NAME……..INDEX NO……DATE……

231/2

BIOLOGY

FORM 4

PAPER 2 THEORY

JULY 2024

2 HOURS

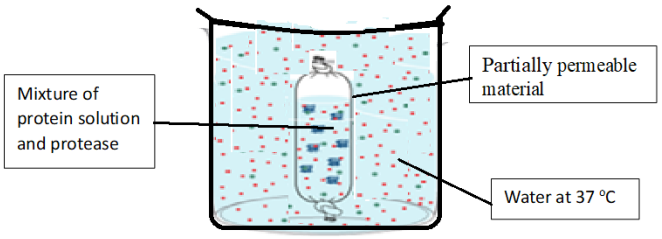
This paper consist of two sections A and B

Answer all questions in section A in the spaces provided.

In section B,answer question 6 (compulsory) and either question 7 or 8 in the space provided after question 8.

SECTION A 40 MKS

1. Form 2 students set up an experiment on diffusion as shown below. The set up was left to stand for 15 minutes.



a) What does the partially permeable material represent in a cell. (1mark)

b) Give a reason for keeping the water at 37 ^{o}C. (2marks)

c) The students carried out a test for proteins using the **contents of the partially permeable material** after the 15 minutes. Suggest the conclusions made. (1 mark)

Explain your answer in c) above. (1mark)

d) Amino acids were found to be present in the water. Explain its source and presence there. (3 marks)

2.The diagram below shows the base sequence of part of a nucleic acid strand. Observe it and answer the question that follows

G T T A C G C A

a) Giving the reason, identify the type of nucleic acid (2 mks)

b) Show the complimentary RNA strand (1mk)

c) Haemophilia is a genetic disorder which is transmitted through recessive gene linked to X-Chromosome. A woman who is a carrier to haemophilia married a normal man. Using the punnet square, work out the genotype of F1 Offspring (4 mks)

3. The equation below shows the chemical reaction that takes place in plants.

Carbon (IV) oxide + water $\longrightarrow$ Glucose +A

i) Identify substance A (1mk)

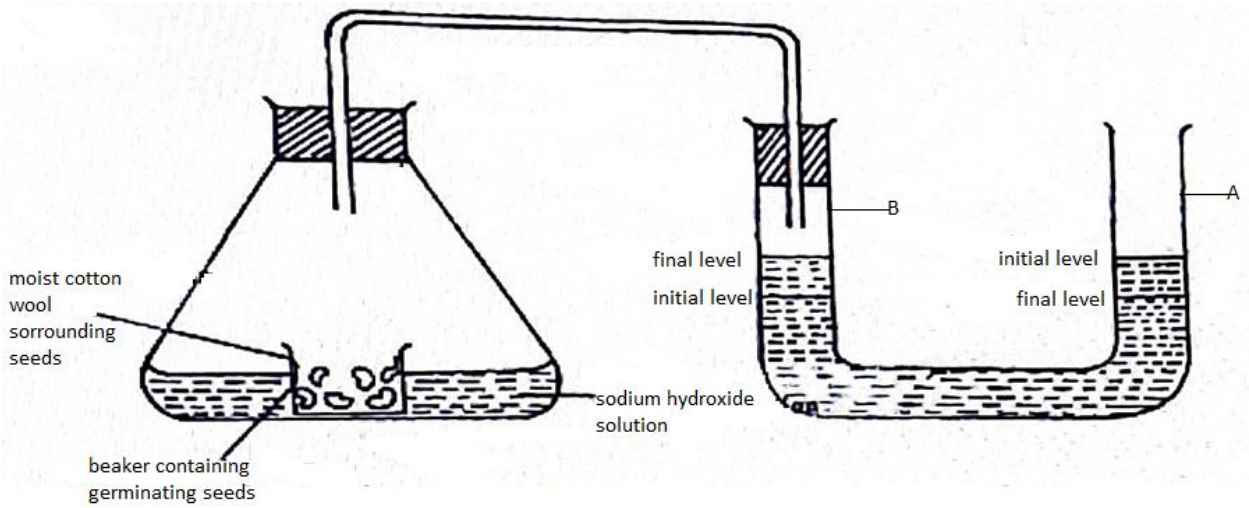
ii) Other than the reactants, state two conditions necessary for this reaction (2mks)

iii) Name the process represented by the equation above (1 mk)

iv) Give two types of cell where this process occurs (2mks)

v) How would the process named in (iii) above be affected by age of leaves in plants (2mks)

