

MOCK SCIENCE SUBJECTIVE TEST
CLASS – X (SET – 1)**Maximum Marks: 80****Duration: 3.0 Hrs.**

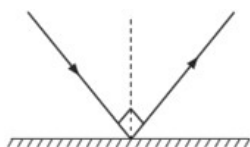
Life, Process, Control and Coordination, Human Eye, Light, Chemical Reactions and Equations, Acids Bases and Salts, Metals and Non-Metals

General Instructions:

- This question paper consists of **39 questions**. All questions are compulsory.
- Paper Pattern and Marking Scheme:**
There are **Five Sections** in the question paper (Section **A, B, C, D** and **E**).
 - In **Section A** – question numbers **1 to 20** are Multiple Choice Questions (MCQs) carrying **1** mark each.
 - In **Section B** – question numbers **21 to 26** are Very Short Answer Questions (VSA) type carrying **2** marks each. Answer to these questions should be in the range of **30** to **50** words.
 - In **Section C** – question numbers **27 to 33** are Short Answer Questions (SA) type carrying **3** marks each. Answer to these questions should be in the range of **50** to **80** words.
 - In **Section D** – question numbers **34 to 36** are Long Answer Questions (LA) type carrying **5** marks each. Answer to these questions should be in the range of **80** to **120** words.
 - In **Section E** – question numbers **37 to 39** are 3 source-based/case-based units of assessment carrying 4 marks each with sub-parts.
 - There is no overall choice. However, an internal choice has been provided in some Sections.

(SECTION – A)

- Consider the figure shown. The reflected ray is perpendicular to the incident ray. Angle of incidence for the ray is:



- (A) 30° (B) 45° (C) 60° (D) 75°

2. A man runs towards a mirror at a speed of 15 m/s . The speed of the image relative to the man is:
 (A) 15 ms^{-1} (B) 30 ms^{-1} (C) 35 ms^{-1} (D) 20 ms^{-1}
3. Identify the correct statement about concave mirror:
 (A) Focus lies in front of mirror and centre of curvature lies behind the mirror
 (B) Focus lies behind the mirror, and centre of curvature lies in front of it
 (C) Focus and centre of curvature both lie in front of mirror
 (D) Focus and centre of curvature both lie behind the mirror
4. A convex lens of focal length 40 cm is in contact with a concave lens of focal length 25 cm . The power of combination is:
 (A) -1.5 D (B) -6.5 D (C) $+6.5 \text{ D}$ (D) $+6.67 \text{ D}$
5. The far-off point of a myopic person is 80 cm in front of the eye. The nature of the lens required and its power is:
 (A) Convex, power $+1.25 \text{ D}$ (B) Convex, power $+2 \text{ D}$
 (C) Concave, power -1.25 D (D) Concave, power -2 D
6. Clouds appear white due to:
 (A) Water droplets scatter all wavelength (B) Water in frozen conditions looks icy white
 (C) Fog is formed around clouds (D) All of these
7. **Assertion (A)** : Distance of real image formed by a mirror is taken to be negative but for a lens we take it with positive sign.
Reason (R) : A mirror forms real image of an object in front of it but real image formed by a lens lies on other side of lens.
 Choose the correct answer out of the following choices.
 (A) Both assertion and reason are true, and reason is correct explanation of the assertion.
 (B) Both assertion and reason are true, but reason is not the correct explanation of the assertion.
 (C) Assertion is true, but reason is false.
 (D) Assertion is false, but reason is true.
8. The product of the reaction in $\text{Ca(OH)}_2 + \text{Cl}_2 \longrightarrow$:
 (A) CaCl_2 (B) $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$
 (C) CaOCl_2 (D) $\text{CaO} + \text{HCl}$
9. Non-metallic oxides are generally:
 (A) Acidic in nature (B) Basic in nature
 (C) Neutral in nature (D) Atmospheric in nature
10. Chlor-alkali process does not yield:
 (A) O_2 (B) H_2
 (C) Cl_2 (D) NaOH

