**CHOGORIA-MURUGI PRE-MOCK EXAM**

**231/2**

**BIOLOGY – Paper 2**

**MARCH/APRIL 2023**

**TIME: 2 hours**

**Name**………………………………..…**Adm No**……**Class**………

**Instructions to Candidates**

1. This paper consists of two sections; A and B.
2. Answer all the questions in section A in the spaces provided after each question.

(c) In section B answer question 6 (compulsory) and either question 7 or 8 in the spaces

provided after question 8.

(d) Candidates should answer the questions in English

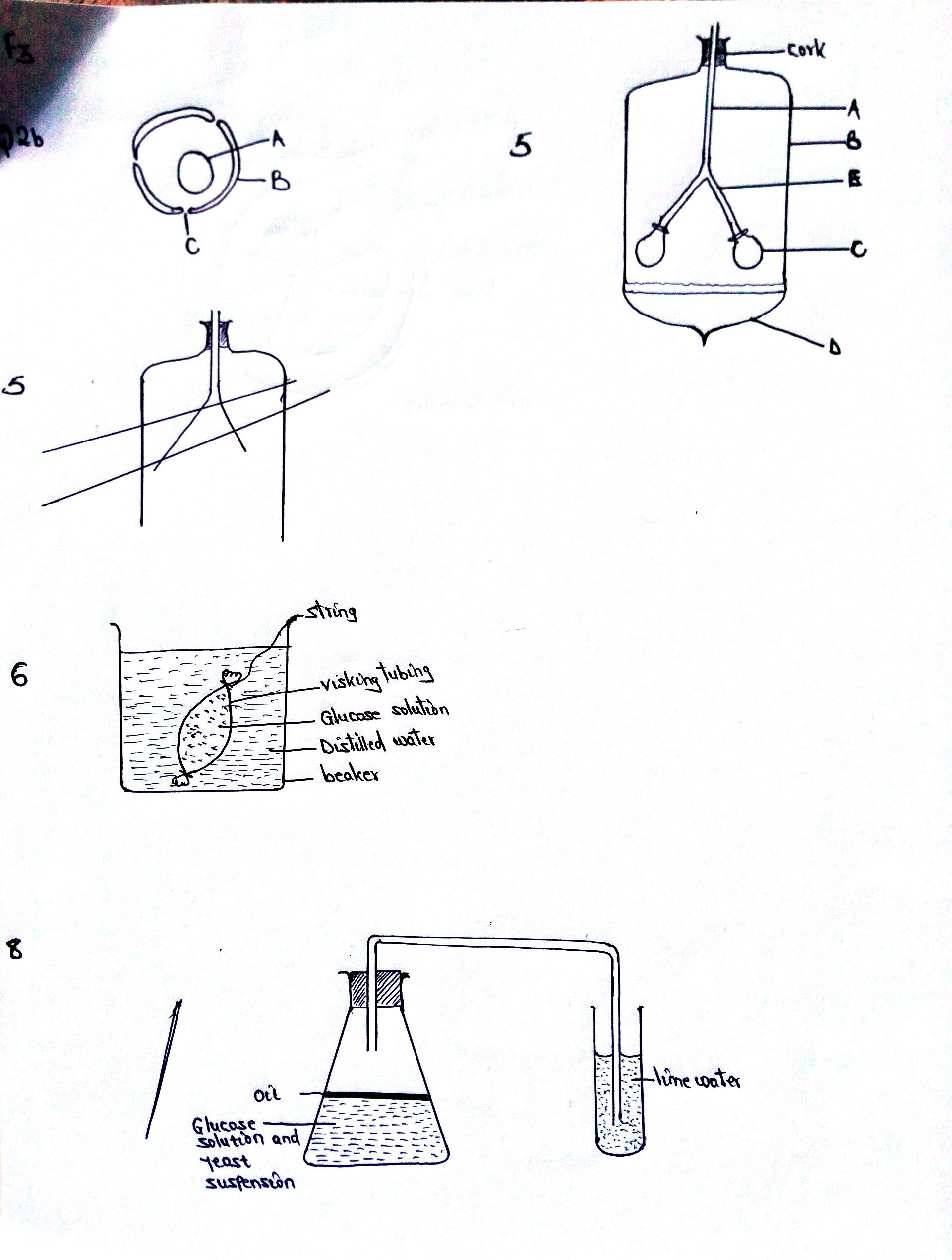
**For Examiner’s Use Only**

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| --- | --- | --- | --- |
| **SECTION** | **QUESTIONS** | **MAXIMUM SCORE** | **CANDIDATE’S SCORE** |
| A | 1 | 8 |  |
| 2 | 8 |  |
| 3 | 8 |  |
| 4 | 8 |  |
| 5 | 8 |  |
| B | 6 | 20 |  |
| 7 | 20 |  |
| 8 | 20 |  |
|  | **TOTAL SCORE** | 80 |  |

**SECTION A**

***Answer ALL the questions in this section***

1.The following diagram below shows a set up that was used to demonstrate fermentation. Glucose solution was boiled and oil added on top of it. The glucose solution was then allowed to cool before adding the yeast suspension.



1. Why was the glucose solution boiled before adding the yeast suspension? (1mk)

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1. What was the importance of cooling the glucose solution before adding the yeast suspension

(1mk)

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1. What was the use of the oil in the experiment (1mk)

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1. What observation would be made in test tube B at the end of the experiment (1mk)

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1. Suggest a control for this experiment (2mks)

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f) Name the type of respiration that is most efficient (1mk)

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g) Give a reason for your answer in a) above (1mk) ………………………………………………………………………………………………………………………………………………………………………………………………………………

2. An experiment was carried out to find out the concentration of ions in the cell sap of an aquatic plant and that of the pond water in which they were found.