4. The apparatus below was set up by a student to find out the changes in gases during germination



a) After 48 hours the level of water in the U-tube at **A** and **B** was as shown. Explain the observation (3mks)

b) Calculate the respiratory quotient (**RQ**) from the equation below:- (2mks)

$$2C_{51}H_{98}O_6 + 145O_2 \longrightarrow 102\ CO_2 + 98H_2O + \text{Energy}$$

c) Identify the substrate being respired in the above equation (1mk)

d) (i)where in the cell does glycolysis take place? (1mks)

ii) what is oxygen debt? (1mks)

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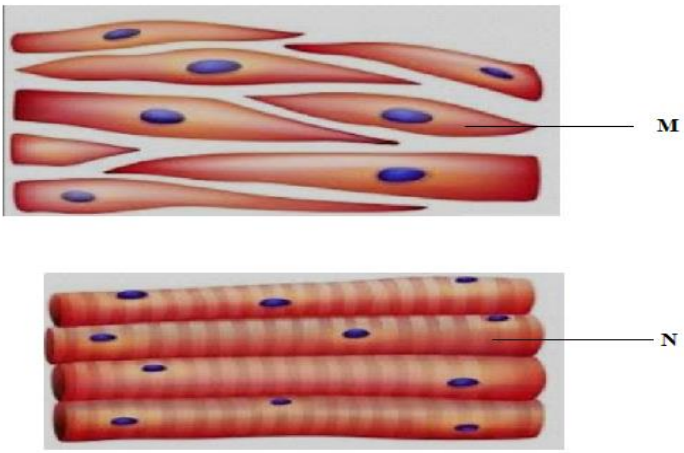
5.The figures below illustrate specialised cells in animal's body



i)Identify cells M and N **(2mks)**

M

N

ii) State two structural differences between M and N **(2mks)**

M	N

iii) Which of the above specialized cells is found in the gut or human intestines **(1mk)**

iii) Which organelles are found in large numbers in N (1mks)

iv) Name a carbohydrate and form of energy stored in cell N(2mks)

carbohydrate

form of energy

SECTION B (40 marks)

