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

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

**BIOLOGY** Date: …………………………

Paper 2

(Theory)

March/April 2014

**Time: 2 Hours**

**Kenya Certificate of Secondary Education (K.C.S.E.)**

**Biology**

Paper 2

(Theory)

March/April 2014

**Time: 2 Hours**

**INSTRUCTIONS TO CANDIDATES**

* Write your **name** and **index** **number** in the spaces provided above
* **Sign** and write the **date** of examination in the spaces provided.
* This paper consist 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 8 in the spaces provided after question 8

**For Examiners Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| SECTION | QUESTION | MAX.SCORE | CANDIDATE’S SCORE |
| A | 12345 | *8**8**8**8**8* |  |
| B | *6**7**8* | *20**20**20* |  |

*This paper consists of 8 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

1. (a) Name **one** human disorder caused by gene mutation and are not sex-liked. (1mrk)

 (b) Study the genetic chart below showing inheritance of a gene responsible for sickle cell condition

In a family (Note; Let HbA represent gene for normal hemoglobin, and Hbs to represent gene for sickle cell trait).



**6**

**5**

**4**

**3**

**2**

**1**

**KEY:**

****

**Normal male**

**Woman with sickle cell trait**

**Man with sickle cell anemia**

**Woman with sickle cell anemia**

**Normal female**

 (i) Write the genotypes for individual number 1 and 6. (2mrks)

 1 ……………………………………………………………….

 6 ………………………………………………………………

(ii) Suppose a family member 6 marries a male with sickle cell anemia, what will be the phenotypic ratio of the off springs? Show your working. (4mrks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (iii) What are sex –linked gene? (1mrk)

 ……………………………………………………………………………………………………………………………………………………………………………………………………

2. Student in a certain school carried out an ecological study of woodland and recorded the following observations.

 (i) Rabbits feed on plants.

 (ii) Hawks feed on rabbits and small birds.

 (iii) Snails feed on plants.

 (iv) Small birds feed on snails.

 (v) Fox feeds on rabbits and small birds.

1. Using the above observations, construct a food web. (3mrks)
2. From your web,
3. Draw a food chain that ends with hawks as tertiary consumer. (1mrk)
4. Name **two** carnivores that compete in the woodland and state the food they compete for. (1mrk)
5. Suggest the most likely method of sampling used to estimate the rabbit population in the woodland. (1mrk)

…………………………………………………………………………………………………

1. State two precautions the student have taken when using the sampling method named in (c) above.
2. ………………………………………………………………………………………………
3. ………………………………………………………………………………………………

3. The equation below shows a chemical reaction that takes place in green plants under certain conditions.

 Carbon (IV) oxide + water Glucose + X.

 (a) What is the name of substance X? (1mrk)

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

(b) Other than the reagents, state **two** conditions necessary for this reaction. (2mrks)

 (i) ……………………………………………………………………………………….

 (ii) ………………………………………………………………………………………

(c) Name **two** types of cells in which this process occurs. (2mrks)

 ……………………………………………………………………………………………………

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

1. Name the process represented by the equation given above. (1mrk)

 ……………………………………………………………………………………………………

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

1. State **two** importance of the above process. (2mrks)

 ……………………………………………………………………………………………………

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

4. The diagram below represents certain type of plant.

**B**

**C**

**D**

**A**

1. Identify the division of plant kingdom the plant belongs. (1mrk)

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

1. Name the part labeled A,B and D. (3mrks)

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

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

 **D** ………………………………………………………………………………………

1. State **two** functions of part labeled **C**. (2mrks)

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

1. Sate **two** characteristics of the division the plant belongs. (2mrks)

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

5. The diagram shows a plant cell after having been subjected to certain treatment.



**A**

**B**

**Sap vacuole**

 (a) Name the physiological process being investigated. (1mrk)

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

 (b) Account for the shape of the cell shown above. (3mrks)

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

 ……………………………………………………………………………………………………

 (c) State the functions of the parts labeled **A** and **B.** (3mrks)

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

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

***SECTION B***

***Answer question 6 compulsory in the paces provided. Answer either question 7 or 8 in the spaces provided after question 68.***

6. An investigation was conducted to compare water loss from twigs of two species, of plants **Q** and **L**. The apparatus shown below was used for the investigation. The twigs had equal leaf surface.



**Water**

**Beaker**

**Air bubble**

**Capillary tubing**

**Ruler**

**Tap**

**Rubber band**

**Leaf shoot**

1. The results of the investigation were recorded in the table below.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time of day | 6.am | 8.am | 10.am | 12noon | 1pm | 2pm | 3pm | 4pm | 6pm | 8pm | 12midnight |
| Water loss gh-1 | 0 | 4 | 20 | 40 | 55 | 36 | 26 | 20 | 2 | 0 | 0 |
| Water loss gh-1 species L | 8 | 20 | 39 | 131 | 198 | 182 | 130 | 81 | 45 | 12 | 12 |

1. Plot a graph of water-loss gh-1 against time for the two plan. (7mrks)