|  |  |  |
| --- | --- | --- |
|  | Concentration in | |
| Ions | Cell sap | Pond water |
| Na+ | 50 | 1.2 |
| K+ | 49 | 0.5 |
| Mg2+ | 11 | 3.0 |
| Ca2+ | 13 | 1.3 |
| Cl- | 101 | 1.3 |
| SO42- | 13 | 0.67 |

(a)(i) Name the process by which the aquatic plant absorbs ions from pond water. (1 mk)

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(ii) State the four roles of the process you have named in (a)(i) above in a mammalian body.

(4 mks)

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(c) How can the rate of uptake of ions by the aquatic plant be increased. (2mks)

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3 Polydactyl is a genetic disorder in which people inherit an extra digit. Polydactyl is caused by a dominant allele (B). The table below describes the different genotypes for polydactyl.

Complete the table below by giving the correct genotype, alleles of each genotype and the expected number of fingers per hand. (4mks)

|  |  |  |
| --- | --- | --- |
| Genotype | Alleles | Expected number of digits per hand. |
| Homozygous dominant |  | Six |
|  | bb |  |
| Heterozygous. | Bb |  |

(a)The table below shows results of marriages between various parents. Complete the table by writing the probability of each marriage producing a child with polydactyl. One has been done for you. (2mks)

|  |  |
| --- | --- |
| Parental genotypes. | Probability of child with polydactyl |
| Bb X BB |  |
| Bb X bb | 0.5 |
| Bb X Bb |  |

c) State the two types of variation (2mks)

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4. Identify the characteristics of living organisms shown by the following; (2mks) (a)Bursting of the sporangium in *Rhizopous*.

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(b)A cheetah chasing after a gazelle.

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(c) Explain the role of water during germination (2mks)

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(d) Name the cell organelles that would be abundant in:

i) White blood cells destroying pathogens 1mk

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ii) Palisade mesophyl cells (1mk)

