

ICSE 2025 EXAMINATION

Sample Question Paper - 1

Time: 2 Hours.

BIOLOGY

Total Marks: 80

General Instructions:

1. Answers to this paper must be written on the paper provided separately
2. You will be not allowed to write during first 15 minutes
3. This time is to be spent in reading the question paper.
4. The time given at the head of this paper is the time allowed for writing the answers.

Section A is compulsory. Attempt any **four questions** from **Section B**.
The intended marks for questions or parts of questions are given in brackets []

SECTION A

(Attempt all questions from this Section.)

Question 1

Choose the correct answers to the questions from the given options.

(Do not copy the question, write the correct answer only.)

[15]

- (i) The alphabet 'C' in NICD stands for
1. Cancer
 2. Community
 3. Communicable
 4. Campaign
- (ii) **Assertion (A):** The surface of the skin is impervious to water.
Reason (R): The skin surface is covered by stratified cuboidal epithelium.
1. Both A and R are true
 2. Both A and R are false
 3. A is true and R is false
 4. A is false and R is true
- (iii) Below statements describe a particular disease.
- I. It is caused by bacterium *Shigella*.
 - II. It occurs frequently among children.
 - III. It is marked by loose motions, intestinal pain, and mild fever.
- Identify the disease.
1. Amoebic dysentery
 2. Bacillary dysentery
 3. Cholera
 4. Typhoid

(iv) An animal of Class Mammalia is

1. Jellyfish
2. Starfish
3. Whale
4. Sycon

(v) Biological control of mosquito larvae is done by

1. Spraying DDT on ponds and marshy places
2. Introduction of *Gambusia* fish in the ponds
3. Pouring kerosene over the stagnant water
4. Elimination of breeding places of mosquitoes

(vi) **Assertion (A):** The central cell of the embryo sac has two haploid polar nuclei.

Reason (R): The antipodal cells are three in number in the embryo sac.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(vii) The joint between the ribs and the sternum is a type of

1. Cartilaginous joint
2. Gliding joint
3. Pivot joint
4. Ball and socket joint

(viii) **Assertion (A):** Gram, pea and mango show epigeal germination.

Reason (R): In epigeal germination, the hypocotyl elongates faster.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(ix) Ropes, mats, and certain textiles are made from plant fibres. These fibres are the

1. Parenchyma cells
2. Collenchyma cells
3. Sclerenchyma cells
4. Aerenchyma cells

(x) **Assertion (A):** Euglena is an example of a prokaryotic cell.

Reason (R): Prokaryotes have a well-defined nucleus.

1. Both A and R are true
2. Both A and R are false
3. A is true and R is false
4. A is false and R is true

(xi) The activity of the mammary glands is related to the reproductive hormone

1. Progesterone
2. Prolactin
3. Oestrogen
4. Testosterone

(xii) Sushma experiences painful breathing. This condition is referred to as

1. Eupnea
2. Dyspnea
3. Apnea
4. Claustrophobia

(xiii) Which of the following is a nutritional deficiency?

1. Marasmus
2. Asbestosis
3. Coronary arteriosclerosis
4. Sickle cell anaemia

(xiv) Pratik enjoys eating fries and chips. Digestion of these food items occurs in the

1. Small intestine
2. Large intestine
3. Stomach
4. Oesophagus

(xv) *Allium cepa* is the scientific name of

1. China rose
2. Onion
3. Potato
4. Maize

Question 2

(i) Name the following:

[5]

- (a) Substances produced by microbes that are effective against other pathogenic microbes.
- (b) Condition in which carpels of a flower mature earlier than stamens.
- (c) Medicines made by the combination of penicillin and sulpha drugs.
- (d) Process by which the dormant embryo of the seed forms a seedling.
- (e) The type of parenchyma which contains chloroplasts.

(ii) Match the following:

[5]

| Phylum | Characters |
|-------------------|--------------------------------|
| 1. Porifera | a. Locomotion by tube feet |
| 2. Nematelminthes | b. Excretion by protonephridia |
| 3. Echinodermata | c. Body has canal system |
| 4. Mollusca | d. Triploblastic body |
| 5. Chordata | e. Excretion by metanephridia |

(iii) State whether the following statements are True or False. Correct and rewrite the false statements.

[5]

- (a) Bending of long bones is a symptom of pellagra.
- (b) The lateral meristem helps in the growth of the plants lengthwise.
- (c) Mosquitoes contaminate the food by depositing their excreta.
- (d) The enamel protects the teeth from wear and tear.
- (e) The Red Cross is an international agency only.

(iv) State one point of difference between the following pairs on the basis of what is indicated in the brackets.

[5]

- (a) Plant cell and animal cell [reserve food material]
- (b) Tuberculosis and diphtheria [causative organism]
- (c) Thoracic region and caudal region [number of vertebrae]
- (d) Vitamin B₆ and Vitamin B₁₁ [function]
- (e) Respiration and photosynthesis [end products]

(v) Choose the odd one out and name the category to which the others belong:

[5]