11. What is true about corrosion:
- (A) Corrosion of iron is called rusting
(B) More reactive metals corrode easily
(C) Corrosion occurs on exposure to O_2 , CO_2 , H_2O etc
(D) All of these
12. Which of the following elements displace aluminium from its salt?
- (A) Zn (B) Ni (C) Fe (D) Ca
13. If a compound is formed by the transfer of electrons from a metal to a non-metal then which of the following is not true about it:
- (A) It has high melting & boiling point
(B) It conducts electricity in the molten state
(C) It is insoluble in water
(D) It generally exists as a solid & break into piece when pressure is applied
14. Given below are two statements: One is labelled as Assertion (A) and the other is labelled as Reason (R).
Assertion (A): Hydrogen gas is not evolved when a metal reacts with nitric acid
Reason (R): Nitric acid is a strong oxidizing agent.
In the light of the above statements, choose the correct answer from the option given below:
- (A) Assertion and reason both are true and the reason is correct explanation of assertion
(B) Assertion and reason both are true but reason is not correct explanation of assertion
(C) Assertion is true but reason is wrong
(D) Assertion and reason both are wrong
15. Aerobic respiration does not
- (A) take place under normal conditions (B) take place in animals
(C) utilize molecular oxygen (D) takes place at oxygen deficient situations
16. Right auricle of mammalian heart release blood through
- (A) Tricuspid valve (B) Vena cava
(C) Pulmonary aorta (D) Mitral valve
17. In annelids excretory organs are:
- (A) Nephridia (B) Malpighian tubules
(C) Green glands (D) Kidneys
18. Growth regulators are also known as:
- (A) Phytohormones (B) Oxygen
(C) Light (D) Water
19. The product of light reaction are:
- (A) ADP and ATP (B) ATP and $NADPH_2$
(C) ATP and FAD (D) ADP and $NADPH_2$
20. If pancreas is removed, the compounds whose digestion may be affected are:
- (A) Carbohydrate (B) Fats
(C) Protein (D) All of these

(SECTION – B)

21. What happens when a ray of light is incident normally on a rectangular glass slab?
22. What is the cause of refraction of light?
23. What is observed when aqueous solutions of potassium iodide & lead nitrate are mixed together? Name the type of reaction & write the chemical equation for the reaction that occurs.
24. When copper powder is heated in a water glass, a black substance is formed
 - (i) Why is this black substance formed? Name it.
 - (ii) How can this black substance be reversed to its original form?
25. What is peristaltic movement? Write its role in human digestion
26. Where does absorption mainly take place and why?

(SECTION – C)

27. A 52-year old near-sighted person wears eye-glass with a power of -5.5 dioptres for distance viewing. His doctor prescribes a correction of $+1.5$ dioptres in the near-vision section of his bi-focals. This is measured relative to the main part of the lens
 - (i) What is the focal length of his distance-viewing part of the lens?
 - (ii) What is the focal length of the near-vision section of the lens?
28. Draw a ray diagram to show the path of the reflected ray in each of the following cases.
A ray of light incident on a convex mirror:
 - (i) Strikes at its pole making an angle θ from the principal axis.
 - (ii) Is directed towards its principal focus.
 - (iii) Is parallel to its principal axis.
29. (i) Identify the substances that are oxidized and the substance that are reduced in the following reaction:
$$2\text{PbO} + \text{C} \longrightarrow 2\text{Pb} + \text{CO}_2$$
 - (ii) Balance the given reaction:
$$\text{Pb}(\text{NO}_3)_2 \longrightarrow \text{PbO} + \text{NO}_2 + \text{O}_2$$
30. A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal & its ore and give the reaction involved.
31. Differentiate between arteries and veins and describe briefly circulation of blood in heart.
32. Draw the diagram of heart.

Or

Draw the diagram of nephron.

33. Write two pairs of antagonistic human hormones along with their functions.

(SECTION – D)

34. Draw the ray diagram in each case to show the position and nature of the image formed when the object is placed:
- At the centre of curvature of a concave mirror
 - Between the pole P and focus F of a concave mirror
 - In front of convex mirror
 - At $2F$ of a convex lens
 - In front of a concave lens
35. (a) (i) While diluting an acid, why is it recommended that the acid should be added to water & not water to the acid.
- (ii) How can you test the presence of acids & bases by using phenolphthalein.
- (iii) Why does tooth decay starts when the pH of mouth is lower than 5.5?
- OR**
- (b) (i) A gas turns lime water milky. Identify the gas & write the balanced chemical reaction for this process.
- (ii) Why does solution of an acid in water conduct electricity?
- (iii) How do you prepare the following salts? Write the balanced reaction involved.
- Bleaching powder
 - Plaster of paris
36. Explain briefly different parts of brain. What is reflex action? Explain reflex arc with an example.

