NAME ..... **ADM NO** ....

SCHOOL ..... **SIGNATURE** ..... **DATE** ....

231/2
BIOLOGY
PAPER 2
(THEORY)
MARCH/APRIL, 2019
2 HOURS

MOKASA JOINT EVALUATION TEST, 2019

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

INSTRUCTIONS TO CANDIDATES

- **Write your name and Index Number in the spaces provided above.**
- **This paper consists of two sections. Section A and section B.**
- **Answer ALL 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.**
- **This paper consists of 9 Printed pages. Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing**

For Examiners 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	

SECTION A (40 MARKS)

1. (a) Explain how dichogamy prevents self-fertilization in flowering plants.
(2 marks)

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(b) State the changes that take place in a flower after fertilization.
(3 marks)

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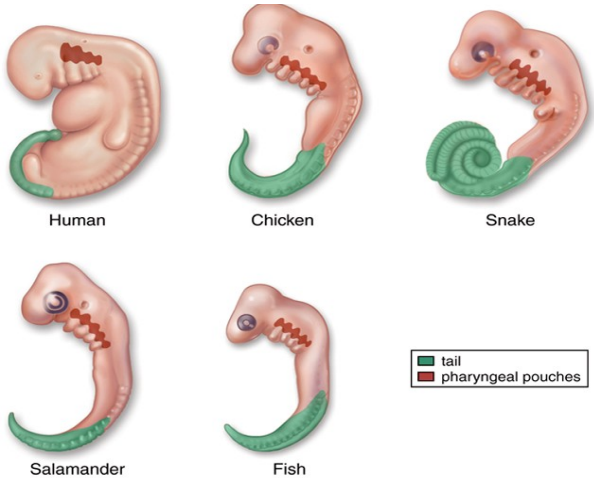
(c) Describe the adaptations of the male parts of a wind pollinated flower to their function? (3 Marks)

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2. (a) Explain how convergent evolution may occur.
(3 marks)

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(b) The diagrams below show some organism structures that have been used as evidence of the process of evolution.



Name the type of evidence and explain it provides evidence to proof that the process of evolution may be taking place.
(3 marks)

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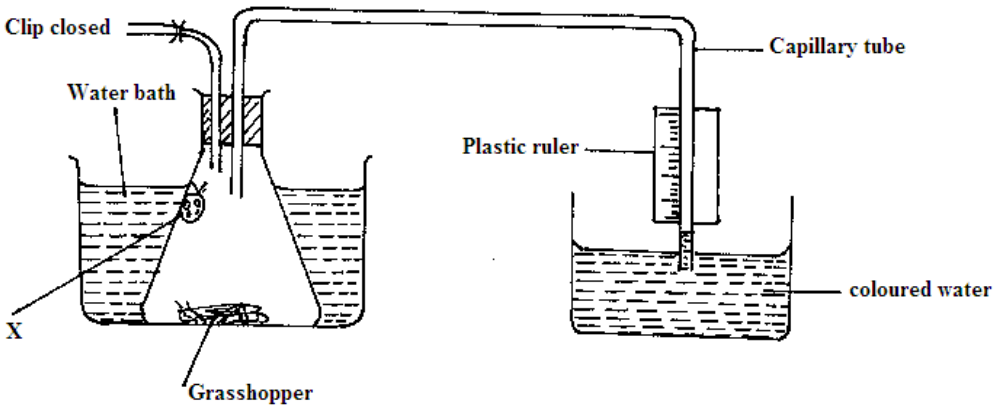
(c) Outline two evolutionary characteristics that adapt man to his environment. (2 marks)

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3. (a) Name the end products of glycolysis.
(1 mark)

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(b) The diagram below illustrates an experiment to determine the rate of respiration in a small insect.