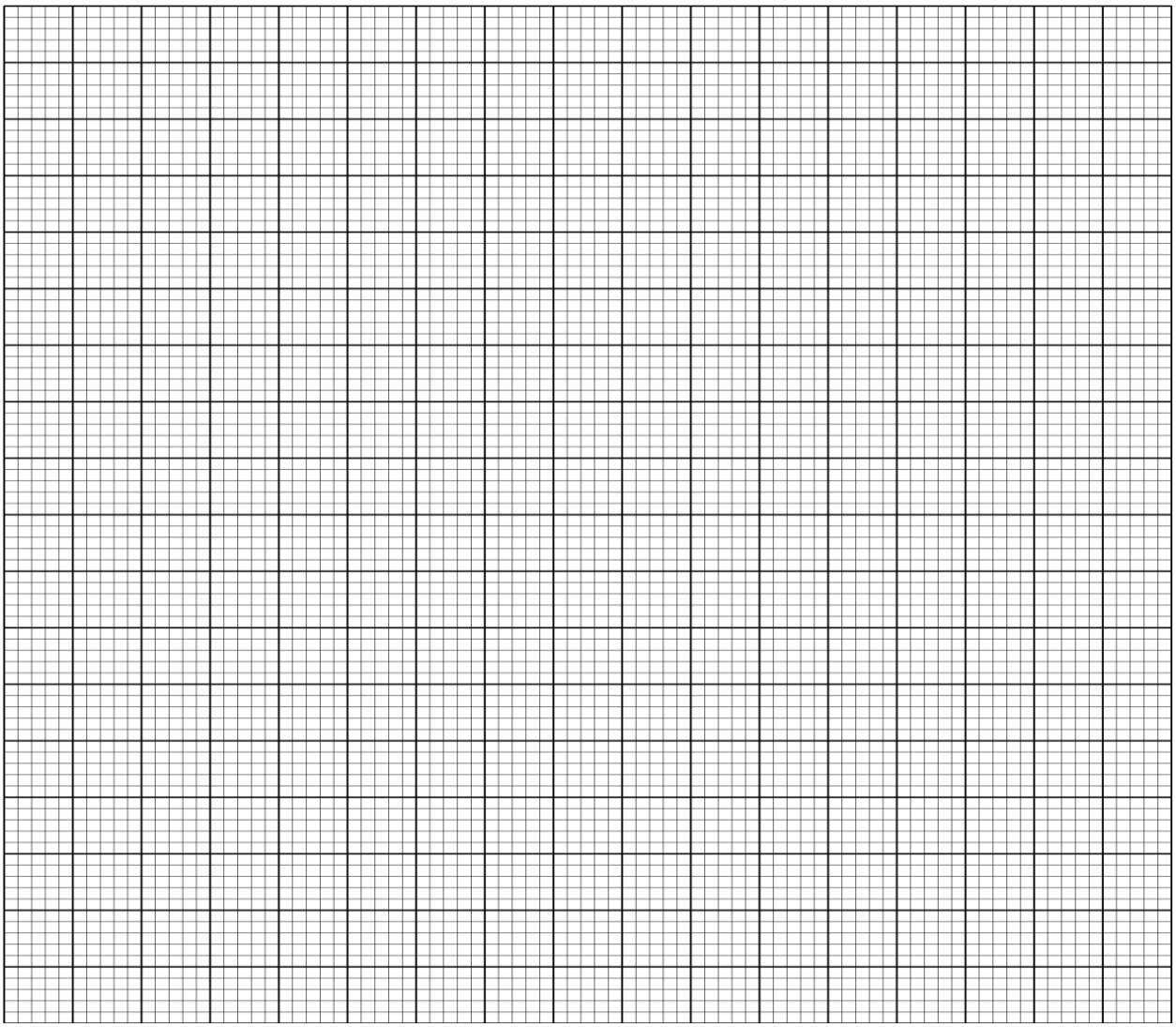
Answer question 6 (compulsory) and either question 7 or 8 in the space provided after question 8.

6. An experiment was carried out to investigate transpiration and absorption of water in a certain plant species. The plants were potted and supplied with adequate water. The amount of water lost and absorbed was determined. The results are shown in the table below;

Time of the day	**Amount of water in grams**	
	Transpiration	**Absorption**
0700	30	15
0900	40	25
1100	48	34
1300	56	45
1500	40	50

1700	25	40
1900	15	28
2100	10	21

a) Using the same axes, plot graphs to show transpiration and absorption of water in grams against time of the day. (7mks)



b) i)At what time of the day was the amount of water the same for transpiration and absorption; (1mk)

ii) how much water was absorbed at 1800 hours? (1mk)

c) Explain the shape of the graphs of:-

i) Transpiration (4mks)

ii) Absorption (4mks)

d) Suggest what would happen to transpiration and absorption of water if the experiment was continued for another 2 hours; (1mks)

e) Name two environmental factors that affect the rate of transpiration (2mks)

7a) Describe fertilization in flowering plants. (14marks)

b).Explain ways through which plants hinder self-pollination and encourage cross pollination. (6mks)

8(a).Describe the breathing mechanism in human (12mks)

(b).**State the structural adaptation of insects tracheal system (8 mks)**