

Name ..... Index No. ....

231/2  
**BIOLOGY**  
Paper 2  
(Theory)  
July/August 2016  
Time: 2 Hours

Candidate's Signature .....

Date .....

**NYANDARUA SOUTH FORM FOUR JOINT EVALUATION**  
**Kenya Certificate of Secondary Education**

**BIOLOGY**  
Paper 2  
July/August 2016  
Time: 2 Hours

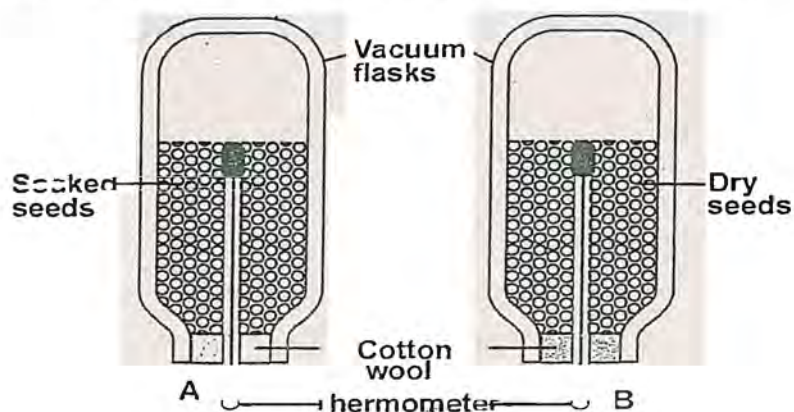
**INSTRUCTIONS TO CANDIDATES**

- \* Write your name and index number in the spaces provided above.
- \* Sign and write the date of examination in the spaces provided above.
- \* This paper consists of two sections; **A** and **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 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            |                   |
|             | 7        | 20            |                   |
|             | 8        | 20            |                   |
| Total Score |          | 80            |                   |

- A student set up an experiment using soaked and dry seeds as shown below.



- a) State the objective of this experiment. (1 mark)

- b) State the observations made in each of the flask after 24 hours. (2 marks)

- c) Account for the observation made in (b) above. (2 marks)

- d) Suggest why vacuum flasks were used in this experiment. (1 mark)

- e) What alteration would you make in the set up to make the results more reliable. (1 mark)

- f) Why should the seeds be washed with antiseptic solution. (1 mark)

2. a) Differentiate between the mode of fertilization in higher plants and in mammals. (2 marks)

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- b) Explain the role of the following hormones in the female menstrual cycle. (2 marks)
- i) Oestrogen

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- ii) Luteinising hormone (2 marks)

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- c) Give two functions of the placenta during pregnancy. (2 marks)

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The equation below represents a metabolic reaction that occurs in the mammalian liver.

Amino acids  $\rightarrow$  organic compounds + urea

- a) Name the process. (1 mark)

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- b) What is the importance of the process to the mammal ? (1 mark)

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- c) What is the source of the amino acids in the process named in (a) above ? (1 mark)

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- d) State three ways through which organic compounds produced in the reaction are utilized in animal's body. (3 marks)

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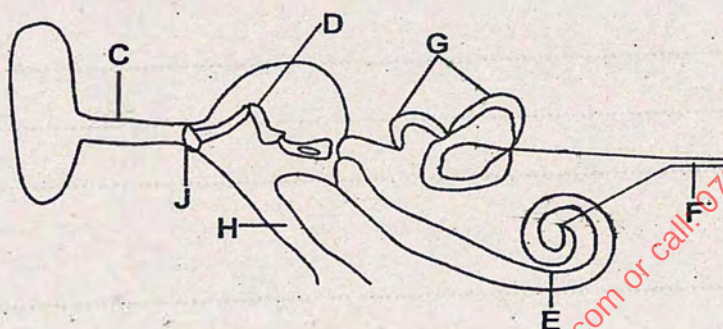
e) What is the difference between essential and non-essential amino acids ? (2 marks)

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l. The diagram below shows the structure of a human ear.



a) State the functions of human ear. (2 marks)

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b) Give the name of structures labelled C, G and F (3 marks)

C .....

G .....

F .....

c) i) What is the function of the structure labelled H. (1 mark)

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ii) Name the structure in the ear that detects sound waves. (1 mark)

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d) In which structure of the ear is the velocity of the sound transmission fastest. (1 mark)

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A common species of rats has individuals with white, black or grey coats. During a study, a rat with white coat was crossed with a rat with a black coat. Both parents were pure lines. All the offsprings in F<sub>1</sub> generation had grey coats. Using letter B to represent the gene for black coat and W for white coat.

a) Work out through a genetic cross the phenotypes of the F<sub>1</sub> generation. (4 marks)

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b) Give a genetic explanation of the nature of the offspring in F<sub>1</sub> generation. (1 mark)

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c) State the significance of a test cross in study of genetics. (1 mark)

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d) State the importance of crossing over in meiosis. (1 mark)

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e) Name one example of a characteristic in man that is transmitted by multiple alleles. (1 mark)

