

Candidate Name

Candidate Number

Centre Name

Centre Number

Paper 2 (2 hour)

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.
- The objective section consists of 25 questions, and you must 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 the 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.
- You are allowed to use a calculator if needed.

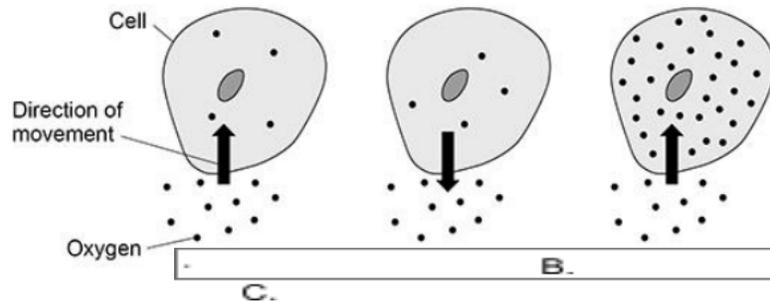
INFORMATION:

- This paper has a total of 100 marks.
- In the objective section, there are 25 questions, each carrying one mark. There is no negative marking for incorrect responses.
- Subjective section comprises 75 marks
- The number of marks assigned for every question or its parts is indicated within brackets ().
- Rough work must be completed on this question paper.

Objective Section

Marks: 25

1. Which diagram transportation of oxygen through diffusion?



2. What is the appropriate method of naming an organism according to the binomial system?

- A. *Common buttercup*
- B. *ranunculus acris*
- C. *Ranunculus acris*
- D. *Ranunculus sp.*

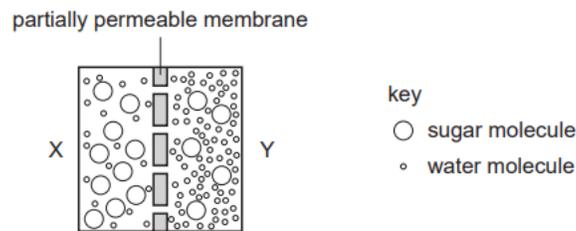
3. Which substance facilitates the enzymatic breakdown of fats into fatty acids and glycerol?

- A. adrenalin
- B. bile
- C. lipase
- D. alcohol

4. On the activity of amylase, what impact effect does a gradual decrease in pH from 13 to 1 have?

- A. slows it down only
- B. speeds it up only
- C. speeds it up then slows it down
- D. slows it down then speeds it up

5. Water and sugar molecules on both sides of a partially permeable membrane are shown in the figure.



What happens during osmosis?

- A. More sugar molecules pass through the membrane from X to Y than from Y to X.
- B. More water molecules pass through the membrane from X to Y than from Y to X.
- C. More water molecules pass through the membrane from Y to X than from X to Y.
- D. More sugar molecules pass through the membrane from Y to X than from X to Y

6. Which structures are found in palisade and liver cells among the following:

- cell wall
 - cytoplasm
 - nucleus
- A. 1 and 2
 - B. 1 only
 - C. 2 and 3
 - D. 3 only

7. For positioning the quadrat, which method should be employed?

- A. Place the quadrat where there are many buttercup plants.
- B. Place the quadrat only where there are no trees.
- C. Place the quadrat using random coordinates.
- D. Use the same person to place all the quadrats.

8. Carbohydrates are an essential component of a balanced diet. Which chemical formula represents glucose?

- A. C₆H₁₂O₆
- B. CO₂
- C. H₂O
- D. O₂

9. The microorganisms that are responsible for causing disease are?

- A. Pathogens
- B. Predators
- C. Prokaryotes
- D. Non-pathogenic microorganisms

10. Sperm cells are produced by which type of cell division?

- A. Binary fission
- B. Differentiation
- C. Meiosis
- D. Mitosis

11. The scientific and common names of four plants are given in the table.

scientific name	common name
<i>Althea officinalis</i>	marsh mallow
<i>Hottonea palustris</i>	water violet
<i>Viola palustris</i>	marsh violet
<i>Viola tricolor</i>	wild pansy

Which word indicates the greatest features shared between two plants?

- A. marsh
- B. palustris
- C. Viola
- D. Violet

12. A palisade cell has a:

- A. Vacuole.
- B. Cell membrane.
- C. Nucleus.
- D. Cytoplasm.

