LRN International GCSE: Biology (6210)

Candidate Name	
Candidate Number	
Centre Name	
Centre Number	

Paper 1:   **Model Paper V4 Marking Scheme**

(2 hours)

It is necessary to respond on the answer sheets provided alongside this question paper. Additionally, you must have a soft pencil (preferably of type B or HB),a clean eraser and a dark blue or black pen.

INSTRUCTIONS:

- You must write your name, candidate number, centre name and centre number on the answer sheets in the designated spaces.
- Objective section consists of 25 questions, and it is essential that you attempt all of them.
- Each question has four options labelled A, B, C, and D. Select the option that you think is correct. Mark it on the multiple-choice answer sheet using a soft pencil.
- Attempt all the questions from subjective section using a dark blue or black pen.
- It is important to follow the instructions provided on the answer sheets.
- Do not use correction fluid.
- Avoid writing on any bar codes.

INFORMATION:

- This paper has a total of 100 marks.
- In objective section there are 25 questions, each carries one mark. There is no negative marking for incorrect responses.
- In subjective section, 45 marks are for extended theory and 30 marks for practical component.
- The number of marks assigned for every question or its parts is indicated within brackets [ ].

OBJECTIVES PORTION: **[Total 25 marks]**

1. D
2. A
3. B
4. D
5. B
6. D
7. C
8. D
9. A
10. D
11. C
12. C
13. B

14. D
15. B
16. D
17. A
18. B
19. B
20. B
21. B
22. C
23. D
24. B
25. D

THEORY PORTION: **[Total 45 marks]**

1.

(i)

By using a potometer

- Obtain a healthy plant shoot and add oil on top.
- Set up a potometer with it and seal it tightly.
- Record water movement into a potometer.
- Calculate transpiration rate = water loss ÷ leaf surface area.
- Repeat for accuracy and analyze collected data.

(ii)

Exposure to a concentrated salt solution causes cell plasmolysis which shrinks the cell due to water loss by osmosis. This leads to a shriveled appearance in animal cells and a wrinkled appearance in plant cells.

(iii)

- Growth spurts
- Limited dietary intake

- Less sun exposure
- Use of sunscreen

2.

(i)

7.5 micrometers

(ii)

- Damages the chloroplasts
- Reduces photosynthesis
- Cell damage and death
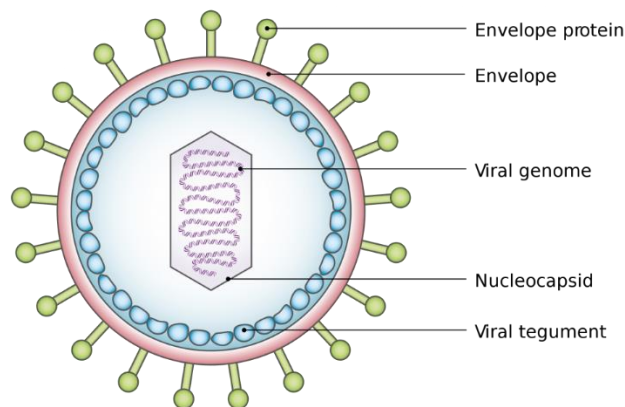- Disturbs nutrient transport.

(iii)

- **First Process:** Diffusion occurs passively through a concentration gradient, as it ensures that cells receive oxygen and release carbon dioxide.
- **Second Process:** No net movement of gases because concentrations of gases are balanced.
- **Third Process:** Diffusion of Gases occurs to ensure that gases move through a concentration gradient, maintaining equilibrium.
- **Fourth Process:** No net movement of gases. Sodium ions (Na^+) are transported into the cell against a concentration gradient, to maintain proper sodium balance and osmotic regulation.

3.

(i)

- **Artery:** carries oxygenated blood from the heart to the body, and supplies nutrients and oxygen to the tissues.
- **Vein:** transports deoxygenated blood from body tissues to the heart. Also contains valves to prevent the backflow of blood.
- **Capillaries:** tiny blood vessels connecting arterioles and venules. They facilitate the exchange of gases, nutrients, and waste products between the blood and tissues.

(ii)

(iii)

HIV targets and damages CD4 cells to weaken the immune system, making the individual susceptible to infections. Untreated HIV infection progresses to AIDS, leading to life-threatening infections and illnesses.

4.

(i)

- Increase in concentration of the hormone X in the blood.
- Affects hormone production by the gland Y.
- Decrease in concentration of hormone X in the blood.
- Increase in concentration of hormone Z in the blood.

(ii)

- Feedback Regulation
- Specificity

PRACTICAL PORTION: **[Total 30 marks]**

1.

(i)

- Maintains temperature
- Uniform heating

(ii)

(a)

- Measure the mass of the food sample and treat it using a calorimeter.
- Measure the temperature change.
- Calculate the energy using the formula $Q = mc\Delta T$

Q = energy

m = mass of water

c = specific heat capacity of water

ΔT = temperature change.

(b)

- Determine the energy released using calorimetry
- Convert it to kilojoules (kJ).
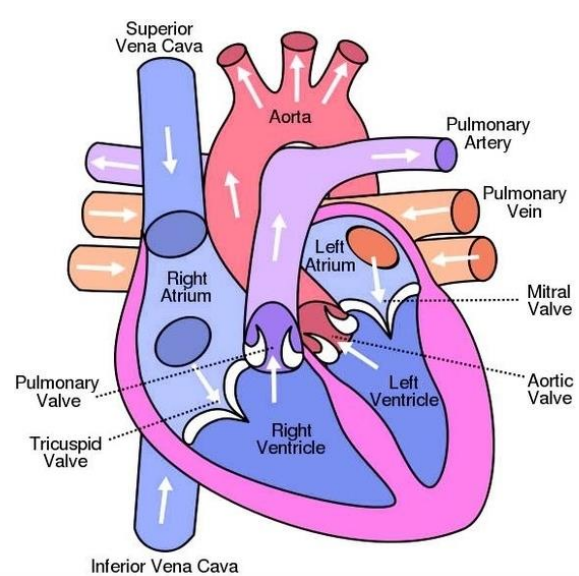- Obtain energy content per gram by dividing energy by the mass of the food sample.

(iii)

(a)

- During physical exercise, the rate and depth of breathing increase to meet the oxygen demand.
- The breathing and respiratory rate increases to facilitate increased exchange of oxygen and carbon dioxide.

(b)

- Vital capacity increases because exercise strengthens the respiratory muscles which allows more efficient expansion and contraction of the chest cavity.
- Results in improved lung function and endurance.

2.

3.

(i)

- Eukaryotic organisms, moist habitats, nutrient absorption from surroundings.
- Have cell walls made of chitin.
- May reproduce sexually or asexually.
- e.g. yeast, mushrooms.

(ii)

- Prokaryotic microorganisms with variable shapes

- Have cell walls made of peptidoglycan.
- Reproduce asexually through binary fission.
- May be beneficial or harmful.

(iii)

- Non-living infectious agents, cause diseases in animals, plants, and bacteria.
- Lack of cellular structures only having genetic material (DNA or RNA).
- The host is necessary for reproduction.