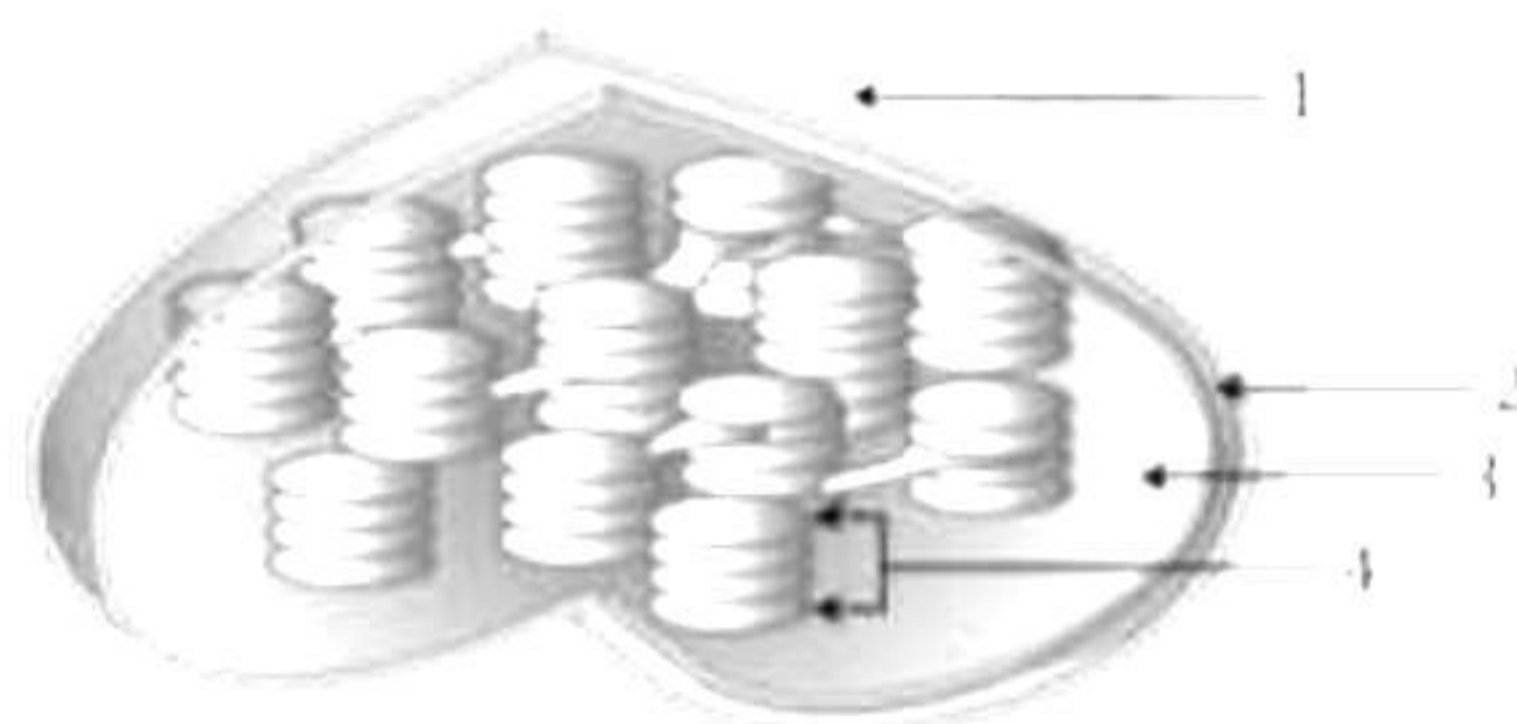
- (a) Centrosome, Vacuole, Cell wall, Plastid
- (b) Trachea, Mouth, Pharynx, Larynx
- (c) Glucose, Sucrose, Galactose, Fructose
- (d) Scabies, Sleeping sickness, Malaria, Amoebic dysentery
- (e) Animal feed, Bagasse, Animal waste, Plastic packing

SECTION B

(Attempt any four questions from this section.)

Question 3

- (i) Why is maize grain considered a fruit? [1]
- (ii) State the functions of: [2]
 - (a) Skull
 - (b) Pectoral girdle
- (iii) State the role of nitrifying bacteria. [2]
- (iv) List any two characteristics of striated muscles. [2]
- (v) The given figure shows the structure of chloroplast. [3]



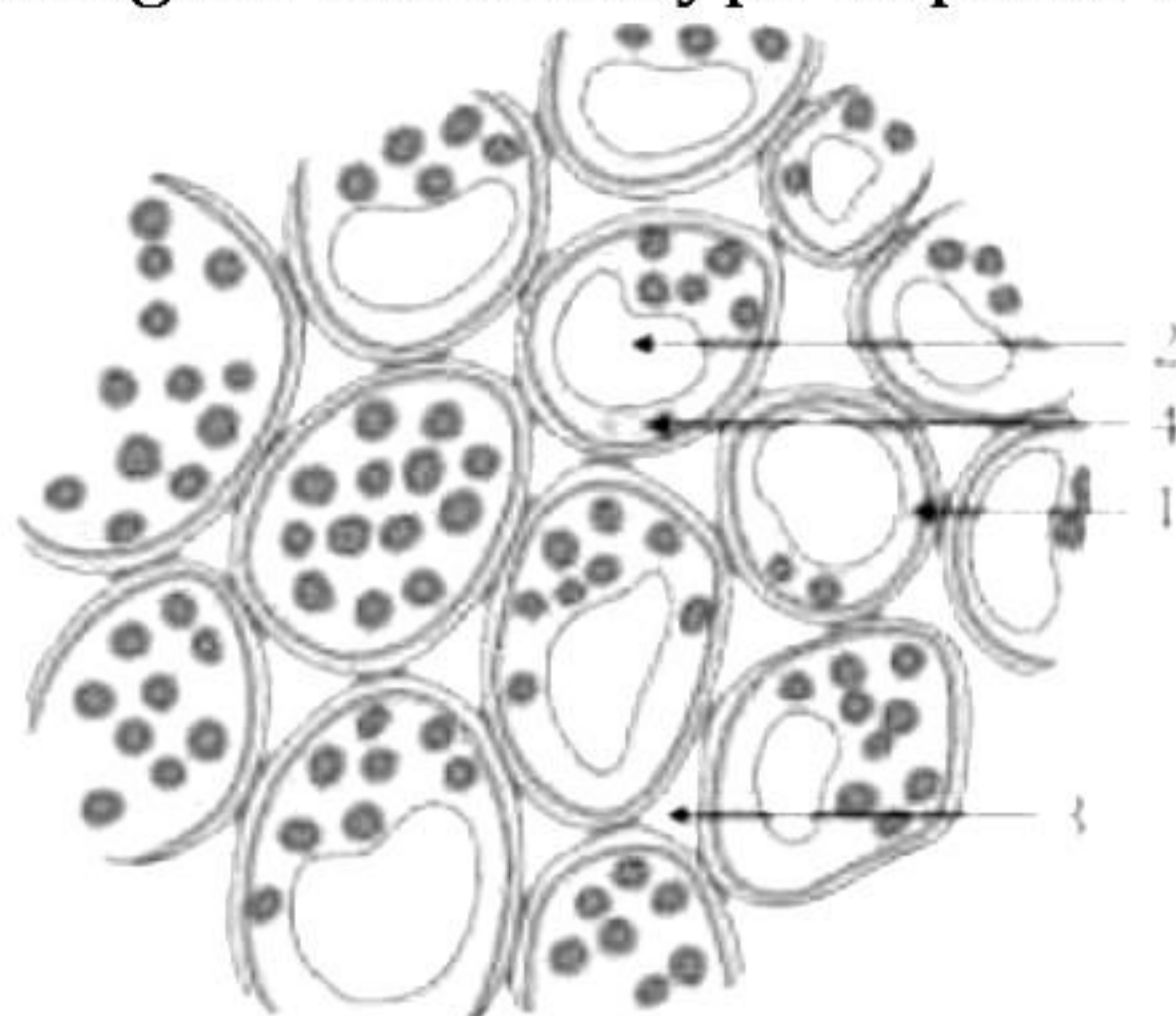
- (a) In which type of cell, the above organelle is present?
- (b) Label parts 1-4.
- (c) What is the function of this structure?