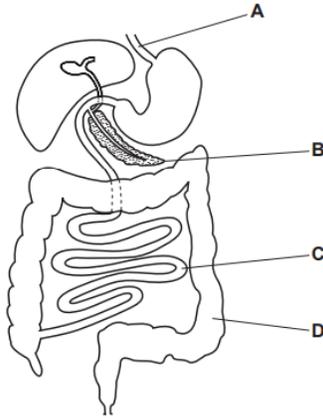
13. The movement of active transport involves:

- A. Molecules from a region of their higher concentration to a region of their lower concentration.
- B. Urine by relaxation of a sphincter muscle in the bladder.
- C. Particles from a region of lower concentration to a region of higher concentration using energy from respiration.
- D. Water through a partially permeable membrane from a more dilute to a more concentrated solution.

14. How young plants are supported?

- A. the pressure of water inside the cells pressing outwards on the cell membranes
- B. the pressure of water passing from the roots through the phloem
- C. the pressure of water passing from the roots through the xylem
- D. the pressure of water inside the cells pressing outwards on the cell walls

15. In which of the following structures is most glucose absorbed into the blood within the human alimentary canal, as shown in the diagram below?



- A. A
 B. B
 C. C
 D. D

16. Plants manufacture carbohydrates. Which raw materials and waste products are involved in this process?

	raw materials	waste product
A	carbon dioxide and chlorophyll	oxygen
B	carbon dioxide and water	oxygen
C	oxygen and chlorophyll	carbon dioxide
D	oxygen and water	carbon dioxide

17. Which substances are being transported in the phloem?

- A. amino acids and sucrose
 B. protein and starch
 C. starch and sucrose
 D. amino acids and starch

18. Which nutrient causes a purple color when mixed with the biuret solution?

- A. protein
 B. reducing sugar
 C. starch
 D. fat

19. In which test tube is the breakdown of starch is fastest, as shown by the conditions described in the table?

	pH	temperature /°C
A	2	27
B	2	37
C	7	27
D	7	37

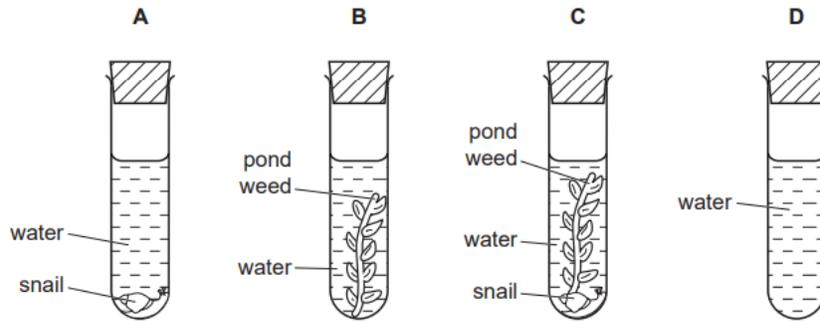
20. Which group of compounds are responsible for metabolic reactions taking place effectively?

- A. Enzymes
 B. fatty acids
 C. hormones
 D. carbohydrates

21. How could it be determined if all the starch is digested by the amylase in the test tube containing starch, water, and amylase?

- A. Add dilute hydrochloric acid.
- B. Weigh the test tubes and contents before and after the experiment.
- C. Add iodine solution.
- D. Add Biuret solution.

22. Four test tubes are exposed to sunlight. After several hours, which test tube carries the most dissolved oxygen?



23. A hormone is synthesized by which of the following?

- A. lung
- B. ovary
- C. spinal cord
- D. heart

24. During anaerobic respiration, yeast generates:

- A. ethanol and carbon dioxide
- B. ethanol and water
- C. lactic acid
- D. carbon dioxide and water

25. What causes the suitability of alveoli as a surface for gas exchange?

	large total surface area	well-supplied with blood vessels
A	✓	✓
B	✓	x
C	x	✓
D	x	x

Theoretical Portion

Marks: 45

1. (i) Complete the sentences. Choose answers from the box.

carbon dioxide	chlorophyll	energy
light	mineral ions	water

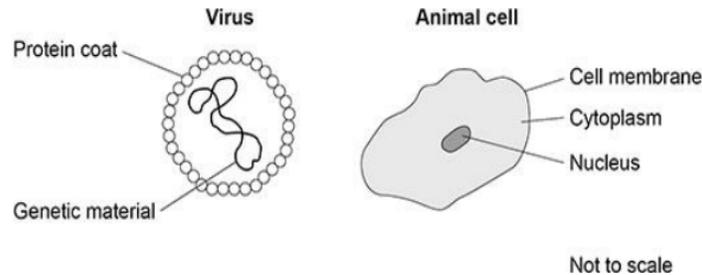
Plant cells absorb substances from the soil. Plant cells use osmosis to absorb _____.