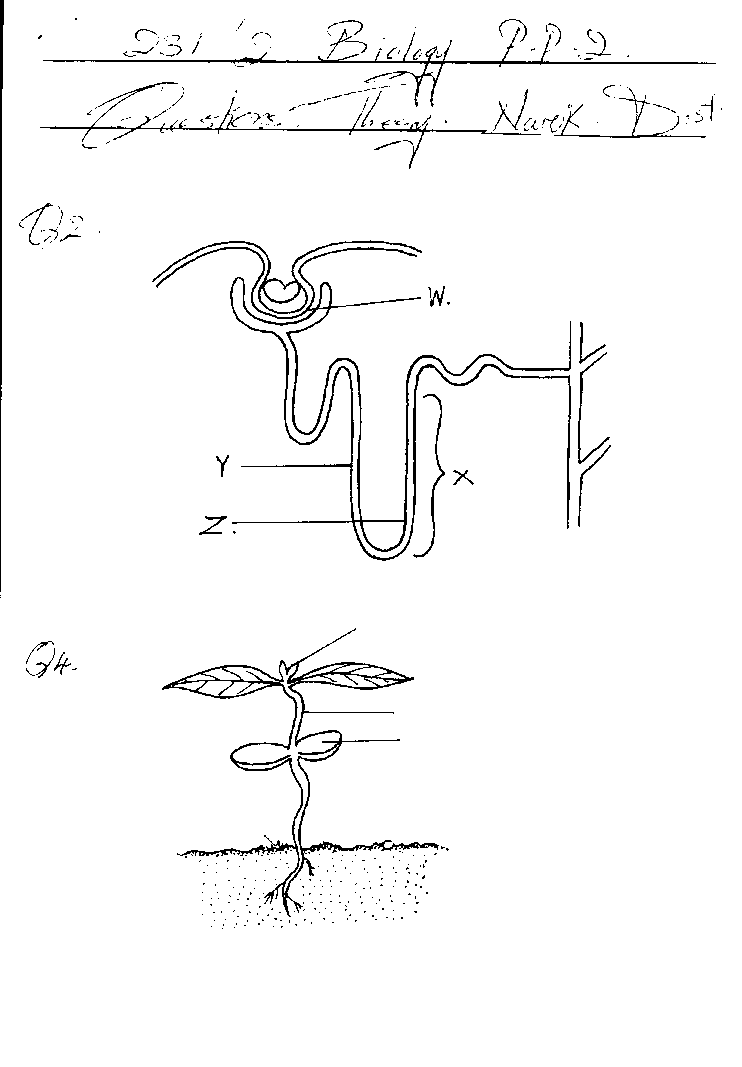
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iii) Skeletal muscle cells (1mk)

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(e)State the role of ribosomes (1mk)

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5. The diagram below represents a nephron from a human kidney.

* 1. Name the part labeled X. (1mk)

………………………………………………………………………………………………..

* 1. Sodium chloride is actively pumped out of the part labeled Z into the medulla of the kidney. This sodium chloride moves back into part Y. Explain the effect of the sodium chloride concentration in the medulla of the kidney on the re-absorption of water from the collecting duct. (3mks)

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* 1. Most of the sodium chloride filtered into the glomerular filtrate is reabsorbed. From which part of the nephron does this re-absorption take place? (1mk)

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* 1. How is re-absorption of the sodium chloride controlled? (2mks)

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* 1. Name the process that occurs in the part labeled W. (1mk)