Question 4

- (i) Define double fertilisation. [1]
- (ii) Write the expanded form of: [2]
 - (a) NFCP
 - (b) CDRI
- (iii) What is the role of the pollen tube in fertilisation? [2]
- (iv) *Ascaris* is an intestinal parasite of humans. It is the most common worm infection causing Ascariasis. How does *Ascaris* spread itself? [2]

(v) The given figure shows a type of plant tissue.

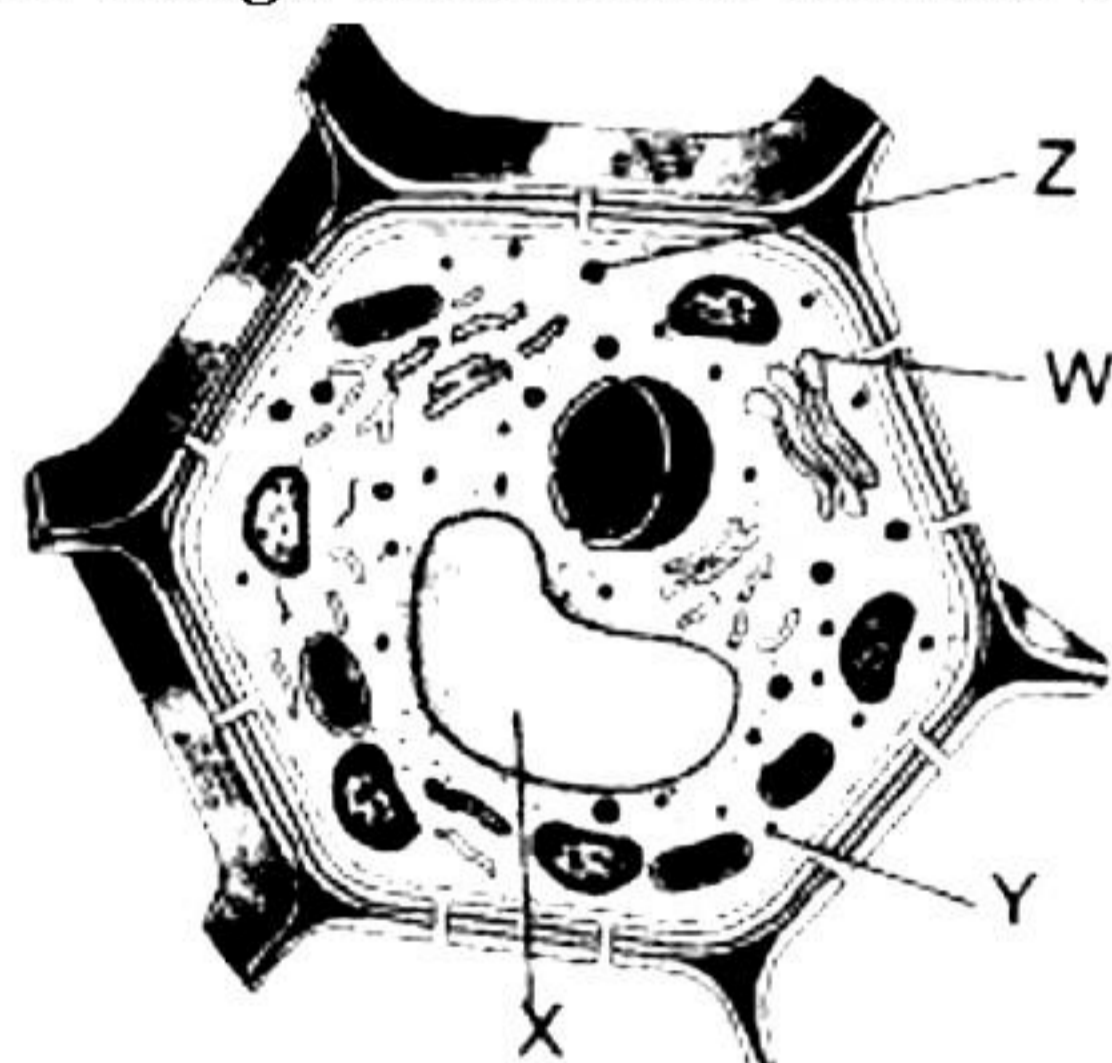
[3]



- (a) Identify the tissue.
- (b) Label parts 1 and 2.
- (c) List any two characteristics of this tissue.

Question 5

- (i) Name the bacteria that converts nitrites to nitrates. [1]
- (ii) Who collects the garbage from the bins placed in our surroundings? Where do they carry this garbage? [2]
- (iii) Under what conditions does the breathing rate increase? [2]
- (iv) List two functions of WHO. [2]
- (v) Observe the given cell and answer the questions based on it. [3]