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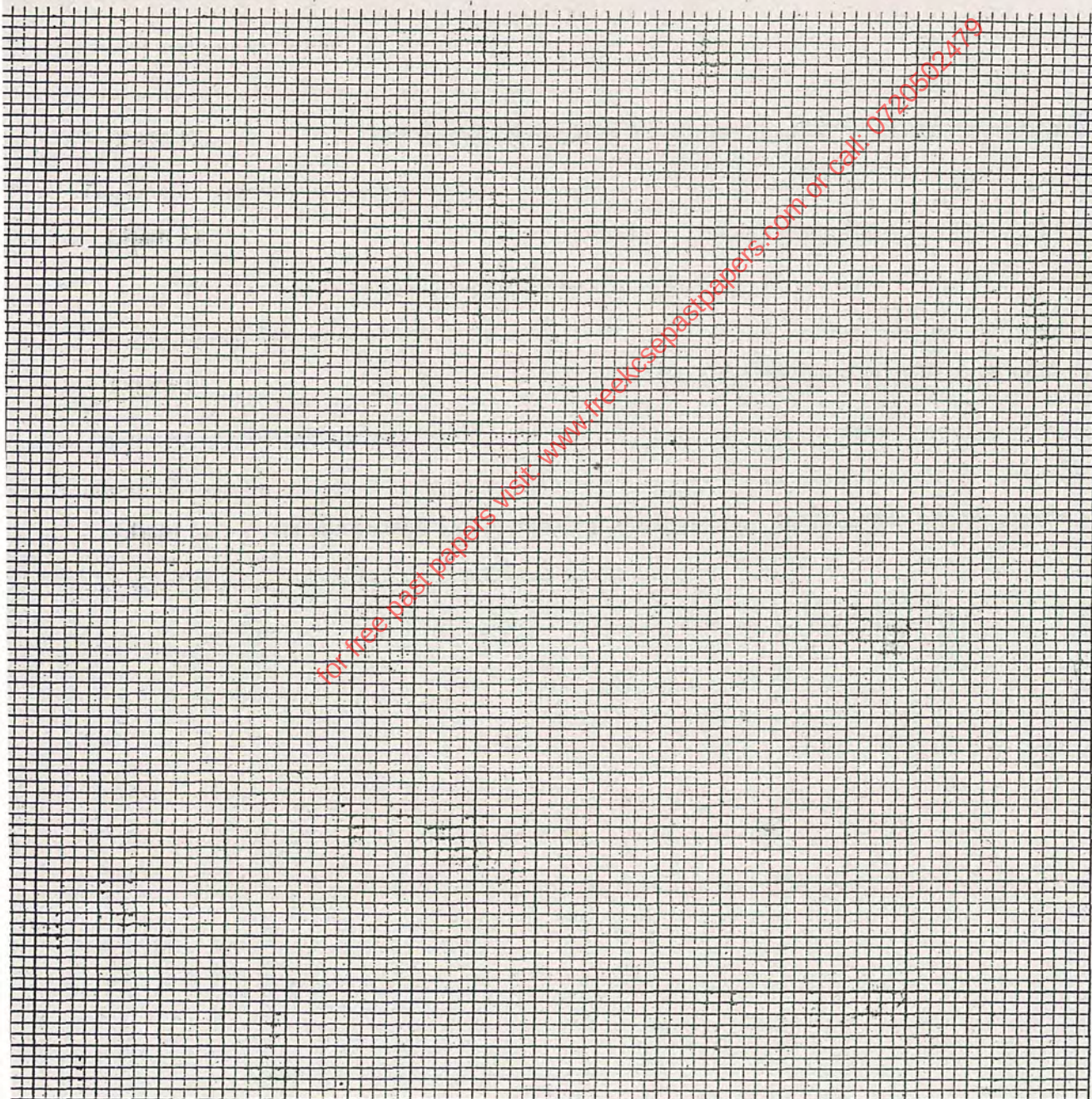
**SECTION B : (40 MARKS)**

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

The table below shows the effect of predation in a laboratory experiment using Paramecium aurelia and yeast cells, cultured in a solution containing sugar.

| Time (hour)                 | 2  | 4   | 6   | 8  | 10 | 12 | 14 | 16  |
|-----------------------------|----|-----|-----|----|----|----|----|-----|
| Paramecium                  | 20 | 90  | 120 | 95 | 50 | 20 | 40 | 60  |
| Yeast per 15cm <sup>3</sup> | 60 | 140 | 100 | 65 | 25 | 50 | 80 | 100 |

- a) Using the same axes, plot graphs to show growth curves of Paramecium aurelia and yeast. (7 marks)



b) At what time was the population of Paramecium aurelia and yeast the same. (2 marks)

c) Explain the relationship between Paramecium aurelia and yeast. (2 marks)

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d) What is the approximate time lapse between the maximum population of yeast and maximum population of paramecium ? Suggest a reason for this lapse. (2 marks)

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e) Account for the shape of the graph of Paramecium aurelia between : (3 marks)

i) 2 and 6 hours

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ii) 6 and 12 hours (3 marks)

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f) i) Suggest what would happen to the population of paramecium if the temperature was lowered to 0°C. (1 mark)

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7. Describe the
- i) Process of inhalation in mammals. (10 marks)
  - ii) Mechanism of opening and closing of stomata. (10 marks)
8. a) Describe how the digestion of a protein is achieved in the following parts of the alimentary canal.
- i) Stomach (4 marks)
  - ii) Duodenum (4 marks)
- b) i) Describe the process of absorption of water from the root hair to the xylem of the root. (8 marks)
- ii) Describe how temperature and light intensity affect the rate of transpiration. (4 marks)

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