**TRIAL EXAMINATIONS 2021**

**Kenya Certificate of Secondary Education (KCSE)**

**231/2 - BIOLOGY - Paper 2**

**(THEORY)**

**Dec. 2021 – 2 hours**

**Name: ………………………………..…….......… Index No: ……….……………**

**Stream**: ……………… **Candidate’s** **Signature**: …….……....**Date**:…..…………...

**Instructions to candidates**

1. *Write your name and admission number in the spaces provided above.*
2. *Sign and write the date of the examination in the spaces provided above*
3. *This paper consists of* ***two*** *sections;* ***A*** *and* ***B****.*
4. *Answer* ***all*** *questions in section* ***A*** *in the spaces provided.*
5. *In section* ***B*** *answer question* ***6 (compulsory)*** *and either and either* ***7*** *and* ***8*** *in the spaces provided after question 8.*
6. ***This paper consists of 11 printed pages.***
7. ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***
8. ***Candidates should answer the questions in English.***

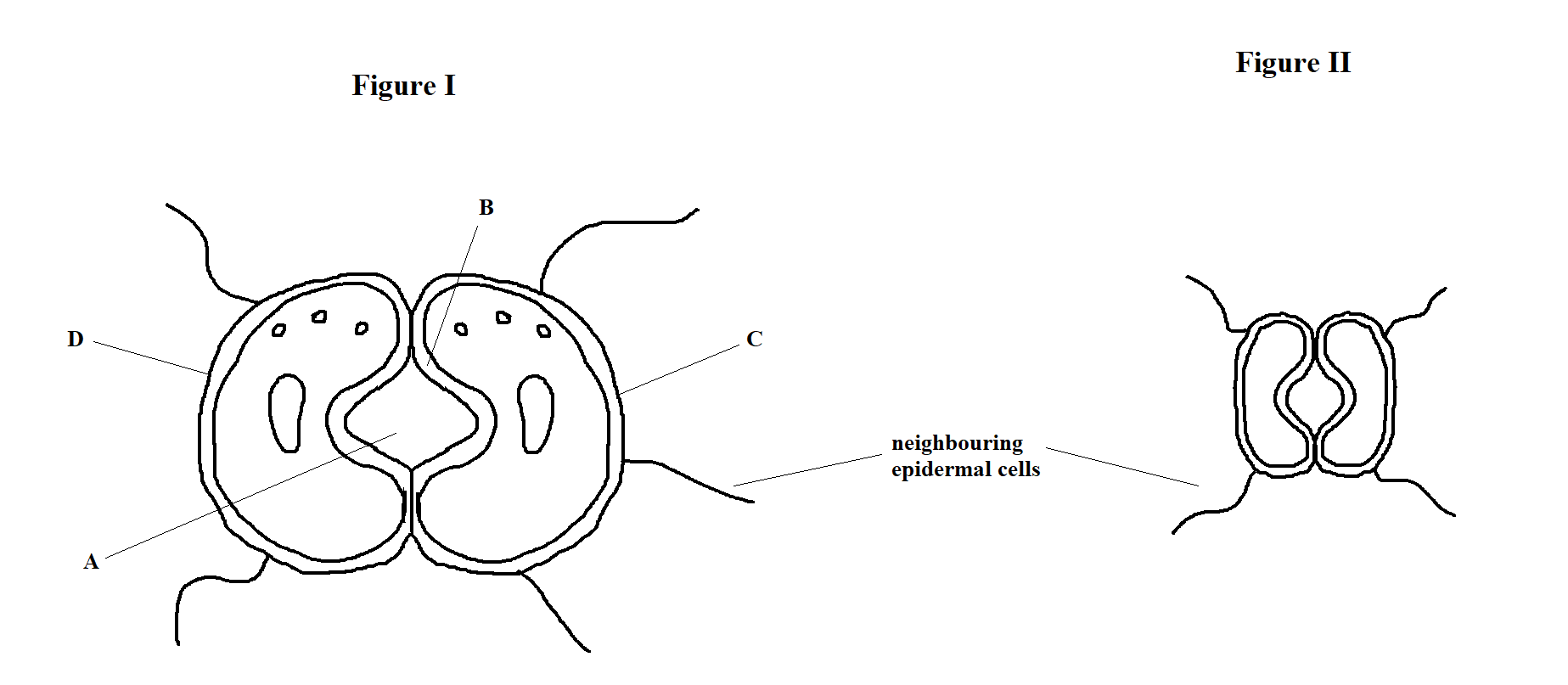
***For Examiner’s Use Only***

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| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum Score** | **Candidate’s Score** |
| **A** | **1** | **8** |  |
| **2** | **8** |  |
| **3** | **8** |  |
| **4** | **8** |  |
| **5** | **8** |  |
| **B** | **6** | **20** |  |
|  | **20** |  |
| **Total Score** | **80** |  |

**SECTION A** (40 MARKS)

*Answer* ***all*** *questions in this section in the spaces provided*

1. The figure below represents structures located in plant leaves. Use them to answer the questions that follow.



1. How is the structure, labelled **D**, adapted to its function? (2 marks)

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1. Name the parts labelled (2 marks)

