

NAME..... INDEX NO.....

231/2

BIOLOGY

PAPER 2

(THEORY)

TIME: 2 HOURS

CANDIDATE'S SIGN.....

DATE.....

## CENTRAL KENYA NATIONAL SCHOOLS JOINT EXAM - 2015

Kenya Certificate of Secondary Education

BIOLOGY

PAPER 2

(THEORY)

TIME: 2 HOURS

### INSTRUCTIONS TO CANDIDATES:

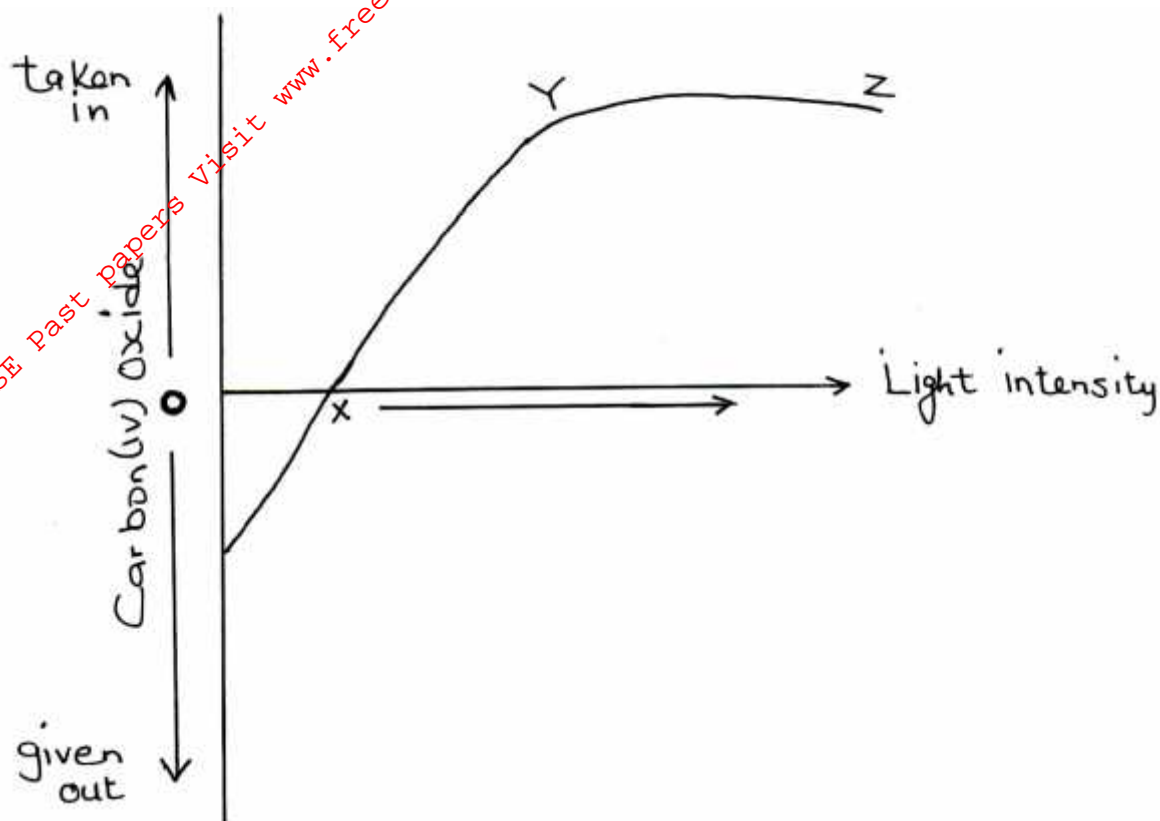
- (a) Write your **Name**, **Index Number** and **School** in the spaces provided above.
- (b) **Sign** and write the **date** of examination in the spaces provided above.
- (c) This paper consists of **two Section; A and B**.
- (d) Answer all the questions in **Section A** in the spaces provided.
- (e) In Section B answer question **6 (Compulsory)** and either question **7** or **8** in the spaces provided after question **8**.