(i) Name the chemical compound labelled X and state its function.
(2 marks)

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(ii) What changes would you expect to observe in the level of the coloured water in the capillary tube after the experiment has run for 10 minutes?
(1 mark)

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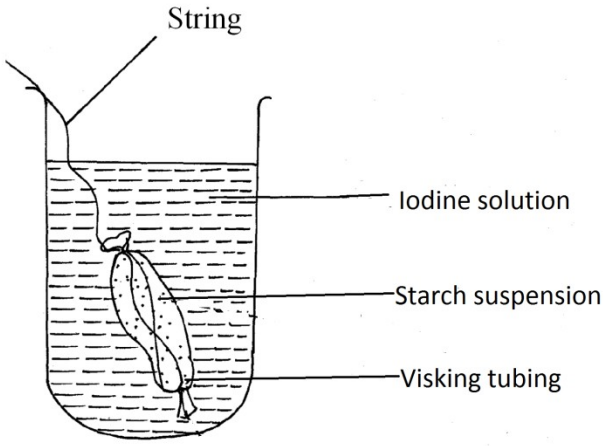
(iii) Explain the changes you have stated in (b) (ii) above.
(3 marks)

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(c) Why was it necessary to place the flask in a water bath?
(1 mark)

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4. An investigation was performed by a group of students as shown in the set up below.



After 30 minutes, the starch suspension had turned blue-black while iodine solution retained its colour.

(a) Name the physiological process that was being investigated in the experiment. (1 mark)

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(b) Account for the results observed after 30 minutes. (3 marks)

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(c) Explain what would happen to a red blood cell when placed in distilled water and left to stand for the same duration as for the experiment above. (3 marks)

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(d) Define cell physiology. (1 mark)

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5. In a plant breeding research, a certain plant species was developed and found to be normally green in colour. A recessive gene for colour (g) causes these plants to be white in the homozygous state. In this state, the gene is lethal causing white plants to die at an early age soon after germination. In

the heterozygous state, these plants are pale green in colour and grow to maturity.

(a) Suggest a reason for the early death of the plants with homozygous recessive genes. (1 marks)

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(b) A normal green plant was crossed with a pale green plant; work out the genotypes of the F1 generation. Show your working.
(4 marks)

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(c) Seeds from the heterozygous plants were planted. The plant breeders allowed the resulting plants to self-pollinate. Work out the phenotypic ratio of the plants that would grow to become mature.(2 marks)

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(d) Give an explanation for the occurrence of the pale green colour in heterozygous plants. (1 mark)