OR

Explain the mechanism of digestion in human being with diagram.

(SECTION – E)

37. Saniya and Shikha are friends studying together in grade IV. While Saniya can read a book keeping it at normal distance of about 25cm, Shikha has to keep the book at about 50cm from her eyes. Shikha feels it is a natural defect of her eyes, which cannot be corrected. Saniya is smarter. She tells her that medical science is advanced and there must be treatment for this problem. The doctor, on checking, prescribes spectacles of suitable power to Shikha and her vision with glasses becomes normal.
- What the above passage and answer the following questions :
- What defect was there in the vision of Shikha ?
 - What could be the causes of this defect ?
 - Calculate nature and power of the lens prescribed by the doctor. Assume that Shikha can read the book from a distance of 25cm, which she could do from a distance of 50cm without glasses.
 - What are the values of life displayed by Saniya ?

38. Metal oxides are basic in nature. But some metal oxide such as aluminium oxide, zinc oxide etc. show both acidic as well as basic behaviour. Such metal oxides which react with both acids as well as bases to produce salts & water are known as amphoteric oxide. Most metal oxides are insoluble in water but some of these dissolve in water to form alkalis.

- (i) Write a chemical reaction of aluminium when burnt in air?
- (ii) Name two oxide which are soluble in water & form alkalis?
- (iii) Why potassium & sodium is kept under the kerosene oil?

OR

(iii) Write the balanced reactions of amphoteric oxide with acid & base.

39. We also think about our actions. Writing, talking, moving a chair, clapping at the end of a programme are examples of voluntary actions which are based on deciding what to do next. So, the brain also has to send messages to muscles. This is the second way in which the nervous system communicates with the muscles. The communication between the central nervous system and the other parts of the body is facilitated by the peripheral nervous system consisting of cranial nerves arising from the brain and spinal nerves arising from the spinal cord. The brain thus allows us to think and take actions based on that thinking. As you will expect, this is accomplished through a complex design, with different parts of the brain responsible for integrating different inputs and outputs. The brain has three such major parts or regions, namely the fore-brain, mid-brain and hind-brain.

- (i) What are voluntary actions?
- (ii) How does communication between central nervous system and peripheral nervous system takes place.
- (ii) Differentiate between cranial nerves and spinal nervous.
- (iv) What are the three major parts of brain.

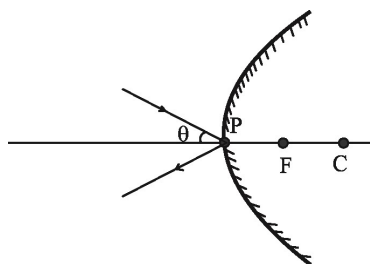
(SECTION – B)

21. When a ray of light is incident normally (or perpendicularly) on a glass slab, then there is no bending of the ray of light, and it goes straight.
22. Speed of light changes as it passes from one medium to another. This causes bending in the path of light on travelling from one medium to another. So, the dependence of speed of light on optical density of medium is the cause of refraction of light.
23. When aqueous solutions of potassium iodide & lead nitrate are mixed together, a yellow ppt of lead iodide is formed. The type of reaction is double displacement reaction.
- $$2KI + Pb(NO_3)_2 \longrightarrow PbI_2 + 2KNO_3$$
24. (i) The black substance is formed due to the oxidation of copper. The substance is copper oxide.
(ii) On passing hydrogen gas to this black substance it reduces to copper.
25. Peristalsis is the process of synchronized contractions and relaxation of the muscular wall of the digestive tract. Peristaltic movements may occur starting at the oesophagus up until and including the bowels. Peristaltic movements are involuntary and they have the function of moving and mixing food along the digestive tube.
26. Absorption mainly takes place in small intestine as it is surrounded by finger like projections called villi which increase the surface area for absorption.