### FOR EXAMINER'S USE ONLY:

Section	Question	Maximum Score	Candidates Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
Total Score		80	

**Answer all the questions in the spaces provided.**

1. The figure below shows the effect of light intensity on the exchange of carbon (IV) oxide between a green leaf and the air around it.



- (a) Account for the effect of increasing light intensity on the rate of uptake of carbon (IV) oxide. (4 marks)

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- (b) What is the name given to point X? (1 mark)

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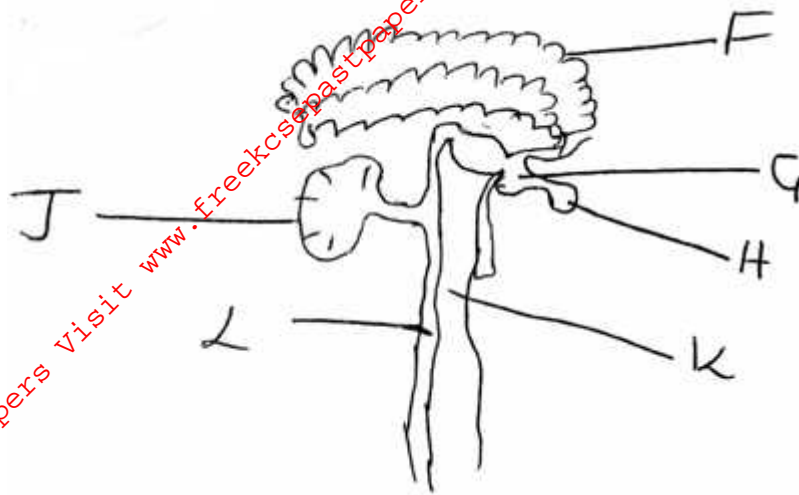
- (c) Explain why at point X, the carbon (IV) oxide taken in is equal to carbon (IV) given out by the plant. (3 marks)

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Which letter represent the part of the brain which;

(2 marks)

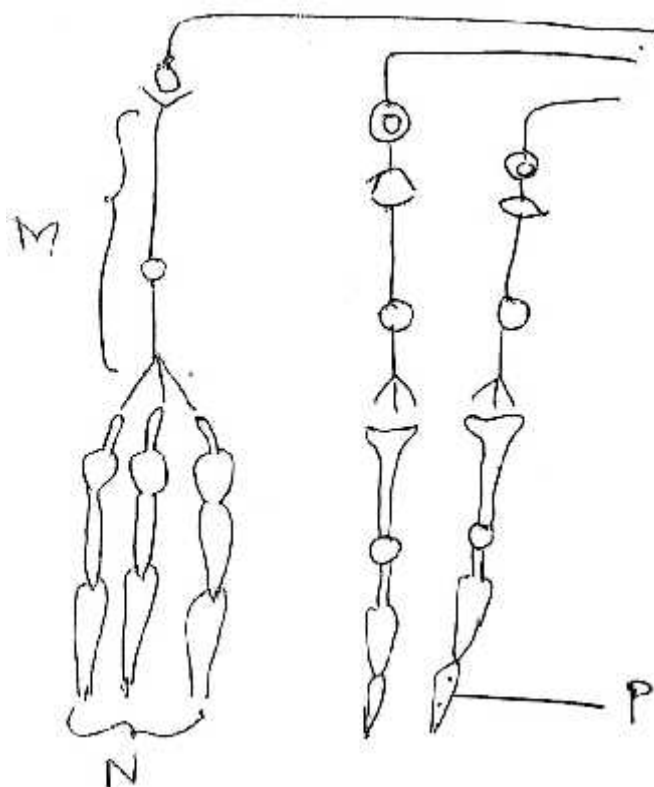
(i) Control voluntary movements of the body.

\_\_\_\_\_

(ii) Is more developed in birds and fish than in man.

\_\_\_\_\_

(b) The diagram below shows the arrangement of cones and rods in retina of the eye.



With reasons identify the following cells.

