NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ INDEX NO. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SCHOOL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGNATURE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

DATE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**231/2**

**BIOLOGY**

**(THEORY)**

**PAPER 2**

JULY / AUGUST, 2015

**TIME: 2 HOURS**

231/2

BIOLOGY

(THEORY)

PAPER 2

TIME: 2 HOURS

**INSTRUCTIONS TO CANDIDATES**

* Write your name, school and index number in the spaces provided above.
* Write the date of examination and sign in the spaces provided above.
* Answer **ALL** the questions in **section A** by filling in the spaces provided.
* In **section B**, **answer question 6 (compulsory question)** and **any other one question** from the remaining two questions. (i.e. 7 or 8) in the spaces provided after question 8.
* Candidates may be penalized for false information and even wrong spellings of technical terms.
* This paper consists of 10 printed pages.
* Candidates should check to ensure that all pages are printed as indicated and no questions are missing.

FOR OFFICIAL USE ONLY

|  |  |  |  |
| --- | --- | --- | --- |
| Section | Question | Maximum score | Candidate’s score |
| A | 1 | 9 |  |
| 2 | 8 |  |
| 3 | 8 |  |
| 4 | 8 |  |
| 5 | 7 |  |
| B | 6 | 20 |  |
| 7 | 20 |  |
| 8 | 20 |  |
|  | Total Score | 80 |  |

**SECTION A (40 MARKS)**

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

1. In genetics blood groups are determined by three genes represented by letter A, B and O.

A couple with blood group A female and blood group B male had a child with blood group O.

1. i) State the genotypes of the parents. (2 marks)

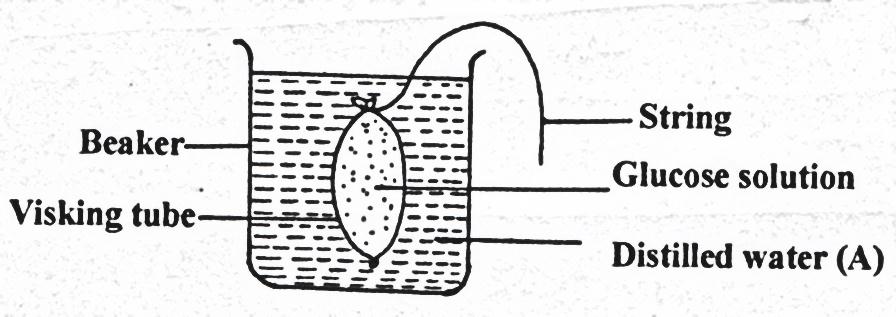
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii) State the gametes of the male parent. (1 mark) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Work out the probability of the above couple having blood group AB child. (5 marks)
2. Define the term co-dominance (1 mark)

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1. An experiment was set up as shown below.



**Distilled water A**

**Glucose solution**

**String**

**Visking tube**

**Beaker**

Contents of the beaker were tested for the presence of reducing sugars at start of experiment and after 30 minutes using Benedict’s solution. The results were recorded as shown overleaf.

|  |  |  |
| --- | --- | --- |
|  | Observation | Conclusion |
| At start | Contents (A) took colour of Benedict’s solution |  |
| After 30 minutes | Contents turned blue, green, yellow to orange |  |

1. Complete the table above. (2 marks)
2. i) Name the biological process that was being investigated. (1 mark)

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ii) Account for the observations made. (3 marks)

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1. Distinguish between cell physiology and cell specialization. (2 marks)

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1. The diagram below represents a simplified nitrogen cycle.



1. Name the group of bacteria represented by: (2 marks)

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. i) Name the group of organisms represented by C. (1 mark)

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ii) Give the reasons for your answer in b (i) above. (2 marks)

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1. i) Define the term nitrification. (1 mark)

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ii) Explain how excessive use of pesticides will affect nitrification. (2 marks)

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1. a) i) What are vestigial structures? (1 mark)

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ii) Give **two** examples of vestigial structures in man. (2 marks)

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b) i) Explain the occurrence of plasmodium resistant to chloroquin treatment. (4 marks)

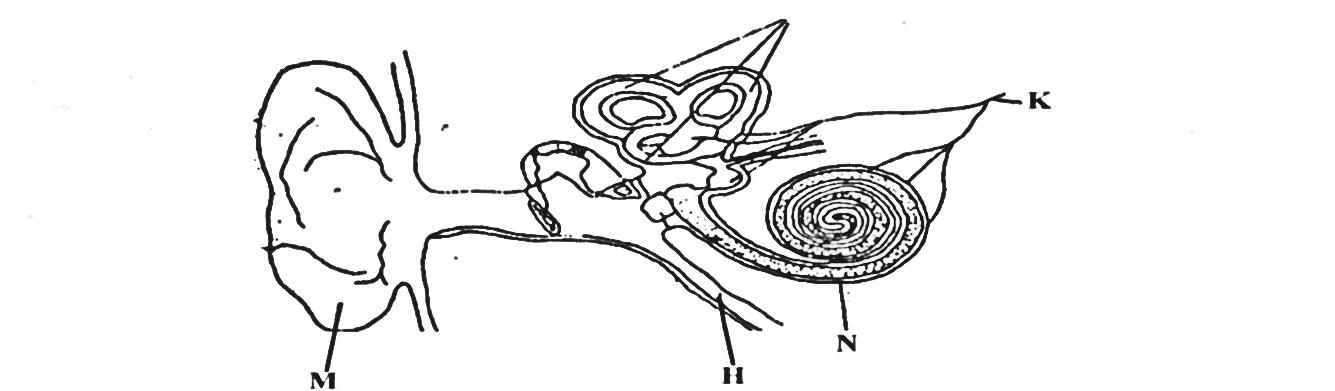
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii) Name the disease caused by plasmodium in human beings. (1 mark)

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1. The diagram below represents a section through the mammalian ear.

**J**



**M**

**H**

**N**

**K**

1. Name the structures labelled H and J. (2 marks)

H \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

J \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain how the structures labelled M and N are adapted to their functions.

M (2 marks) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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N (2 marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. State **one** function of the ear. (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.***

1. A 50 grams sample of finger millets was germinated on moist cotton wool. Half of the sample was grown in normal daylight and the other half in permanent darkness. Samples from each group were weighed every 48 hours. Their fresh mass was determined in each case and the following results were obtained.

|  |  |  |
| --- | --- | --- |
| Day | Fresh mass of seeds grown in light (g) | Fresh mass of seeds grown in darkness (g) |
| 0 | 10.0 | 10.0 |
| 2 | 13.9 | 13.8 |
| 4 | 16.0 | 16.6 |
| 6 | 20.0 | 21.2 |
| 8 | 26.6 | 26.6 |
| 10 | 34.7 | 32.2 |
| 12 | 43.8 | 31.6 |
| 14 | 53.6 | 28.6 |
| 16 | 61.4 | 25.0 |
| 18 | 68.2 | 20.6 |

1. On the same axes, plot graphs of the fresh mass against time. (7 marks)



1. Account for the difference between the two graphs. (4 marks)

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1. What was the mass of the seedling in light and in the dark on the 17th day? (2 marks)

In dark

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In light

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State **two** characteristics of the seedling grown in dark. (2 marks)

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1. Explain **two** roles of each of the following in germination.
2. Water (2 marks)

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1. Oxygen (2 marks)

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1. Name **one** hormone that plays a role in germination. (1 mark)

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1. Describe how the mammalian skin is adapted to its functions. (20 marks)
2. a) State **one** difference between a seed and a fruit. (1 mark)

b) Explain how fruits and seeds are adapted to their various methods of dispersal. (19 marks)

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