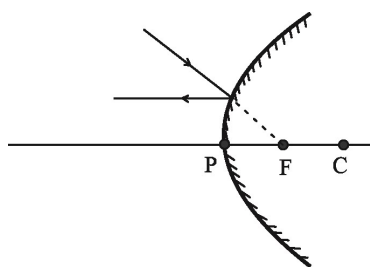
(SECTION – C)

27. (i) Focal length of lens for distance viewing $f_1 = \frac{1}{P_1} = \frac{1}{-5.5} = -0.182 \text{ m} = -18.2 \text{ cm}$
(ii) Focal length for near-vision $f_2 = \frac{1}{P_2} = \frac{1}{1.5} = 0.667 \text{ m} = 66.7 \text{ cm}$

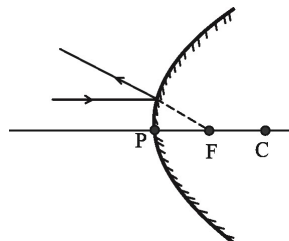
28. (i)



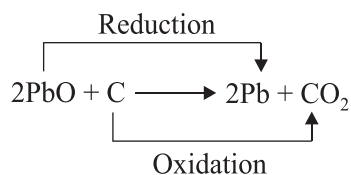
- (ii)



(iii)

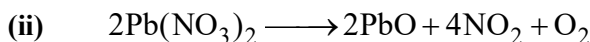


29. (i)



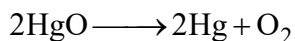
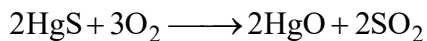
Oxidation \rightarrow C

Reduction \rightarrow PbO



30. Mercury is the only metal that exists as a liquid at room temperature. It can be obtained by heating cinnabar (HgS).

The reactions are as follows:



31. Differentiate between Arteries and Veins.

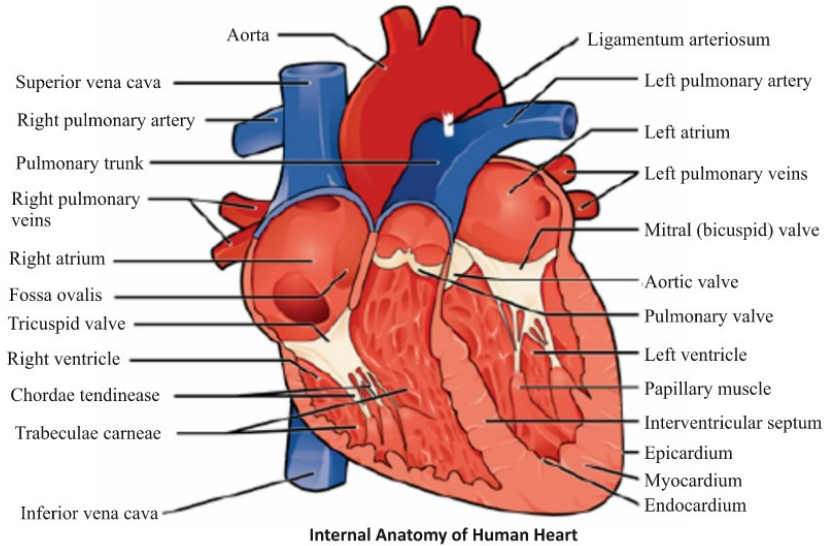
(i) **Arteries:** Arteries are the thick-walled blood vessels which carry blood away from the heart for distribution to the body. The wall of arteries, particularly those near the heart, are thick that enables them to dilate (increase in diameter) but not rupture when the heart contracts and forces blood into them. Thus, the blood passing through narrow lumen of arteries is aerated except pulmonary artery and has a considerable pressure. They don't have valves.

(ii) **Veins:** Veins are thin-walled blood vessels which bring blood from the body to the heart. They are larger and hold more blood than the arteries. The blood passing through wide lumen of veins is nonaerated (except in pulmonary veins) and has low pressure. It flows slow and steady. The veins have valves that allow the blood to flow only towards the heart and prevent the backflow.

Circulation of Blood

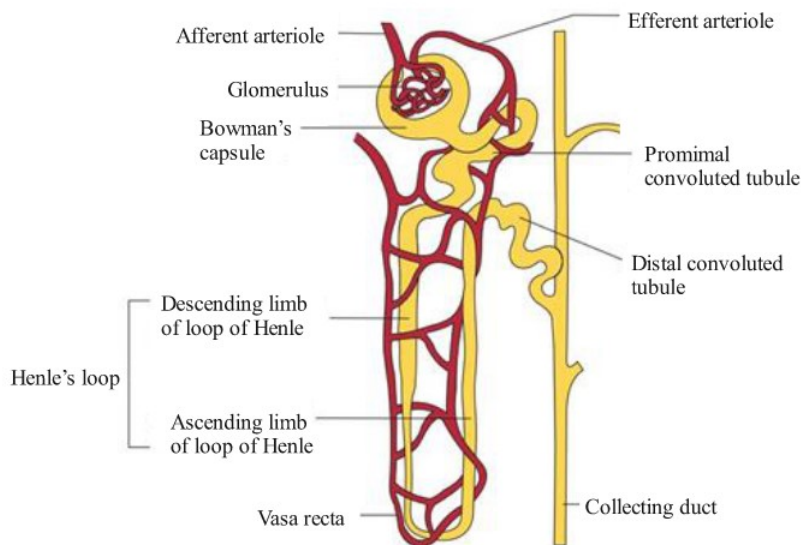
Blood comes into the right atrium from the body, moves into the right ventricle and is pushed into the pulmonary arteries in the lungs. After picking up oxygen, the blood travels back to the heart through the pulmonary veins into the left atrium, to the left ventricle and out to the body's tissues through the aorta.