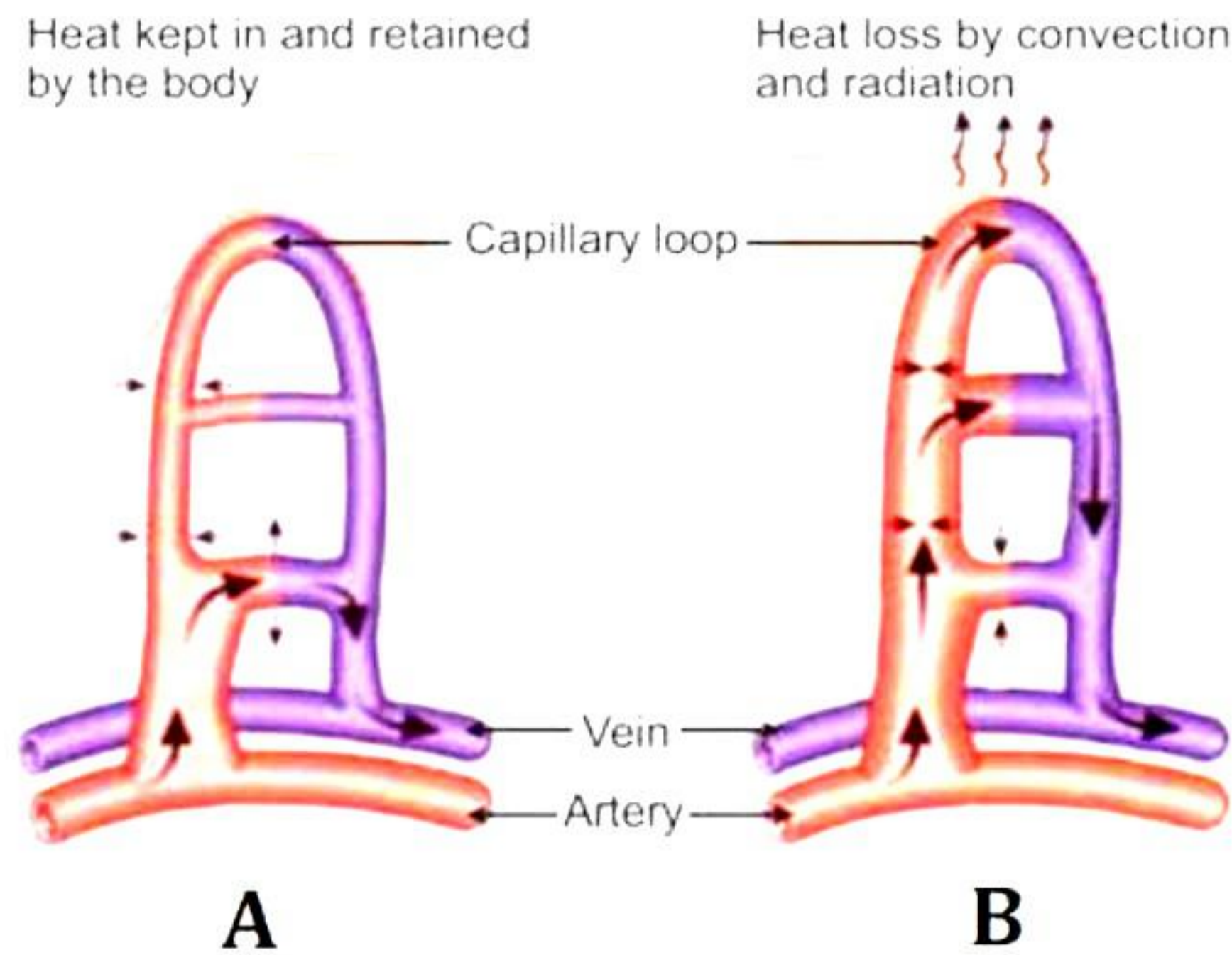


- (a) Identify W, X, Y and Z.
- (b) What is the covering membrane of X known as?
- (c) What are the functions of X?

Question 6

- (i) What is the main objective of the Red Cross Society? [1]
- (ii) How can we recognize *Anopheles* and *Culex* mosquitoes? [2]
- (iii) The stomach secretes gastric juice which contains hydrochloric acid. What is its function? [2]
- (iv) How are respiration and burning similar and how are they different? Write two points for each. [2]

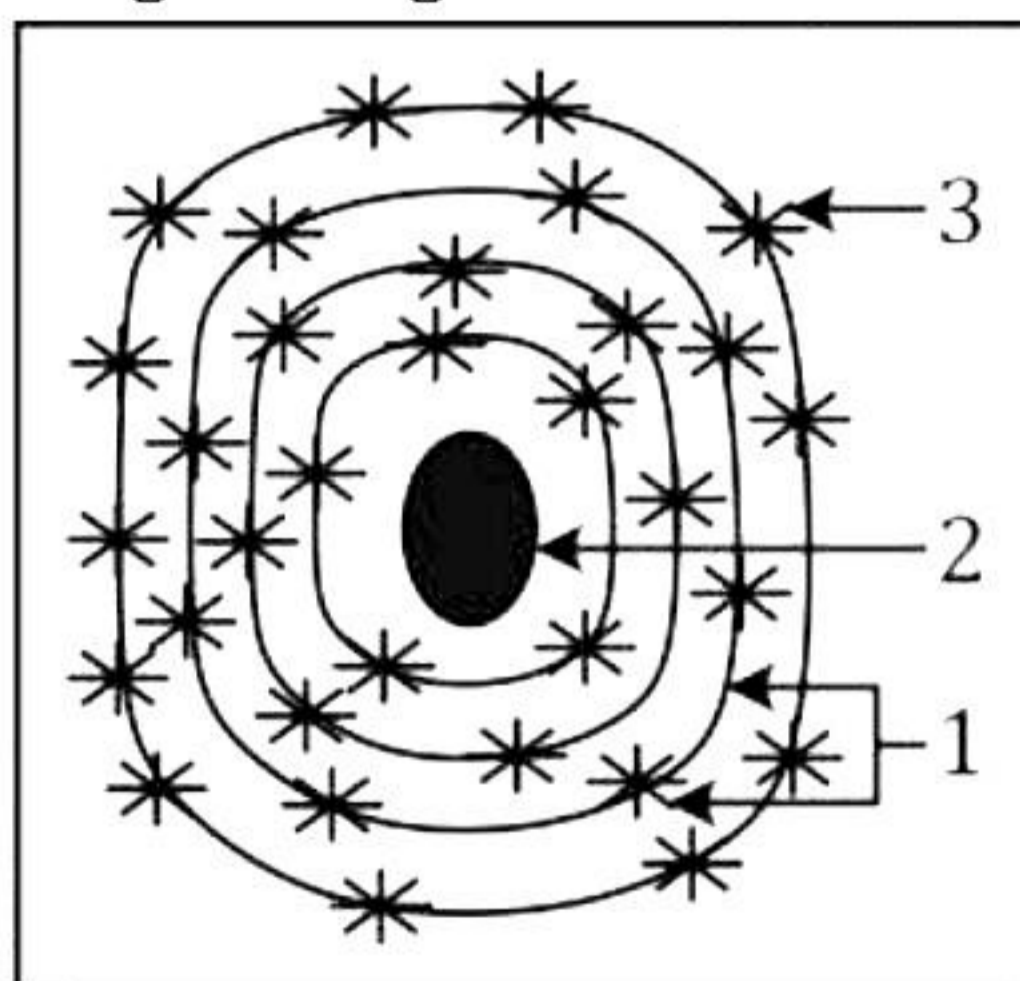
- (v) The figures A and B given below represent the ways of heat regulation in our body with the help of blood vessels. Study the figures and answer the following questions: [3]



- Name the process/condition shown in figures A and B.
- During what climatic conditions do these processes occur in our body?
- Do these situations occur due to emotional causes? If yes, name them.

