NAME: _____ ADM. NO: _____CLASS: _____

231 BIOLOGY PAPER

ST. PAUL'S HIGH SCHOOL-KEVOTE

NOV DEC HOLIDAY WORK 2025

FORM TWO

Kenya Certificate of Secondary Education

1. Define the following branches of biology. (2 marks)
   i) Histology……
   ii) Cytology……

2. A group of students placed a fresh leaf in warm water. They observed that air bubbles formed on the surface of the leaf.
   a) What biological process was being investigated? (1 mark)

……

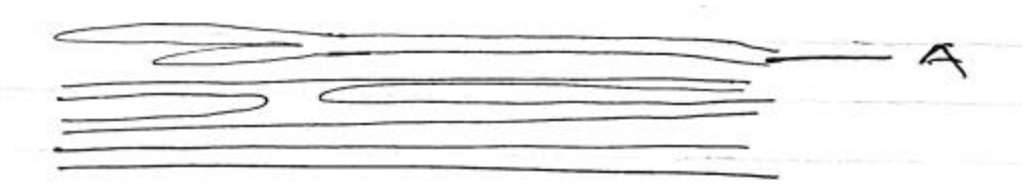
   b) Name the structures from which the air bubbles were coming from. (1 mark)

……

   c) Explain the distribution of the structures named in (b) above. (2 marks)

……

3. The diagram below shows a cell organelle.



a) Name part A. (1 mark)……

b) Name the organelle. (1 mark)

c) Give two functions of the organelle.(2 marks)

4. Give three adaptations of gill filaments for gaseous exchange.(3 marks)

5. During a practical investigation of food tests, students were provided with the following reagents:

→ Benedict's solution

→ Sodium hydrogen carbonate

→ Dilute hydrochloric acid

a) Identify the food substance the students were to test.

(1 mark)

……
……

b) State the role of dilute hydrochloric acid and sodium hydrogen carbonate during the experiment.

(i) Dilute hydrochloric acid

(1 mark)

……
……

(ii) Sodium hydrogen carbonate

(1 mark)

……
……

6. Define the term Binomial nomenclature.

(1 mark)

……

……

7. The equation below represents oxidation of a certain food substance.

$C_{18}H_{36}O_2 + 26\ O_2 \longrightarrow 18\ CO_2 + 18\ H_2O + Energy$

a) Calculate the respiratory quotient of the substrate being oxidised.

(2 marks)

b) Identify the substrate being oxidised in the reaction. (1 mark)

……

……

SECTION B: ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED

8. Study the table below and answer the questions that follow.

Solution	Initial length of cylinder in (mm)	Final length of cylinder in (mm)
A	40	40
B	40	38.5
C	40	41

a) State the nature of solution A and C in relation to the concentration of the potato cell sap.

(2 marks)

A …….

B ……..

b) Explain the observation that was made in the potato cylinder which was put in solution B.

(3 marks)

……
……

c) Name the process red blood cells would have undergone if they were subjected to solution B assuming they had the same concentration as potato cells
(1 mark)

……
……

d) Name two conditions necessary for active transport to take place. (2 marks)

……
……

9. (a) Fill the table below. (3 marks)

Food Substance	**Enzyme**
Sucrose	
	Lipase
Maltose	

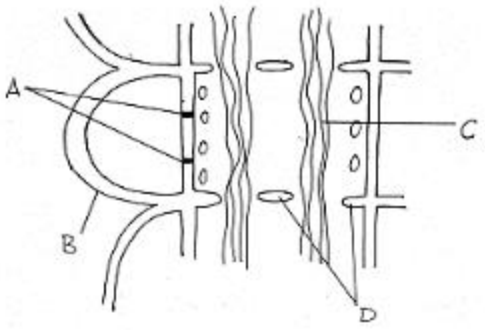
(b) Describe how temperature affects enzyme-controlled reactions. (3 marks)

……
……

(c) Name two types of enzyme inhibitors.
(2 marks)

……
……

10. Study the diagram below and answer the questions that follow.



a) Give the function of cell B.

(1 mark)

……

……

b) Name parts labelled A and C and for each state the function.

(4 marks)

A ……

C ……

c) Give three structural differences between xylem and phloem.

(3 marks)

……

……

11. a) State three functions of vitamin C in humans.

(3 marks)

……

……

b) Explain how age determines energy requirements in human beings.

(2 marks)

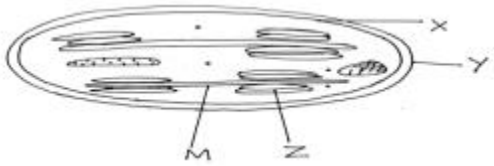
……

……

c) Explain three adaptations of mouth to its digestive function.
(3 marks)

……
……

12. Study the diagram below and answer the questions that follow.



a) Name the organelle drawn above. (1 mark)

……
……

b) Name parts X and Y
(2 marks)

X……Y……
……

c) Give the function of part Z.
(1 mark)

……
……

d) Name three products of the first stage of photosynthesis.
(3 marks)

……
……

e) Give two conditions necessary for photosynthesis to take place. (1 mark)

……
……

SECTION C: ANSWER ALL THE QUESTIONS IN THIS SECTION.

13. The table below shows the concentration of lactic acid in mg / 100cc of human blood during and after exercise.

Time (seconds)	0	5	10	15	20	25	30	35	40	45	50	55
Lactic acid in mg/100cc	22	25	45	90	86	85	84	60	44	25	22	22

a) Using the data provided in the table, plot a graph of lactic acid against time. (6 marks)

b) Use the graph to determine the duration of vigorous exercise. (1 mark)

……

……

c) Suggest the normal concentration of lactic acid in the blood when the person was resting.

(1 mark)

……

……

d) What is the effect of lactic acid on the body muscles when its concentration rises above 90mg / 100cc of blood?

(1 mark)

……

……

e) Give three ways in which the body adjusts to the high concentration of lactic acid.

(3 marks)

……

……

f) From the graph suggest the time when oxygen debt:

(i) Occurred.

(1 mark)

……
……

(ii) Began to be paid in the person's body.

(1 mark)

……
……

g) List four differences between aerobic and anaerobic respiration in animals.

(4 marks)

……
……

h) (i) State an organ that is not affected by high concentration of lactic acid

(1 mark)

……
……

(ii) State a reason for your answer in h) (i) above.

(1 mark)

……
……

14. Describe the photosynthetic theory of opening and closing of stomata.

(10 marks)

……
……15. Describe the adaptations of the red blood cells to their function. (10 marks)

……

THIS IS THE LAST PRINTED PAGE!