32. Draw the diagram of heart.



OR

Draw the diagram of nephron.

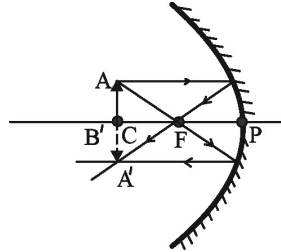


33. Antagonist pair of hormones:

- (A) (i) **Insulin:** Lowers blood glucose level
(ii) **Glucagon:** That increases blood glucose
- (B) Parathyroid: Increase Calcium levels in blood
Calcitonin: Decrease Calcium levels in blood

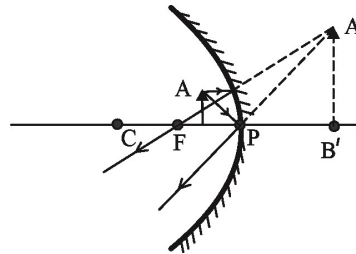
(SECTION – D)

34. (i)



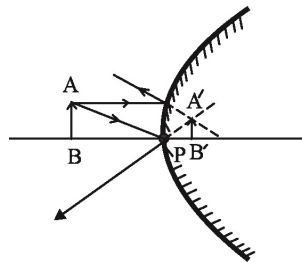
Nature of image: Real, inverted and same size image is formed at the centre of curvature.

(ii)



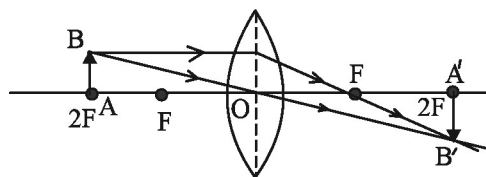
Nature of image: Virtual, enlarged and erect images is formed behind the mirror.

(iii)



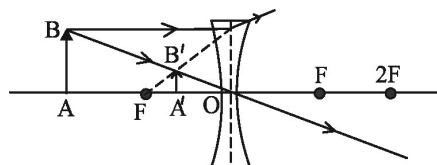
Nature of image: Virtual, erect and diminished, image is formed behind the mirror.

(iv)



Nature of image: Real, inverted and same size as object, image is formed at 2F on the other side of lens.

(v)



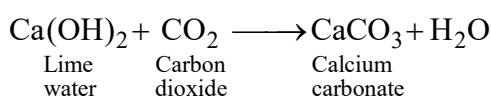
Nature of image: Virtual, erect and diminished image if formed between O and F on the same side of lens.

- 35.(a) (i) Dilution is an exothermic process so a large amount of heat generated due to which it might be possible that mixture may splash out and cause burns.
- (ii) In acidic solution, phenolphthalein remains colourless but in basic solution, it changes its colour from colourless to pink.
- (iii) Bacteria present in the mouth produce acids by degradation of sugar & food particles left in the mouth after eating. Due to this acid pH of the mouth is lower than 5.5 and this acid reacts with the tooth enamel which is the hardest substance of the body & cause tooth decay

OR

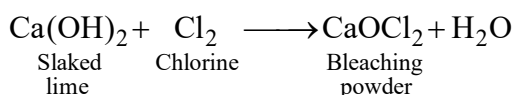
- (b) (i) The gas is CO_2 .

The reaction involves is:

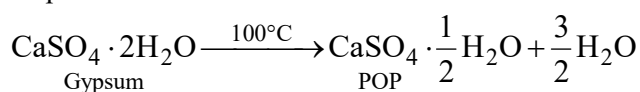


- (ii) Solution of acid contain free ions hence its conducts electricity.