**A** ……………………………………………………………………………………………….

**B** ……………………………………………………………………………………………….

1. Using photosynthesis theory, briefly explain how the part marked **A** in the **Figure II** changes to part marked **A** in the **Figure I**. (4 marks)

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1. In an experiment, black mice were crossed with brown mice. All the offspring had patches of black and brown in equal proportion. Using letter **B** to represent the gene for **black colour**, and **b** to represent the gene for **brown colour**:
2. Work out the phenotypic ratio of **F2** generation (5 marks)
3. What is genetic engineering? (1 mark)

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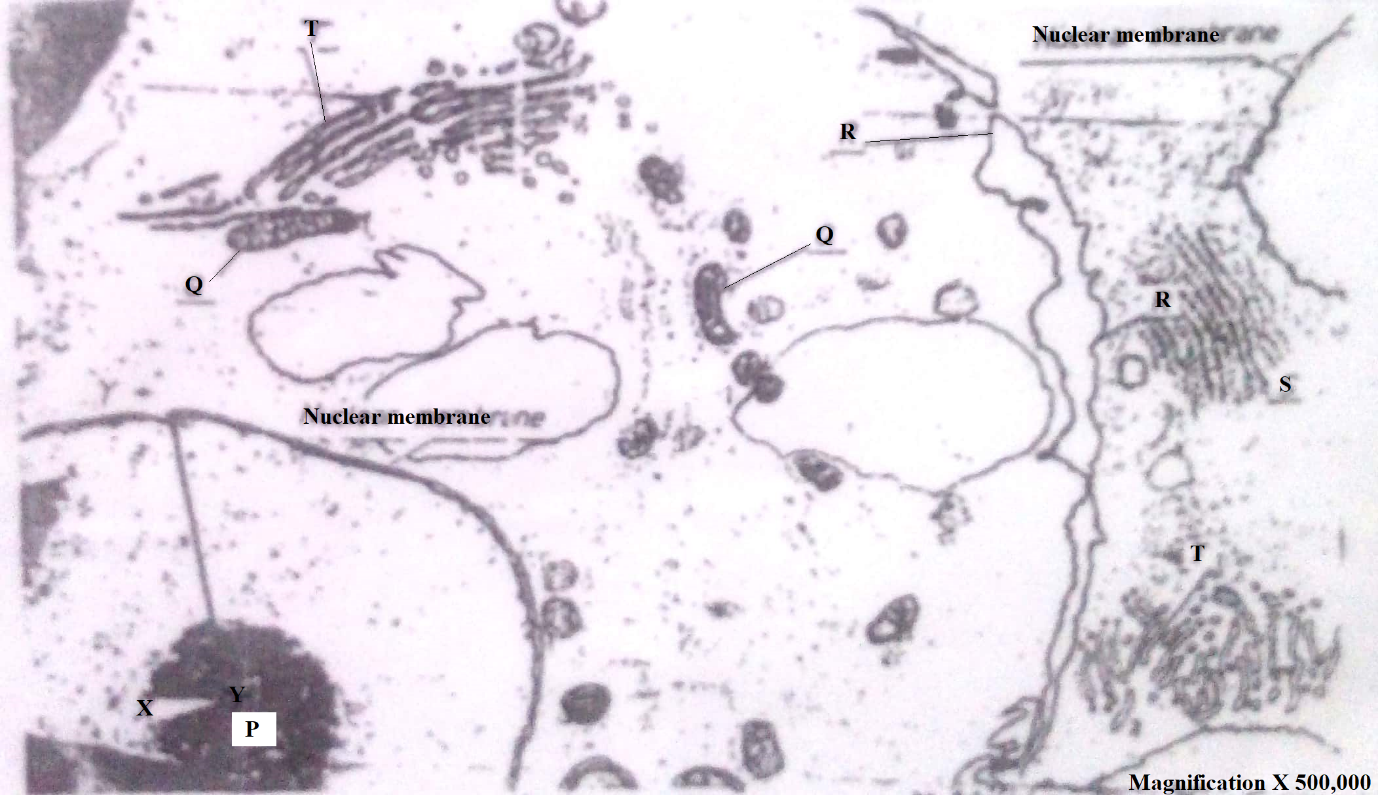
1. Explain why drosophila melanogaster is suitable for use in genetic experiment. (2 marks)

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1. Study the electron micrograph below, and answer the questions that follow.



1. With reasons, identify whether this is a plant of animal cell (3 marks)
2. Identity ………………………………………………………………………………….
3. Reasons

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1. Calculate the diameter labelled **X – Y** in micrometres (2 marks)

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What is the function of the structure labelled **T**? (2 marks)

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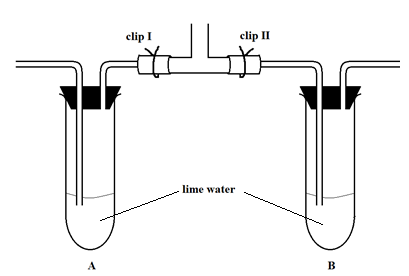
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1. State **one** significance of the structure labelled **R** (1 mark)

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1. The diagram below represents the apparatus that can be used to investigate an aspect of gaseous exchange in man.