Question 7

- How does *Vibrio cholerae* cause death? [1]
- Name the body structure concerned with the given functional activity: [2]
 - Helps to increase the volume of the chest cavity lengthwise.
 - Protects the lungs from mechanical injury.
- Draw a neat and well-labelled diagram of the human alimentary canal. [2]
- State two differences between cartilaginous fish and bony fish. [2]
- Study the given figure and answer the questions based on it: [3]



- What does the given figure show?
- Label parts 1-3.
- What is the function of part 1?

Question 8

- (i) What is an epidemic disease? Give one example. [1]
- (ii) Why do seeds that are sown very deep inside the soil fail to germinate? [2]
- (iii) Briefly explain the role of the following health aids: [2]
 - (a) Antiseptics
 - (b) Disinfectants
- (iv) Why are proteins an integral part of our diet? [2]
- (v) Explain what is a synovial joint and list its types. [3]

Solution

SECTION A

Solution 1

- (i) Communicable
- (ii) A is true and R is false
- (iii) Bacillary dysentery
- (iv) Whale
- (v) Introduction of *Gambusia* fish in the ponds
- (vi) Both A and R are true
- (vii) Cartilaginous joint
- (viii) A is false and R is true
- (ix) Sclerenchyma cells
- (x) Both A and R are false
- (xi) Prolactin
- (xii) Dyspnea
- (xiii) Marasmus
- (xiv) Small intestine
- (xv) Onion

Solution 2

(i)

- (a) Antibiotics
- (b) Protogyny
- (c) Pentidsulph
- (d) Germination
- (e) Chlorenchyma

(ii)

| Phylum | Characters |
|-------------------|--------------------------------|
| 1. Porifera | c. Body has canal system |
| 2. Nematelminthes | b. Excretion by protonephridia |
| 3. Echinodermata | a. Locomotion by tube feet |
| 4. Mollusca | e. Excretion by metanephridia |
| 5. Chordata | d. Triploblastic body |

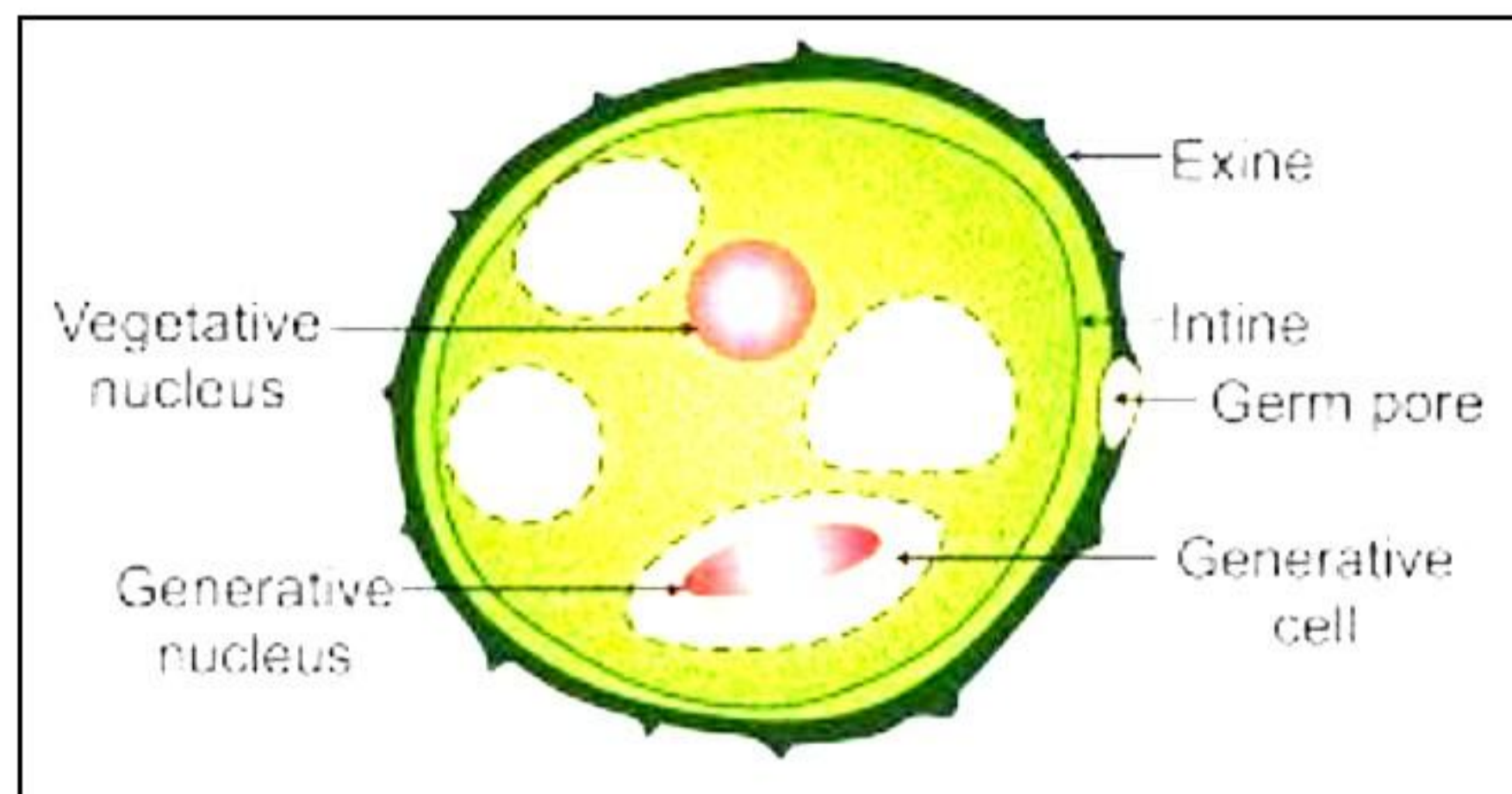
Solution 4

- (i) Tidal volume is the volume of air inspired or expired during normal breathing. It is about 500 mL.
- (ii)
- (a) ICMR: Indian Council of Medical Research
- (b) ZIG: Zoster Immune Globulin
- (iii) Non-essential whorls (sepals and petals) in a flower are also called non-reproductive or accessory whorls. They are the helping parts of a flower which either protect the reproductive parts of the flower or make the flower attractive for pollination.
- (iv) Milk and milk products are rich in calcium, phosphorus and vitamin A. Calcium and phosphorus are necessary for strengthening the bones and the teeth. To make the bones and teeth strong, the doctor advises a patient with bone problems to include more milk and milk products in his daily diet. Milk also prevents the oxidation of Vitamin A. Calcium present in the milk even helps in clotting of blood.
- (v)
- (a) Potassium hydroxide (KOH) solution is kept in test tubes X and Y to check the presence of CO₂, as KOH can absorb CO₂, if it is produced.
- (b) When the process of respiration takes place in test tube X, the O₂ present in the test tube is consumed. The CO₂ produced due to respiration is absorbed by the KOH present in the test tube. Hence, a space is developed due to the consumption of O₂ and therefore, the coloured water rises in tubing 1.
- (c) Boiled peas soaked in a disinfectant are kept in test tube Y because the boiled seeds are dead and cannot respire. Therefore, the process of respiration does not take place in test tube Y. It acts as a control for the experiment.