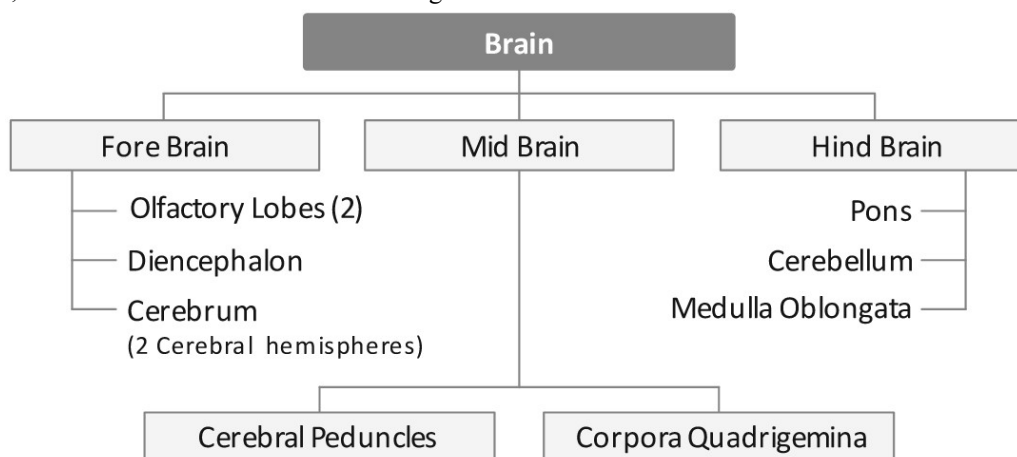
- (iii) Preparation of bleaching powder



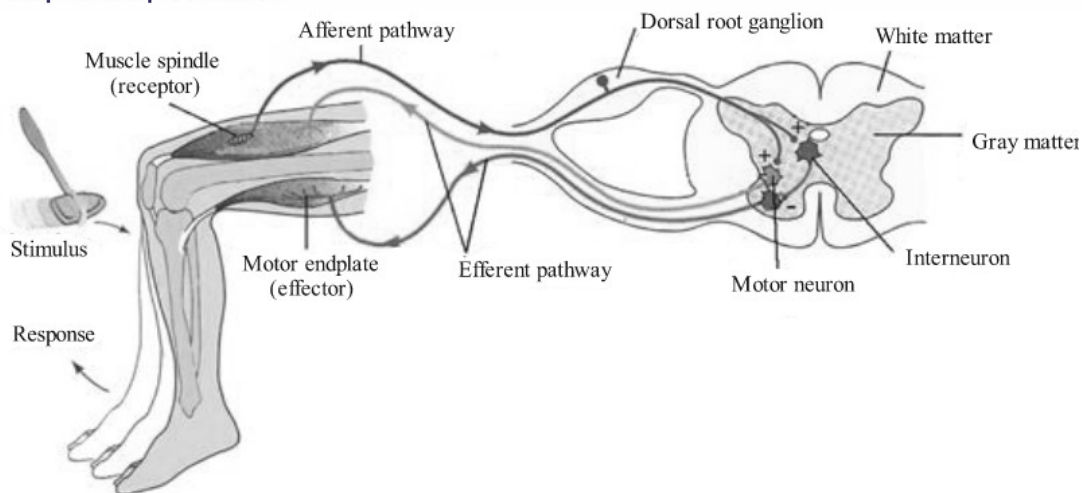
Preparation of POP



36. The forebrain, midbrain, and hindbrain are the three main brain divisions. The forebrain handles higher cognitive functions, the midbrain controls motor movement and sensory processing, and the hindbrain manages coordination, balance, and autonomic functions like breathing and heart rate.



Reflex action is a sudden and involuntary response to stimuli. It helps organisms to quickly adapt to an adverse circumstance that could have the potential to cause bodily harm or even death. Pulling our hands away immediately after touching a hot or cold object is a classic example of a reflex action.



In reflex action, fine tips (dendrites) or receptors (sensory neurons) quickly relay a message (electric impulse) via sensory nerves to the spinal cord. The spinal cord then sends information (impulse) via motor nerves to effectors (muscles or glands). The path taken by nerve impulses in a reflex action is called reflex arc. Thus, reflex actions generally involve spinal cord for quick response to specific stimulus. However, information input also goes on to reach the brain where thinking process occurs.