A person placed his mouth at **tube M** and breathed in and out several times through the tube.

1. State the purpose of **clip I** and **II** in the experiment. (2 marks)

**Clip I** …………………………………………………………………………………………..

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**Clip II** ………………………………………………………………………………………….

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1. Account for the expected results in the experiment above (4 marks)

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1. Explain **two** advantages of breathing through the nose rather than through the mouth. (2 marks)

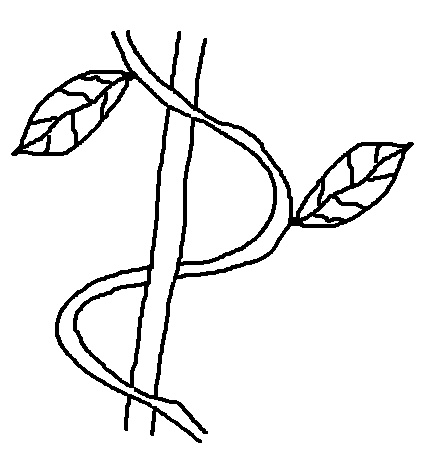
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1. A certain response was exhibited by a certain plant on a stem of a maize plant.



1. Name the type of response exhibited above. (1 mark)

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1. Explain how the response named in **a) (i)** above occurs. (2 marks)

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1. What is the importance of tactic responses to microscopic plants (1 mark)

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1. State **four** applications of plant hormones in agriculture. (4 marks)

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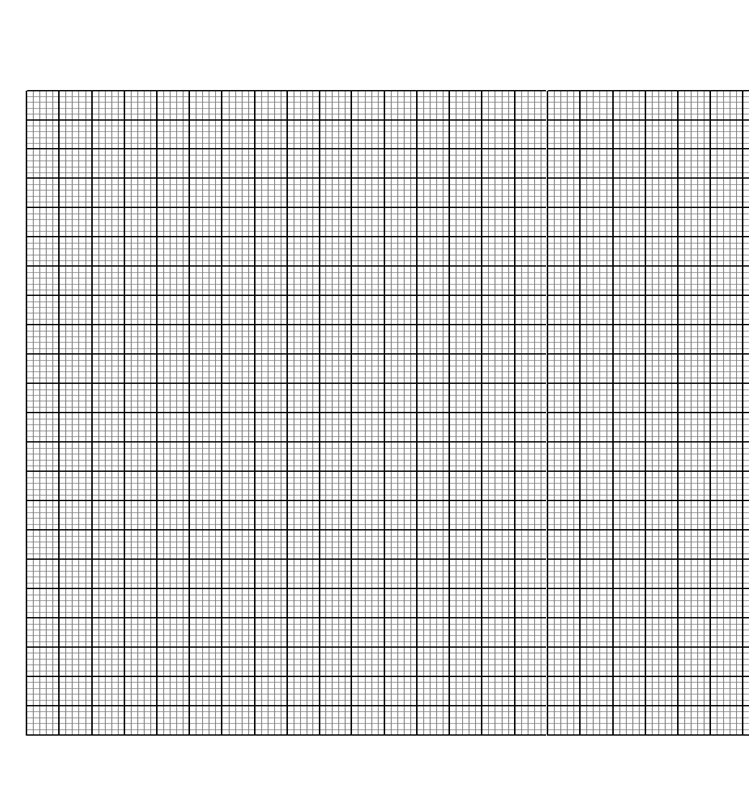
**SECTION B** (40 MARKS)

*Answer question* ***6 (compulsory)*** *and either question* ***7*** *and* ***8*** *in the spaces provided after question* ***8***

1. A culture of bacteria was taken at intervals in order to estimate the number of bacteria in the population. The data is as provided in the table below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time in hours** | 0 | 5 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| **Number of living cells (millions)** | 10 | 20 | 1000 | 1000 | 1000 | 800 | 400 | 250 | 50 |

1. On the grid provided, draw a graph of the number of living cells against time (6 marks)



1. Account for the shape of the graph below:
2. 0 – 5 hours (2 marks)

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1. 5 – 15 hours (2 marks)

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1. 15 – 25 hours (2 marks)

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1. When was the population of bacteria 750 million? (2 marks)

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1. Give **two** reasons for the trend between 25 – 45 hours (2 marks)

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1. Suggest what would happen to the population of bacteria if the temperature was lowered to 0oC after incubating for 12 hours. (1 mark)

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1. Give a reason for your answer in **e) (i)** above (1 mark)

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1. To obtain the observed results, state **two** variables that were kept constant during the investigation. (2 marks)

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1. Describe the menstrual cycle (20 marks)
2. How does excretion take place in plants? (4 marks)
3. Describe the role of human skin in homoeostasis. (16 marks)

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