**Name** ……………………………………………………… **Class** …….…..…

**231/ 2 Candidate’s Signature** ……....…………………...

**BIOLOGY**

**Paper 2 Date** …...…….………..

**(Theory)**

**June/ July, 2015**

2 hours

**Starehe Boys’ Centre and School**

**Kenya Certificate of Secondary Education**

**MOCK EXAMINATIONS, 2015**

***Instructions to candidates***

*Write your name and class in the spaces provided above.*

*Sign and write the date of examination in the spaces provided above.*

*This paper consists of* ***two*** *sections:* ***A*** *and* ***B****.*

*Answer* ***ALL*** *the questions in section* ***A*** *in the spaces provided.*

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

**For Examiner’s Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **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** |  |

**This paper consists of 12 printed pages.**

**Candidates should check the question paper to ascertain that**

**all the pages are printed as indicated and no questions are missing.**

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**Section A (40 marks)**

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

1. In a breeding experiment involving garden peas and in which both parents were pure-breeding, plants with axial flowers were crossed with plants with terminal flowers. All the F1 plants had axial flowers. When the F1 plants were self-pollinated, a total of 858 seeds were produced in the F2 generation out of which 651 seeds gave rise to plants with axial flowers
2. **(i)** Identify the recessive characteristic in the cross above **(1 mark)**

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

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1. Using the figures given above, work out the ratio of F2 plants with axial flowers to that of plants with terminal flowers **(1 mark)**

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1. **(i)** Use a Punnett square to determine the genotypes of the F1 offspring **(4 marks)**

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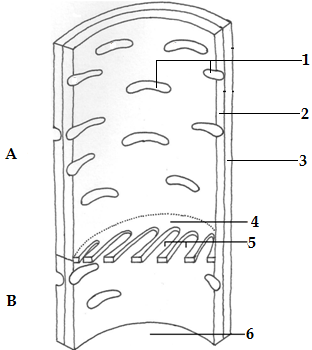
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**(ii)**Work out the phenotypic ratio of the F2 offspring **(1 mark)**

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1. Illustrated below is a longitudinal section ofparts of two adjacent xylem cells, marked **A** and **B**. Study the illustration carefully and answer the questions that follow

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1. Identify the xylem cells illustrated above **(1 mark)**

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1. **(i)** Name the openings marked **1** and **5** and the structure marked **4 (3 marks)**

**1**………………………………………………………………………………………………………..

**5**………………………………………………………………………………………………………..

**4**………………………………………………………………………………………………………..

1. Give **one** functional difference between the openings marked **1** and the openings marked **5**

**(1 mark)**

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1. State **one** structural difference between the part of the cell marked **2** and the part marked **3**

**(1 mark)**

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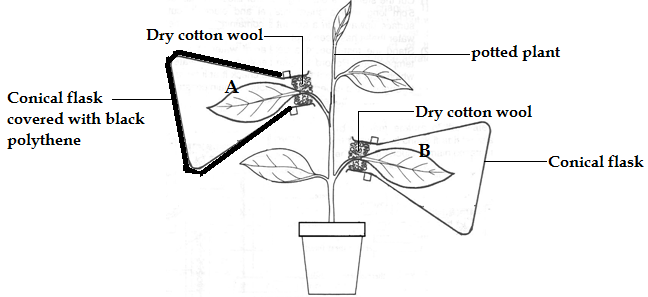
1. How does the part labelled **6** adapt the xylem cells to their function? **(2 marks)**

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1. In investigating a certain aspect of photosynthesis, two students at Starehe school set up the apparatus illustrated in the diagram below, using a potted Gallant soldier (*Galinsoga parviflora*) plant and which was growing in well-watered soil



The plant was first kept in darkness for 6 hours after which the experimental set up was exposed to sunlight for four hours. At the end of thistime period, the leaves labelled **A** and **B** were each tested for the presence of starch

1. What was the aim of the experiment? **(1 mark)**

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1. Why was dry cotton wool rather than a rubber stopper used in the experiment? **(1 mark)**

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1. Why was the flask containing leaf **A** covered with black polythene paper? **(1 mark)**

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1. State the role of leaf **B** in the experiment  **(1 mark)**

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1. **(i)** What results were obtained in testing the leaves for starch? **(2 marks)**

Leaf **A**……………………………………………………………………………………………………

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

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1. Explain your answer in **(e)(i)** above **(2 marks)**