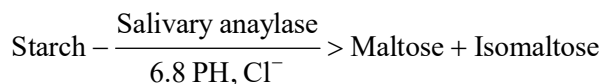
OR

Steps of digestion of food in humans:

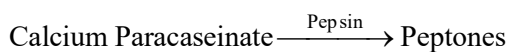
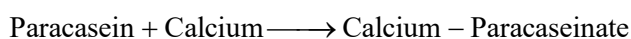
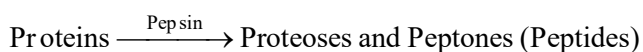
1. It begins with the ingestion of food via the buccal cavity where the food is chewed and saliva gets mixed with it forming a bolus.
2. The saliva having the salivary amylase acts upon the starch and forms maltose and dextrin.
3. The bolus thereafter passes through the oesophagus by peristalsis and reaches the stomach.
4. The stomach releases HCl which activates the pepsin enzyme in the stomach and breaks down the proteins.
5. Here, the food is mixed with water within the stomach, and chyme is formed.
6. The chyme travels to the small intestine for the final stage of digestion.
7. Thereafter within the small intestine, the enzymes from the liver and pancreas are secreted which break down the fats and proteins further.
8. After the complete breakdown of the food, it is absorbed into the blood vessels with the help of the villi in the small intestine.
9. Post absorption is the process of assimilation that begins by which the digested food is transported to every tissue of the body for the cells to convert all that food into energy.

(i) **Digestion:** In man, digestion is started in buccal cavity and completed in intestine.

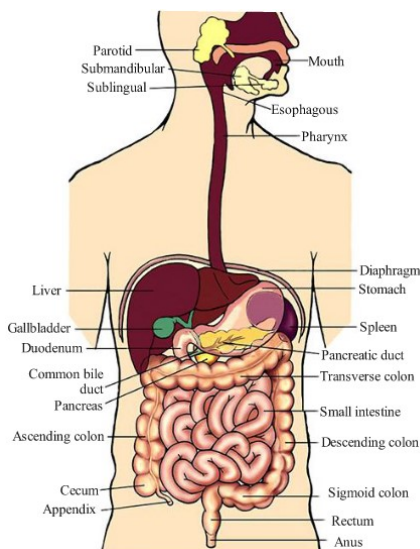
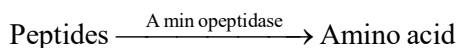
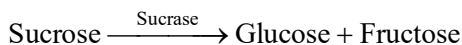
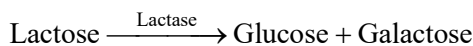
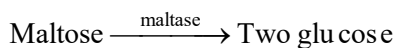
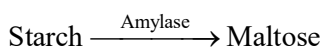
(a) **In Buccal Cavity:**



(b) **In Stomach:**



(c) **In small Intestine:**



(SECTION – E)

37. (i) Shikha is suffering from Hypermetropia or long sightedness.
(ii) Two possible causes of this defect are : decrease in size of eye ball, increase in focal length of eye lens.
(iii) Here, $u = -25\text{cm}$, $v = -50\text{cm}$
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{-50} + \frac{1}{25} = \frac{1}{50}, f = 50\text{cm}$$
$$P = \frac{100}{f} = \frac{100}{50} = +2D$$

The lenses must be convex.

(iv) Saniya has displayed concern for the health of Shikha who is her friends. Her awareness has helped Shikha to get her problem treated. But for Saniya, Shikha has resigned herself to live with the problem. Saniya provided that a friend in need is a friend indeed.

38. (i) $4\text{Al} + 3\text{O}_2 \longrightarrow 2\text{Al}_2\text{O}_3$
(ii) Sodium oxide & potassium oxide
(iii) Both the elements are highly reactive metals, so they react easily with air and catches fire. Hence they are stored under the kerosene oil.

OR

(iii) $\text{Al}_2\text{O}_3 + 6\text{HCl} \longrightarrow 2\text{AlCl}_3 + 3\text{H}_2\text{O}$
 $\text{Al}_2\text{O}_3 + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}$

39. (i) Voluntary actions are those that are under the control of our own will for example- walking, swimming etc.
(ii) Communication between central nervous system and peripheral system takes place through cranial nerves and spinal nerves.
(iii) Cranial nerves are the nerves arising from the brain and the spinal nerves are nerves arising from spinal cord.
(iv) Three major parts of brain are forebrain, midbrain and hindbrain.