Name ................................................................ Index Number ............................................................

School ............................................................... Candidate’s Signature ...............................................

**231/2** Date ...............................................................................

**BIOLOGY**

**Paper 2 (Theory)**

**2015**

2 hours

**Brilliant Kenya certificate of secondary education preparatory examination**

BIOLOGY

(Theory)

**Paper 2**

2 hours

**Instructions to candidates**

1. *Write your name and index number in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *This paper consists of* ***TWO*** *sections:* ***A*** *and* ***B****.*
4. *Answer* ***ALL*** *the questions in section* ***A*** *in the spaces provided.*
5. *In section* ***B*** *answer question* ***6 (compulsory)*** *and either question* ***7*** *or* ***8*** *in the space provided after question* ***8****.*
6. ***This paper consists of 10 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****.*

**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 |  |
| 7 | 20 |  |
| 8 | 20 |  |
|  | | 80 |  |

**Total Score**

**SECTION A** (40 marks)

*Answer* ***All*** *the questions in this section in the spaces provided.*

* 1. In tomatoes, hairy stems are produced by a dominant genotype ‘H’ and hairless stem by its recessive allele ‘h’.
     1. Using a punnet square, work out the outcome of a cross between two heterozygous hairy stemmed plants. (4 marks)
     2. State the phenotypic ratio of the products. (1 mark)

..............................................................................................................................................................................

* + 1. What will be the genotypes if the smooth variety is crossed with one of its parents?

(1 mark)

..............................................................................................................................................................................

* + 1. State **two** ways in which genetics can be applied in the field of Agriculture. (2 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

* 1. (a) State the **two** principle functions of the kidney. (2 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

1. The figure below shows a highly magnified cross-section of a proximal convoluted tubule of a mammalian kidney. Study it and answer the questions that follow.

Wall of capillary

Q

Wall of tubule

* 1. From the diagram, identify **three** structural features that adapt the proximal convoluted tubule to its function. (3 marks)

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

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

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

* 1. Name the physiological process involved in the re-absorption of water and glucose from the proximal convoluted tubule to the bloodstream.

Water (1 mark)

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

Glucose (1 mark)

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

* 1. Which fluid substance flows in the part labelled **Q**? (1 mark)

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

* 1. (a) What is active transport? (1 mark)

..............................................................................................................................................................................

..............................................................................................................................................................................

1. State **three** factors that increase the rate of active transport. (3 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

1. Give four roles of active transport in living organisms. (4 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

* 1. (a) State the difference between Lamarckian and Darwinian theories of evolution. (2 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

1. State **three** pieces of evidence that support the theory of evolution. (3 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

1. Explain continental drift as evidence of evolution. (3 marks)

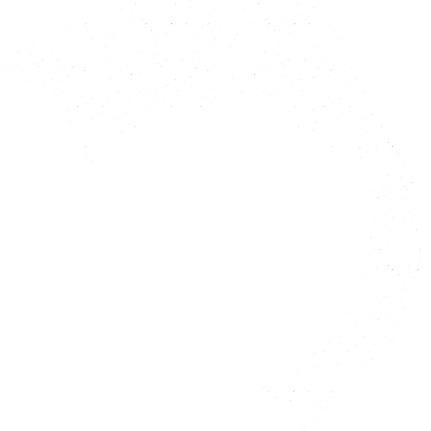
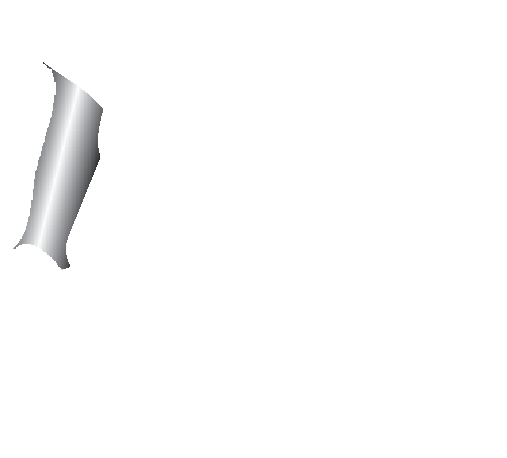
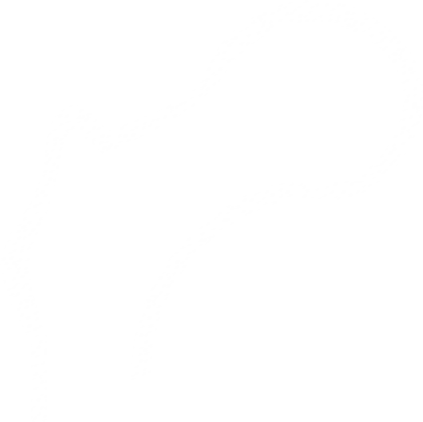
..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

* 1. The diagram below shows some of the features of a synovial joint. Study the diagram carefully and answer the questions that follow.

N



K

L

J

* + 1. Name the type of synovial joint. (1 mark)

..............................................................................................................................................................................

* + 1. Name the parts labelled **J**, **K** and **L**. (3 marks)

**J** ............................................................................................................................................................................

**K** .........................................................................................................................................................................

**L** .........................................................................................................................................................................

* + 1. State **two** roles of the part labelled **L**. (2 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

* + 1. Suggest **one** advantage of this type of joint. (1 mark)

..............................................................................................................................................................................

* + 1. Give the name of the bone adjacent to the proximal end of **K**. (1 mark)

..............................................................................................................................................................................

**SECTION B** (40 marks)

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

* 1. The data below shows growth of the pollen tube in a tradescantia style.

|  |  |
| --- | --- |
| **Time in minutes** | **Growth in millimetres** |
| 0 | 0 |
| 30 | 4 |
| 60 | 10 |
| 100 | 17 |
| 120 | 20 |
| 160 | 22 |
| 180 | 23 |

* + 1. Plot a graph of the pollen tube growth against time. (6 marks)
    2. What was the length of the pollen tube at 90 minutes? (1 mark)

..............................................................................................................................................................................

* + 1. Describe the growth of the pollen tube between 0 and 120 minutes. (3 marks)

..............................................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

* + 1. (i) State the importance of a pollen tube to the plant. (1 mark)

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

(ii) Identify the shape of curve shown by the graph. (1 mark)

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

* + 1. (i) Arthropods show a different growth pattern from the one shown above. What is the name of the growth pattern exhibited by arthropods? (1 mark)

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

(ii) Explain your answer in (e) (i) above. (4 marks)

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

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

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

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

* + 1. (i) Distinguish between primary and secondary growth. (2 marks)

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

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

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

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

(ii) Give a reason why members of class monocotyledonae do not undergo secondary growth.

(1 mark)

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

* 1. Blood has two main functions namely protectiv**8**e and transport.
     1. Explain how blood is involved in transport, stating the constituents of blood involved.

(14 marks)

* + 1. Identify **two** sites in the mammalian body where red blood cells are manufactured.

(2 marks)

* + 1. Describe how blood protects the body. (4 marks)
  1. How is the leaf of a mesophyte plant adapted to its function? (20 marks)

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

# 10

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................

.....................................................................................................................................................................................