Plant cells use active transport to absorb _____.

Active transport moves substances against the concentration gradient and needs _____.

[3]

(ii) The figure shows cells of the virus and animal.



Why are viruses not categorized as cells?

[4]

(iii) Some desert plants develop leaves only after rain and shed the leaves as the soil dries out. How does this shedding of leaves benefit a plant in a dry environment?

[4]

(iv) The farmer applied pesticide on potato plants and heavy rainfall occurred the next day. Explain the decrease in biodiversity in the river.

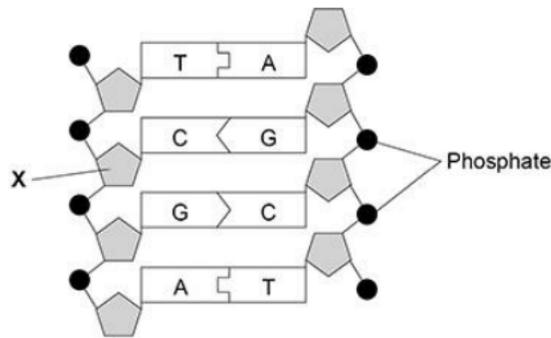
[4]

[Total: 15]

2. (i) The cell contains DNA in its nucleus. Which structure within the nucleus carries DNA?

[3]

(ii) Identify the part of the DNA molecule labeled X as shown in the figure below.



[2]

(iii) What are the substances represented by labels A, C, G, and T in the figure?

[2]

[Total: 7]

3. (i) Why does phenolphthalein lose its color when lipase breaks down the lipids in milk?

[4]

(ii) The gene responsible for the ABO blood group has three alleles, I A, I B, and I O. If parents have blood groups A and B respectively, and they have a child with blood group O. Show how is this possible by using the symbols, I A, I B, and I O, for the alleles. [6]

Parental phenotypes blood group A × blood group B

Parental genotypes ×

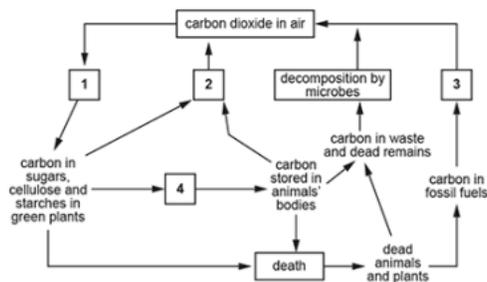
Gametes +.....
 Offspring genotype
 Offspring phenotype blood group O

(iii) Draw a detailed diagram illustrating two features present in the majority of viruses.

[5]

[Total: 15]

4. (i) 4 boxes represent different processes in the carbon cycle within the diagram below.



Connect lines from boxes 1-4 to respective names for the process in the carbon cycle

1.	Combustion
2.	Eating
3.	Photosynthesis
4.	Respiration

[4]

(ii) Which organism in the food web is positioned at the second trophic level?

[4]

[Total: 8]



Distance from the tree (m)	Percentage of ground covered by plants (%)
1	10
2	15
3	18
4	22
5	50
6	58
7	62
8	64

The student hypothesized that shade from the tree is affecting the plants. Describe how the student's results show this.

[6]

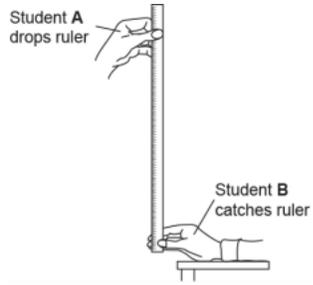
(ii) The rock pocket mouse, a small grey-colored mouse native to Mexico. These mice provide the main food source for owls and Rattlesnakes. In most Mexican regions, the ground is covered with grey rocks. In a specific area, the ground is covered with black rocks, a result of a volcanic eruption about 1000 years ago. Scientists make two key observations:

- A black mouse is born to grey parents due to genetic mutation occasionally.
- Black mice show effective camouflage.

Use these observations to explain why the majority of the mice in this region have black fur but not the usual grey color.

[6]

(iii) A group of students investigates reaction time. Student A releases a ruler and student B catches it. They measure the position of student B's thumb on the ruler, which represents the drop distance. The diagram shows a method of such measurements.



The students aim to investigate reaction times to see if left-handed people exhibit quicker responses than right-handed people. How could they develop the experiment to examine this?

[6]

[Total: 18]