Solution 5

- (i) Bamboo and wheat.
- (ii) Functions of the nucleus:
- It controls all the life processes taking place inside the cell.
 - It helps in the transmission of hereditary characteristics from one generation to another.
- (iii)
- (a) Cuboidal epithelium
- (b) Ciliated columnar epithelium

(iv) Structure of a pollen grain



- (v) Lichens are the symbiotic association of blue-green algae and fungi. The fungi absorb water and mineral matter and supplies it to the algae which in turn prepares food and supplies it to the fungi. Phycobiont is the algal component of lichen and mycobiont is the fungal component.

Solution 6

- (i) The pleural fluid provides lubrication for free movement of the expanding and contracting lungs.
- (ii) Two kinds of fibrous connective tissue are tendons and ligaments.
Tendons connects muscles to bones whereas ligaments connect bone to bone and hold them in position.
- (iii) Liver releases bile juice into the duodenum through the bile duct. Bile contains sodium carbonate, which neutralises the acid content of the food received from the stomach and makes it alkaline to enable the action of pancreatic and intestinal enzymes. Thus, if the bile duct is cut, the stomach acidity would increase making the environment unsuitable for the action of pancreatic and intestinal enzymes.
- (iv) Preventive measures advised by WHO to minimise the chances of getting COVID-19:
(Any two)
1. Stay at home.
 2. Wash hands regularly with soap and water.
 3. Avoid crowded places.
 4. Wear masks in public places and maintain social distancing.
 5. Get vaccinated.
- (v)
- (a) Nucleus
- (b) The nucleus is the control centre of the cell. It regulates all metabolic activities of the cell. It also transfers hereditary characteristics from the parents to the offspring.
- (c) The nucleus is not present in all cells. Human RBCs do not contain a nucleus.

Solution 7

- (i) Cell inclusions are non-living intracellular components of the cytoplasm, which are not bound by any membranes and do not carry out any metabolic activity.

Example: Glycogen granules.

- (ii) Differences between self-pollination and cross-pollination: (Any two)

| Self-pollination | Cross-pollination |
|---|--|
| 1. Transfer of pollen grains from the anther to the stigma of the same flower. | 1. Transfer of pollen grains from the anther of one flower to the stigma of another flower of a different plant of the same species. |
| 2. Does not require any external agent to carry out pollination. | 2. Requires an external agent such as wind, water, or insects for pollination to occur. |
| 3. In self-pollinated flowers, the anther and the stigma mature at the same time. | 3. In cross-pollinated flowers, the anther and the stigma mature at different times. |
| 4. New varieties are not possible. | 4. New varieties can be produced. |

- (iii) An example of carelessness while disposing of research waste was seen in Delhi, where radioactive Cobalt-60 was given to waste dealers, who dumped it in the well of a housing colony. Several people were badly affected and suffered a lot due to this kind of dumping.

- (iv) When a flower arises in the axil of a leaf-like structure, this structure is known as bract. Because bracts are large and brightly coloured structures, they are often mistaken for petals. This helps to attract insects for pollination.

- (v) Types of ribs in the human body:

- There are twelve pairs of ribs in the human body.
- The first seven (7) pairs of ribs are attached with the sternum. They are called true ribs.
- The next three (3) pairs are connected to the 7th pair of ribs. They are called false ribs.
- The last two (2) pairs are free (not attached to the sternum). They are called floating ribs.

Solution 8

(i) Causative agents

- Whooping cough: *Haemophilus pertussis*
- Tetanus: *Clostridium tetani*

(ii)

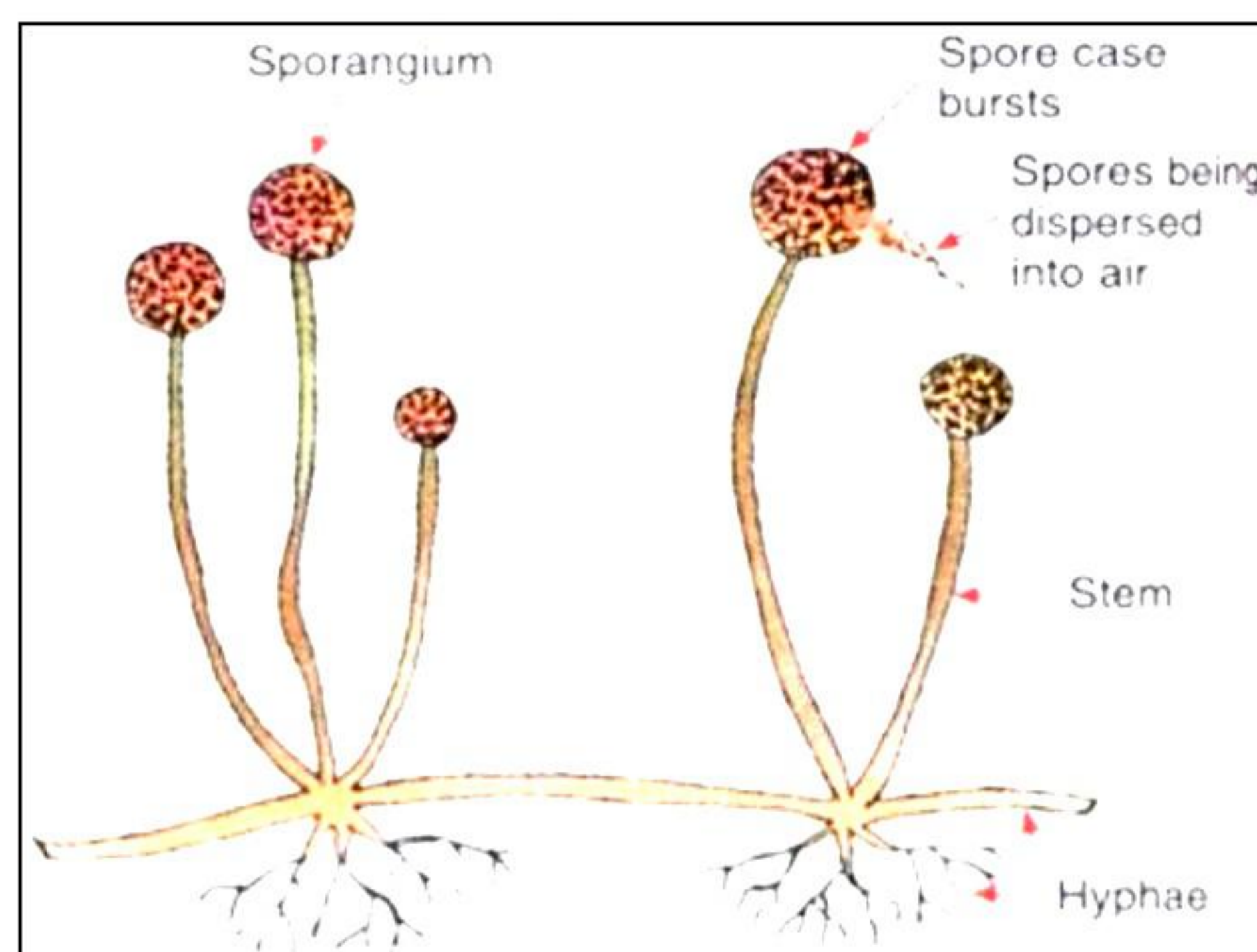
(a) Residual air: Some air is always left in the lungs even after forcibly breathing out. This is the left over or residual air. This volume is 1500 mL.

