

Crop plants produced by selective breeding



33. 1. Functions of following parts of human eye are given below :
    1. Cornea - It is a thin membrane which provides 67% of the eye's focussing power.
    2. Iris - It controls amount of light entering the eye by controlling the size of pupil similar to the aperture of a camera which has capacity to decrease or increase the amount of light entering eye.
    3. Crystalline lens - It helps to focus light on retina for image formation.
    4. Ciliary muscles - It contracts and relax in order to change the lens shape for focussing image at retina. when it contracts the lens become thicker and when it relaxes the lens become flat.

    2. 1. The objective of organising such compaigns is to guide, educate and help those people who are suffering from corneal blindness that they can be cured by corneal replacement surgery.
    2. 1. Come to participate in this campaign because, if someone get his vision through your eyes, it is an incredible help.
    2. As eye is one of the most valuable sense organs through which an individual can achieve so many things in his/her life, so try to realise the situation that these people are sufferinng from.
    3. The persons who actively participate and contribute in such programme are strong hearted and very much helpful for the people living in such situations.

Section D

34. The metals are obtained from its oxides by reduction with suitable reducing agents. Metals low in reactivity series are very unreactive. The oxides of these metals can be reduced to metals by heating alone.
    For example,
    $2Hg(O)\ (s) \rightarrow 2Hg(l) + O_2(g)$
    The metals in the middle of the reactivity series (e.g. iron, lead, copper etc.) are reduced to metals by heating with carbon.
    $ZnO\ (s) + C\ (s) \rightarrow Zn\ (s) + CO\ (g)$
    The metal high up in the reactivity series are obtained by electrolytic reduction. For example, aluminium is obtained by the electrolytic reduction of aluminium oxide.

    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.

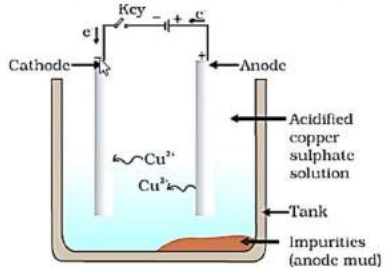
At cathode : $Na^+ + e^- \rightarrow Na$

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

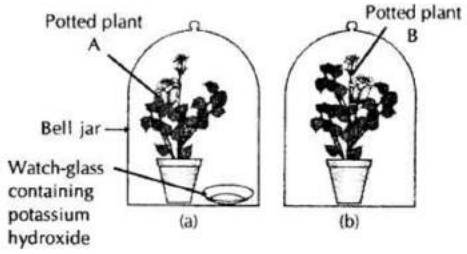
ii. In the electrolytic refining of metal following reactions take place at the anode and cathode

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

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



35. Two healthy potted plants of same size were taken. They were kept in a dark room for three days. Each plant was placed in a separate glass plate. By the side of one of the plant, a watch-glass containing potassium hydroxide was placed. Potassium hydroxide was used for the purpose of absorbing carbon dioxide. Both plants were covered in separate bell-jars. Vaseline was used to seal the bottom of the jars to make the setup airtight. After that, the plants were kept in sunlight for about two hours. The leaves of each plant were observed to find out whether both the leaves show the presence of the same amount of starch.



It was observed that the leaves of the plant in the jar containing potassium hydroxide remain colourless showing the absence of starch. On the other hand, the leaves of the other plant turned blue-black showing the presence of starch.

It can be concluded from the above experiment that the CO_2 was absorbed by KOH. Hence photosynthesis did not occur. In the other jar, photosynthesis takes place in the presence of CO_2.

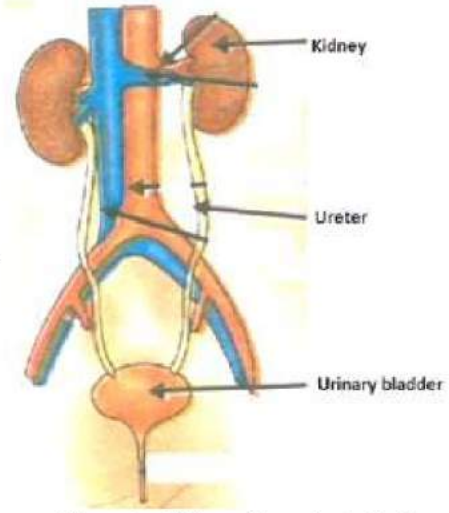
Therefore from the experiment, it can be concluded that CO_2 is essential for the process of photosynthesis.

OR

a. Excretion is the process of removing harmful metabolic waste such as urea, uric acid and salts from our body.
b. Nephron is the basic filtration unit present in the kidney.
c. Diagram of Human Excretory System is shown below.
   i. kidney forms urine
   ii. ureter is a long tube which collects urine from kidney.

iii. urinary bladder store urine until it is passed out.

iv.



36. i. According to this rule, stretch the thumb, forefinger and middle finger of left hand such that they are mutually perpendicular. If the middle finger points in the direction of the magnetic field, the fore finger points in the direction of the flow of current, then the thumb points in the direction of motion.

ii. Three characteristics of electric current use in our home are as follows:
   a. the current supplied in our homes is alternating current.
   b. the current supplied in our homes is at 220 V.
   c. the neutral wire and the live wire carry the current in our homes.

iii. Fuse is a safety device used in a circuit to prevent damage due to overloading/short-circuiting. It protects the circuit by stopping the flow of any unduly high electric current. If current larger than the specified value flows through the circuit, due to Joule's heating effect the fuse wire melts and breaks the circuit.

iv. When live wire touches the metallic appliance then electric current flows through the casing to the earth instead of the human body and thus we prevent ourselves from getting shocked. It is necessary to earth metallic casing of the appliance because it saves electrical appliance from burning and electric shock.

Section E

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

We know that a battery or a cell is a source of electrical energy. The chemical reaction within the cell generates the potential difference between its two terminals that sets the electrons in motion to flow the current through a resistor or a system of resistors connected to the battery. To maintain the current, the source has to keep expanding its energy. Where does this energy go? A part of the source energy in maintaining the current may be consumed for useful work (like in rotating the blades of an electric fan). The rest of the source energy may be expended in heat to raise the temperature of the gadget. We often observe this in our everyday life. For example, an electric fan becomes warm if used continuously for a long time, etc. On the other hand, if the electric circuit is purely resistive, that is, a configuration of resistors only connected to a battery; the source energy continually gets dissipated entirely in the form of heat. This is known as the heating effect of electric current. This effect is

utilized in devices such as an electric heater, electric iron, etc.

(i) The law implies that heat produced in a resistor is
   a. directly proportional to the square of current for a given resistance,
   b. directly proportional to resistance for a given current, and
   c. directly proportional to the time for which the current flows through the resistor.

(ii) Firstly, we calculate the current flowing through it, using the relation $I = \frac{V}{R}$. Then we apply the formula $H = I^2Rt$ to calculate the heating effect.

OR

Heat produced, H = VIt

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

Following questions are based on the two tables given below. Study these tables related to blood sugar levels:

Table A (Blood glucose chart)

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115
	80
	50

Table B (Blood Report of Patient X and Y)

Time of check	**Blood Glucose ranges** (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	<100	70-130
Before lunch, supper and snack	<110	70-130
Two hours after meals	<140	<180
Bedtime	<120	90-15

(i) Diabetes, Diabetes is caused due to less or no secretion of hormone insulin by pancreas.

(ii) Insulin level in the blood is responsible for the given disease.

(iii) Low sugar high fibre diet

OR

> 180mg/dL.

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) 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.