**SUNRISE ONE TERM 1 EXAMINATION 2023**

Kenya Certificate of Secondary Education

FORM FOUR

Form 4 BIOLOGY Term 1

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

**Class:…………………….. Candidate’s Signiture………..Date………………………….**

**STUDENT’S TARGET………………**

**231/2**

**BIOLOGY**

**PAPER 2**

**(THEORY)**

**APRIL, 2023**

**2 HOURS**

**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 after question 8
* This paper consists of 8 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** |  |

231/2

**Section A (40 marks)**

**Answer all the questions**

* 1. The equation below represents a metabolic process that occurs in a certain organ in the mammalian body.

Ammonia + carbon (IV) oxide enzyme organic compound Q + water

1. Name the process represented in the equation above. (1 mk)

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1. Name the organ in which the process occurs. (1mk)

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1. Why is the process important to mammals (1mk)

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1. Identify the organic compound Q. (1mk)

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1. Explain the source of ammonia in the organ named in (b) above. (2mks)

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1. What happens to organic compound Q.? (2mks)

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* 1. An athlete training to take part in an international competition moved to a high altitude area where he was to train for twelve (12) days before the competition. He took his pulse rate per minute daily and tabulated them as shown below

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DAY | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Pulse per minute | 72 | 78 | 89 | 92 | 92 | 90 | 86 | 80 | 77 | 74 | 72 | 72 |

1. Other than pulse rate, name one other process which was affected by change in altitude. (1mrk)

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1. Account for the change in pulse rate from.
2. Day 1 to day 7 (1mrk)

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1. Day 8 to day 12 (1mrk)

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1. Explain the advantage this athlete has over the one who trains in a lower altitude area. (2mks)

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1. The equation below represents a reaction which takes place during rapid muscular movements in humans.

Glucose lactic acid + 150kj

1. State two effects of this reaction to an individual (2mks)

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1. How is lactic acid finally eliminated from the muscle tissue after the muscle return to normal movement (1 mk)

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1. Study the diagram below and answer the questions that follows



1. What type of evolution is illustrated by the limbs (1mk)

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1. What does the origin of the limbs suggest about the ancestry of these animals (1mk)

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(c) (i.) What are vestigial structures? (1mk) ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (ii). State an example of vestigial structure in humans (1mk)

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1. (i) What is natural selection? (2mks) ………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

 (ii) Give one example of nature selection in action (1mk)

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(e) Explain comparative serology as evidence of evolution. (1mk) ………………………………………………………………………………………………………………

1. The diagram below represents a stage of growth in a seed during germination.

**Q**

**P**



**R**

1. (i) Name the type of germination illustrated above (1mk)

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(ii) Give a reason for your answer in (i) above (1mk)

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1. Name the part labellled R in the above diagram. (1mk)

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1. Give **two** functions of the part labeled Q (2mks)

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1. Explain how the part labeled P straightens. (3mks)

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1. The diagram below shows how blood glucose in mammalian body is regulated.

 Pancrease secretes

 Rise Hormone X

 Fall

 Normal glucose level Normal glucose level

 90mg/100ml 90mg/100ml

 Fall rise

 Less hormone X secreted

 Hormone Y released

(a) Name the hormone X and Y (2mks)

 X \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Y \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(b) State two ways by which hormone X lowers glucose level in the blood when it rises above 90mg/100ml (2mks)

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 (c) Name the organ that produces hormone Y (1mk)

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 (d) Suppose there is deficiency of hormone X, state the disease the person would suffer

 from (1mk)

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 (e) Explain how the disease mentioned in (d) above can be controlled. (2mks)

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**SECTION B**

***Answer question 6 compulsory and either question 7 or 8 in the space provided***

1. The diagram below shows an experiment that was carried out to measure rate of photosynthesis in a water plant when exposed to different light intensities.

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 The shoot was exposed to different light intensities and the rate of photosynthesis estimated by counting the number of bubbles of the gas leaving the shoot per minute. The results are tabulated below.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of bubble per minute | 7 | 14 | 20 | 24 | 26 | 27 | 27 | 27 |
| Light intensity (arbitrary units) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

1. Draw the graph of the number of bubbles produced per minute against light intensity. (6 marks)

1. At what light intensity did the shoot produce
2. 18 bubbles per minute (1mk)

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

1. 25 bubbles per minute (1mk)

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1. Give two better ways of measuring the rate of photosynthesis other than counting bubbles produced per minute. (2mks)

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1. What is role of light intensity in photosynthesis (2mks)

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1. Account for the expected results if the experiment was done at the following temperatures.
2. 40c (2mks)

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1. 340 ( 2mks)

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1. 600 ( 2mks)

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1. Apart from light intensity and temperature, name other two factors that affect the rate of photosynthesis. (2mks)

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1. (a) How are lungs adapted to their function? (10mks)

(b) Describe the mechanism of opening and closing of the stomata using the photosynthesis theory.

1. (a) Describe the various mechanism of fruit and seed dispersal. (12mks)

(b) Describe the various events that occur in a flower after fertilization. (8mks)

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