(b) Dead air space: Some tidal air is left in the respiratory passages such as trachea and bronchi, where no diffusion of gases can occur. This volume is called dead air space. It is 150 mL.

(iii) The hypothalamus acts like a thermostat. When the body tends to cool below the normal temperature, it switches on or speeds up the heat-producing process. When the body tends to get overheated, it accelerates the cooling process and switches off the heat-producing process. In this way, the hypothalamus assists in heat regulation of the body.

(iv) Antibodies are immunoglobulins (a type of protein) which act against germs or their secretion and destroy them. Antibodies are produced by a type of specialised lymphocytes on exposure to antigens.

(v) In the process of spore formation in fungi, several nuclei along with the cytoplasm are transferred to the tip of the sporangiophore. The tip is then partitioned off from the main hypha. It swells to form the sporangium. The protoplasm inside the sporangium breaks up into minute pieces, each of which contains several nuclei. Each piece surrounds itself with a wall and becomes a spore.



SECTION B

Solution 3

- (i) Maize grain is considered a fruit because the fruit wall and the seed coat are fused to form a protective layer. We call such a fruit as 'grain.'
- (ii)
 - (a) **Skull:** Protects optic orbits and olfactory sacs
 - (b) **Pectoral girdle:** Provides support to the anterior portion of the body
- (iii) Nitrifying bacteria convert ammonia into nitrites during nitrogen fixation and this process is called nitrification.
- (iv) Characteristics of striated muscles: (Any two)
 - 1. The cells are multi-nucleated.
 - 2. They are long, cylindrical and unbranched.
 - 3. The cells are enclosed in connective tissue sheaths in the form of bundles. These sheaths form tendons that connect muscles with the bones.
 - 4. These muscles are voluntary.
- (v)
 - (a) Plant cell
 - (b)
 - 1 - Outer membrane
 - 2 - Inner membrane
 - 3 - Stroma
 - 4 - Granum
 - (c) The major function of the chloroplast is to assist in food production by the process of photosynthesis. Enzymes obtain carbon from carbon dioxide and combine it with oxygen and hydrogen to produce a simple carbohydrate molecule.

Solution 4

- (i) The process of fusion of one male gamete with the egg nucleus and another male gamete with the polar nuclei or secondary nucleus is called double fertilisation.
- (ii)
 - (a) NFCP: National Filaria Control Programme
 - (b) CDRI: Central Dairy Research Institute
- (iii) The pollen tube grows out of the pollen grain by breaking through its exine. The pollen tube grows through the stigma and style by dissolving these tissues with the help of enzymes and reaches the ovary, where it enters the ovule through a minute pore called the micropyle.

(iv) The female *Ascaris* (which lives in the human intestine) lays thousands of eggs per day, which pass out along with the patient's faeces. The eggs get scattered in the soil, which ultimately reach the vegetables and fruits that grow in the field. Children playing on the ground may get microscopic eggs on their hands and infection can occur by eating with unwashed hands or through unwashed raw vegetables.

(v)

(a) Parenchyma

(b) 1 – Cytoplasm; 2 - Vacuole

(c) Characteristics of parenchyma tissue: (Any two)

- Thin-walled living cells.
- Cell wall is made of cellulose.
- Cells are oval or polygonal.
- Intercellular spaces present between the cells.

Solution 5

(i) *Nitrobacter*

(ii) Safai karamcharis collect the garbage from the bins placed in our surroundings. They carry the garbage in trucks and take it to a low-lying open area, called landfill where they dispose of the garbage.

(iii) The breathing rate increases after a vigorous physical exercise. Accumulation of CO₂ in the blood also increases the rate of breathing.

(iv) Functions of WHO: (Any two)

1. To promote and support projects for research on diseases such as cancer.
2. To collect and supply information about the occurrence of epidemic diseases such as cholera, plague, typhoid, and yellow fever.
3. To suggest quarantine measures to prevent the spread of diseases to others.
4. To lay pharmaceutical standards for important drugs, to ensure purity and size of the dose.

(v)

(a) W - Golgi apparatus; X – Vacuole

Y – Ribosomes; Z - Lysosome

(b) The covering membrane of X (vacuole) is known as tonoplast.

(c) Functions of X (vacuole):

- It acts as a store house for water-soluble pigments and waste products.
- It also stores useful minerals and salts.