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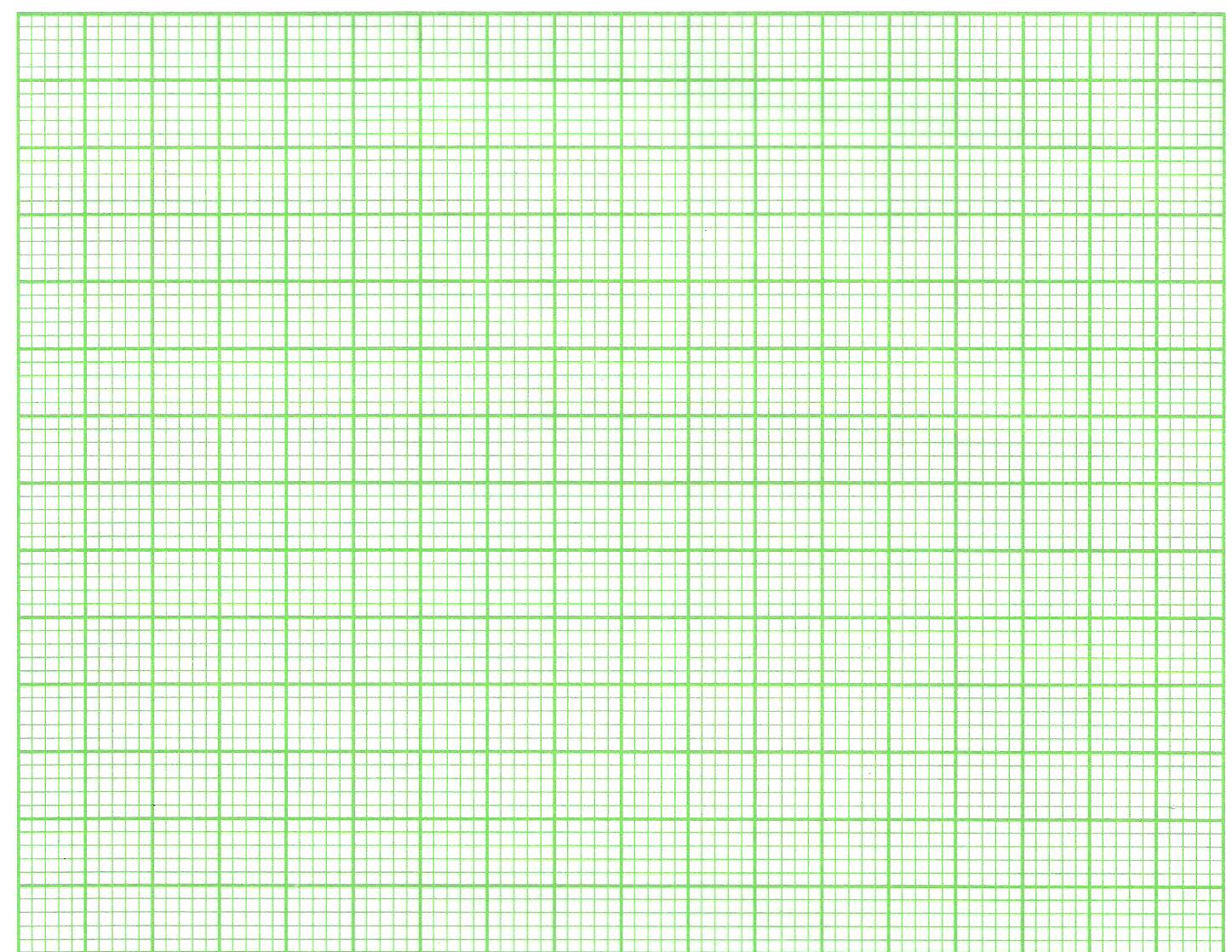
**SECTON B (40 MKS)**

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

6. In a population growth, two species of flour beetles, *Tribulum confusum* and *Tribulum casteanum* were grown in a box with unlimited supply of flour (food). The box was kept at 240C and 30% relative humidity. The beetles were counted at certain intervals and the results tabulated as shown below.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. of days after introduction | | 0 | 10 | 50 | 60 | 80 | 100 | 120 | 140 | 180 | 200 |
| No. of beetles present in the box. | *T. confusum* | 20 | 20 | 300 | 800 | 1330 | 1440 | 1620 | 1600 | 1620 | 1600 |
| *T. casteanum* | 20 | 20 | 300 | 430 | 500 | 400 | 150 | 60 | 20 | 10 |

(a) Using the same axis, draw graphs of number of beetles in the box against time. (8mks



(b) How many beetles were present on the 76th day? (2mks)

(i) *T. confusum*..............................................................................................................................

(ii) *T. casteanum*...........................................................................................................................

(c) Account for the shape of *T. confusum* curve between day 1 and 180. (5mks)

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(d) (i) What happens to *T. casteanum* between day 80 and 160? (1mk)

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(ii) What biological phenomenon is represented by observation in (d) (i) above? (1mk)

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(e) State any **three** factors that determine the distribution of animals in their habitat. (3mks)

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7. Describe the

(i) Process of inhalation in mammals (10 marks)

(ii) Mechanism of opening and closing of stomata (10 marks)

8. Describe the role of hormones in the human menstrual cycle (20mks)

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