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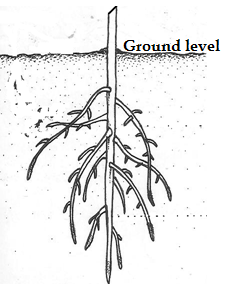
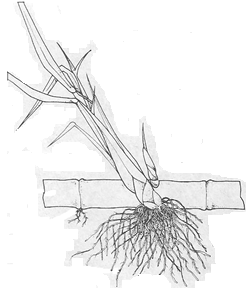
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1. **(a)** Illustrated below are parts of two plant species **A** and **B**. Study the illustrations carefully and

answer the questions that follow

**A B**

** **

1. Give the terms used to describe the root systems illustrated in the diagrams above

**(2 marks)**

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

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

1. A student made cross sections of the roots of plant specimens **A** and **B**and observed these under a microscope. State **two** differences that the student would observe **(2 marks)**

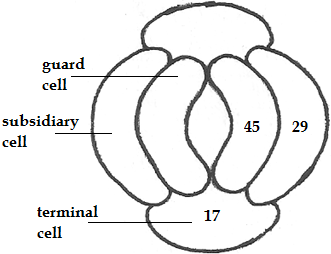
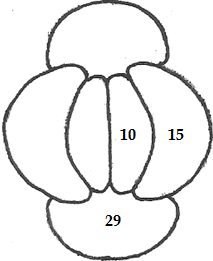
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1. The diagram below illustrates the potassium ion (K+) concentration (in arbitrary units) in the cells around an open and a closed stoma of Tradescantia. Study the illustration carefully and answer the questions that follow

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**stoma open stoma closed**

1. Explain how the movement of potassium ions accounts for the closure of stomata

**(3 marks)**

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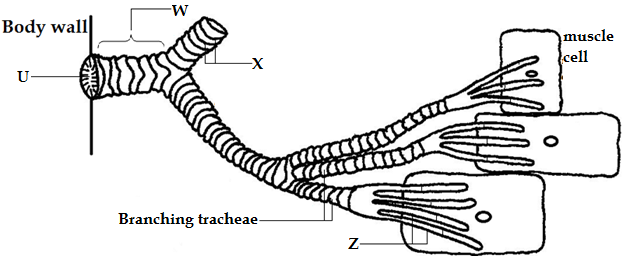
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1. Aside from the potassium ion mechanism described in **(b)(i)** above, name **one** other theory used to explain the opening and closing of stomata **(1 mark)**

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1. Carefully study the illustration of the parts of the gas exchange structures of a grasshopper shown below and answer the questions that follow

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1. Identify and on the diagram, name the parts labelled **W**, **X** and **Z (3 marks)**

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1. Give **one** function of the structures labelled **X (1 mark)**

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1. Outline **two** adaptive features of the structures labelled **Z (2 marks)**

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1. Other than the hair-like structures, name **one** other structure found at the part labelled **U**

**(1 mark)**

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1. In what way is the gas exchange system in the diagram above more efficient than that found in mammals? **(1 mark)**

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**Section B (40 marks)**

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

1. **(a)** Give **two** reasons why Tsetse flies are of economic importance **(2 marks)**

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1. In an experiment at ICIPE- Kenya, the survival rate of pupae of two species of Tsetse fly- *Glossina morsitans* and *Glossina palpalis* was studied. In both species, the pupae develop buried underground in soil. The results of this experiment were as shown in the table below

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Percentage relative humidity of soil** | | **0** | **10** | **20** | **30** | **40** | **50** | **60** | **70** | **80** |
| **Percentage survival**  **rate of pupa** | **G. morsitans** | 60 | 74 | 85 | 93 | 97 | 99 | 99 | 96 | 90 |
| **G. palpalis** | 0 | 2 | 5 | 11 | 47 | 77 | 78 | 66 | 51 |

1. Suitably represent the data above on the graph paper provided **(7 marks)**
2. From the results of this experiment, deduce the respective habitats of the two species of Glossina

**G. morsitans** **(1 mark)**

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**G. palpalis (1 mark)**

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1. Explain your answers in **(b)(ii)** above

**G. morsitans** **(2 marks)**

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**G. palpalis (2 marks)**

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1. What results would have been obtained if the experiment had been carried out at a soil relative humidity of 90%? **(2 marks)**

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1. What is the optimum soil humidity for survival of the pupa of the two species?

**(2 marks)**

**G. morsitans**…………………………………………………………………………………………...…

**G. palpalis**………………………………………………………………………………………………..

1. Explain the results obtained, for *Glossina palpalis*, at soil relative humidity beyond 78%

**(2 marks)**

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1. **(a)**Outline the adaptive features of the intestinal villi of mammals to their function

**(7 marks)**

1. Describe the human menstrual cycle clearly specifying the roles of the hormones involved in the cycle **(13 marks)**
2. **(a)** Describe the role of hormones in the development of insects that show incomplete

metamorphosis **(10 marks)**

**(b)** Describe the control of the rate of the heart beat in man **(10 marks)**

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