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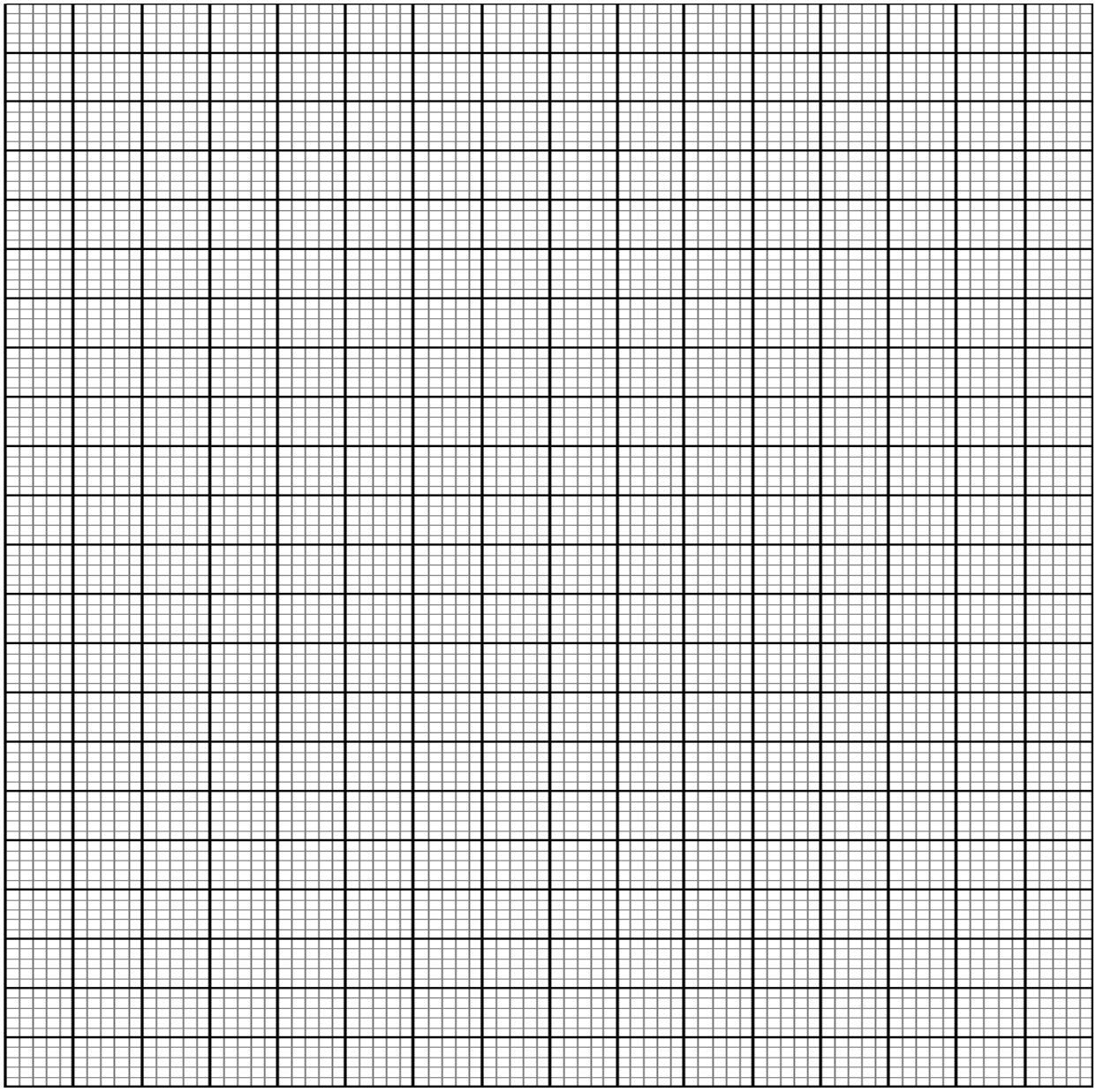
SECTION B (40 Marks)
Answer question 6 (Compulsory) and either question 7 or 8 in the spaces provided after question 8.

6. A group of students carried out a study to estimate the population of grasshoppers in their school compound. The table below shows the number of grasshoppers that were collected from eight sites within the school compound.

Site	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Number of grasshoppers	**280**	**50**	**190**	**220**	**85**	**300**	**175**	**30**

(a) (i) Construct a bar graph to represent the number of grasshoppers collected from each site.

(6 marks)



(ii) In a related exercise, students caught 240 grasshoppers, marked them with ink and then released them. After five days, they caught 160 grasshoppers and found that 40 were marked. Work out the estimated population of grasshoppers in the school compound. (3 marks)

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(b) (i) Identify the method described in (a)(ii) above.
(1 mark)

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(ii) Identify the instrument the students might have used to get the grasshoppers. (1 mark)
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(iii) State three factors that would influence the results in the method above.
(3 marks)

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(c) Outline the adaptable observations the students would make on the grasshopper regarding;

(i) Locomotion. (2 marks)

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(ii) Protection. (2 marks)

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(iii) Feeding. (2 marks)

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7. (a) Name the tissues in flowering plants responsible for secondary thickening (2 marks).

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(b) Describe an experiment you would carry out to demonstrate the region of growth in the root of a bean seedling. (8 marks).

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(c) Explain the role of growth hormones in metamorphosis of a housefly (10 marks).

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8. Describe the role of the liver in;

(a) Blood sugar regulation. **(10 marks)**

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(b) Thermoregulation. (5 marks)

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(c) Name and explain the process that occurs when blood reaching the liver carries excess amino acids.
(5 marks)

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