(6 marks)

**M** \_\_\_\_\_

Reason(s) \_\_\_\_\_

\_\_\_\_\_

Reason \_\_\_\_\_

\_\_\_\_\_

**P** \_\_\_\_\_

Reason \_\_\_\_\_

\_\_\_\_\_

3. A person met a leopard as he walked along a forest path. His adrenal gland secreted adrenaline to prepare him to run away. What was the effect of adrenaline on his?

(a) Circulatory system. (5 marks)

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(b) Respiratory system? (3 marks)

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4. (a) Name the sex chromosome in humans that is considered to be 'genetically empty'. (1 mark)

\_\_\_\_\_

- (b) Colour blindness is a human disease inherited through a recessive gene carried on the X chromosome. If the carrier female married a normal male. Work out the expected genotypes of their children. Show all your working. (Let n stand for colour blindness allele). (5 marks)

- (d) Work out the probability of the first child being a carrier female. (1 mark)

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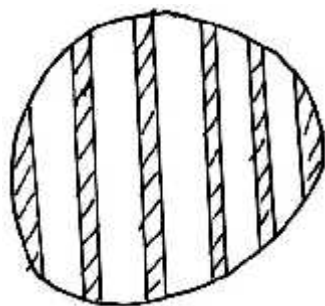
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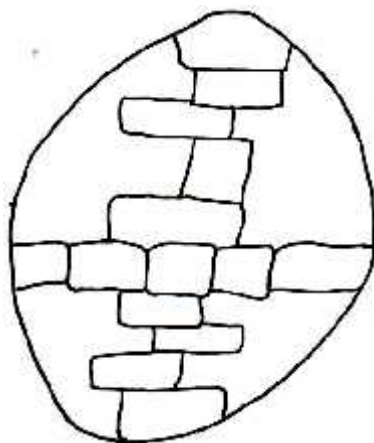
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5. During a biological practical lesson on estimation of the size of onion epidermal cells. Form one student from Huduma Bora Academy placed a transparent ruler across the field of view, brought the millimeter marks to focus and observed them as illustrated below. Give your answer in micrometers.



They then prepared a temporary slides of the onion epidermal cells and observed the arrangement of cells as illustrated below:



- (a) Work out:  
(i) Length of each cell. (2 marks)

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- (ii) The width of each cell.

(2 marks)

- (b) State **two** limitations of using the above method of in estimating the size of cells. (2 marks)

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- (c) Give a reason why using the onion epidermis is more suitable than using a whole scale of leaf of an onion bulb. (1 mark)

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- (d) A part from iodine solution, identify a stain that was probably used by the students to make observation clearer. (1 mark)