Solution 6

- (i) The main objective of the Red Cross Society is to perform activities which should prevent or remove human suffering even at the time of war.
- (ii) The adults of *Anopheles* and *Culex* mosquitoes can be recognized by their sitting posture. The *Anopheles* mosquito always rests with its straight body, making an angle against the surface, while the *Culex* mosquito keeps the body more or less parallel.
- (iii) Functions of hydrochloric acid:
- It gets mixed with the food and kills the bacteria present in food.
 - It activates pepsin to act on proteins.
- (iv) Similarities between respiration and burning: (Any two)
1. Both require oxygen
 2. Both produce energy
 3. Both result in the formation of CO₂ and water

Differences between respiration and burning: (Any two)

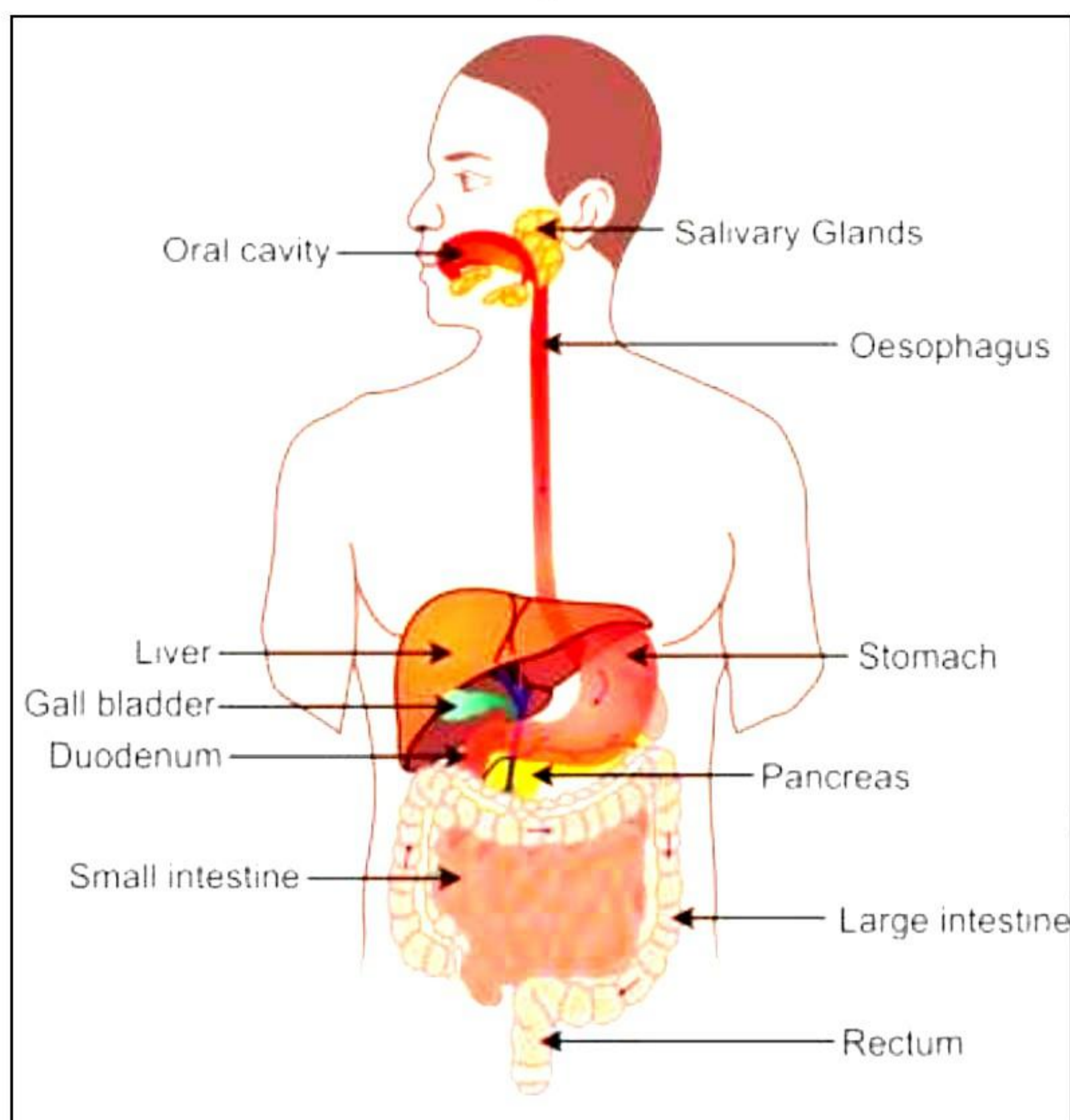
| Respiration | Burning |
|--|--|
| 1. Occurs in a series of chemical steps | 1. Occurs in a single step |
| 2. Carried out by enzymes | 2. Carried out by heat |
| 3. Biochemical process | 3. Physico-chemical process |
| 4. Energy is liberated in the form of ATP and heat | 4. Energy is liberated in the form of heat and light |
| 5. Cellular process | 5. Non-cellular process |

- (v)
- (a) Vasoconstriction (A) and Vasodilation (B).
- (b) Vasoconstriction occurs in cold weather whereas vasodilation occurs in hot weather.
- (c) Some emotional problems, such as stress or danger tighten the blood vessels (vasoconstriction) and strong emotions can lead to shortness of breath and rapid breathing (vasodilation).

Solution 7

- (i) In cases of severe infection of *Vibrio cholerae*, urination does not occur due to the shortage of water in the body. As a result, urea accumulates in the blood, which is highly poisonous and may cause death.
- (ii)
- (a) Diaphragm
- (b) Ribs

(iii) Structure of the human alimentary canal:



(iv) Differences between cartilaginous fish and bony fish:

| Cartilaginous fish | Bony fish |
|--|-------------------------------------|
| 1. The skeleton is made up of cartilage. | 1. The skeleton is made up of bone. |
| 2. Operculum is absent. | 2. Operculum is present. |

(v)

(a) The given figure shows the structure of a bone.

(b) 1 - Canaliculi

2 - Haversian canal

3 - Osteocytes

(c) Part 1 contains blood vessels. Hence, they provide nourishment to the bone cells.

Solution 8

(i) A disease which spreads from one place to another affecting a large number of people is called an epidemic disease, e.g., plague.

(ii) Seeds that are sown very deep inside the soil fail to germinate because:

- They do not have a proper supply of oxygen for respiration.
- There is insufficient pushing force in the embryonic parts (hypocotyl or epicotyl) to break through the upper layers of the soil.

(iii)

(a) Antiseptics: These are mild chemical substances applied to the body which prevent the growth of some bacteria and destroy others.

Examples: Lysol and iodine.

(b) Disinfectants: These chemicals kill the microorganisms when they come in contact with them. Disinfectants are usually too strong to be used on the body. Examples: Cresol and phenol.

(iv) Proteins are an integral part of our diet because they provide the chemical material for growth and repair of the body cells and tissues. At the time of emergency, they may also be oxidized inside the body to release energy.

(v) In a synovial joint, the articulating surface of two bones is covered with articular cartilage. The joint is covered in a synovial capsule. There is a synovial membrane lining the capsule. The cavity of the capsule, called the synovial cavity, contains synovial fluid, which acts as a lubricant.

Types of synovial joints:

1. Hinge joint
2. Ball and socket joint
3. Pivot joint
4. Gliding joint