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**SECTION B: (40 MARKS)**

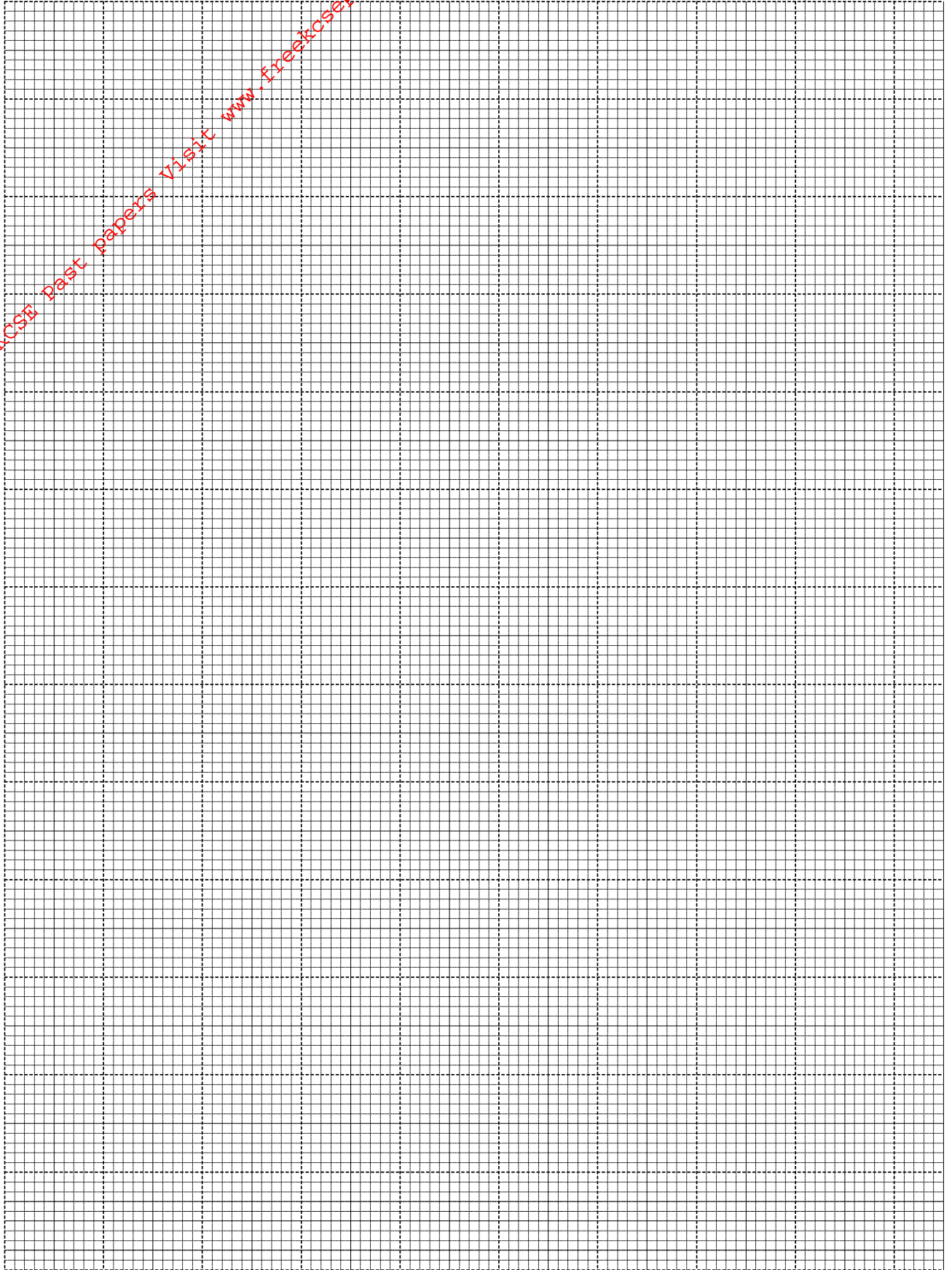
**Attempt question 6 (Compulsory) and either 7 or 8 in the spaces provided after question 8.**

6. A group of students did an experiment to estimate the population of grasshoppers in a plot. They swept the ground ten times with a net and recorded the number of grasshoppers in each of the ten samples.  
The table below shows the results obtained.

Sample number	No of grasshopper	Cumulative total
1	35	35
2	31	66
3	28	94
4	23	117
5	20	
6	18	
7	15	
8	11	
9	8	
10	6	

- (a) Complete the cumulative total column in the results table.

- (b) (i) On the grid provided plot the number of grasshoppers collected per sample against the cumulative total. (6 marks)



- (ii) From your graph estimate the population of grasshoppers in the plot.

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- (c) The number of grasshoppers in this study cannot be adequately determined by this method. What would you consider to be the two main sources of error in this method?

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- (d) A fish farmer wanted to know the number of fish in his pond. He collected ten fish from the pond and labelled each by tying a tag label on its fin, and returned the fish to the pond to mix with other fish. When he later collected a sample of 50 fish from the same pond, he found out that 4 of them had tag labels.

- (i) From the information estimate the total number of fish in the pond. Show your working. (4 marks)

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- (ii) What assumption is made in this method of estimating size of population? (2 marks)

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7. (a) Explain the economic importance of plant excretory products. (10 marks)

- (b) Describe the adaptations of the lungs to their function. (10 marks)

8. (a) Describe the role of hormones in the human menstrual cycle. (15 marks)

- (b) Explain how halophytes are adapted to their habitat. (5 marks)

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