

Name: \_\_\_\_\_

Form: \_\_\_\_\_

231/2

Candidates Signature:

BIOLOGY

Paper 2

Date:

(THEORY)

March 2014

2 hours

#### KCSE MINI-MOCK EXAMINATIONS

#### Instructions to Candidates

- (a) Write your name and class in the spaces provided above.
- (b) Sign and write the date of the examination in the spaces provided above.
- (c) This paper consists of two sections; 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.
- (f) This paper consists of 10 printed pages.

- (g) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (h) Candidates should answer the questions in English.

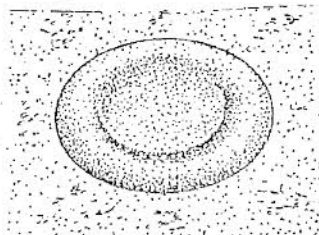
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| Section     | Question | Maximum Score | Candidate's Score |
|-------------|----------|---------------|-------------------|
| A           | 1        | 8             |                   |
|             | 2        | 8             |                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

SECTION A (40 marks)

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

1. The diagrams below show a red blood cell that was subjected to a certain treatment.



At start



At end

of the experiment

- (a) What name is given to the condition of the cell at the end of the experiment. (1 mark)

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(b) Account for the shape of the cell at the end of the experiment.

(2 marks)

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(c) Suggest a situation in the human body that could cause the red blood cells to become as shown at the end of the experiment.

(2 marks)

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(d) Draw a labelled diagram to illustrate how a plant cell would appear if it was subjected to the same treatment.

(3 marks)

(e) Name a process in the human body that prevents the red blood cells from becoming as shown at the end of the experiment.

(3 marks)

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2. In a breeding experiment using snapdragon plants, pure-breeding red-flowered plants were crossed with pure-breeding plants bearing white flowers. The seeds obtained were sown and the plants that developed from them all produced pink flowers.

(a) If the pink-flowered plants were self-fertilised, work out the phenotypic ratio of the offspring they would produce.

(5 marks)

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(b) Explain why there are no plants with red or white flowers in the offspring produced in (a) above.

(2 marks)

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(c) What is a test cross?

(1 mark)

3. (a) What is seed dormancy?

(1 mark)

(b) Give two advantages of seed dormancy to plants.

(2 marks)

(c) State three internal causes of seed dormancy.

(3 marks)

(d) Name two hormones that break seed dormancy.

(2 marks)

4. Onyango carried out an experiment to test the digestion of bread by salivary amylase. He made a smooth paste using a slice of bread and some distilled water. He divided the mixture into three equal volumes which he put into three test tubes labeled A, B and C. He placed the test tubes in the following conditions:

- ~ Test tube A: in a beaker of icy water at 5° C.
- ~ Test tube B: in a beaker of warm water at 38° C.
- ~ Test tube C: in a beaker of hot water at 60° C.

He then added 1 ml of fresh saliva to each test tube. After five minutes, he tested the contents of each of the test tubes using Benedict's solution. He took the amount of precipitate formed as a measure of the amount of starch already digested. He obtained the following results:

| Test tube | Volume of Precipitate |
|-----------|-----------------------|
| A         | 10 ml                 |
| B         | 45 ml                 |
| C         | 1 ml                  |

(a) Which temperature is the most suitable for the digestion of starch? (1 mark)

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(b) Briefly explain why each of these test tube showed a different amount of precipitate.

(i) Test tube A. (1 mark)

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(ii) Test tube B. (1 mark)

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(c) Why did he select Benedict's reagent to test the digestion of starch. (2 mark)

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(d) Suggest, giving a reason, an alternative test that Onyango could have used to investigate the digestion of starch by saliva. (2 marks)

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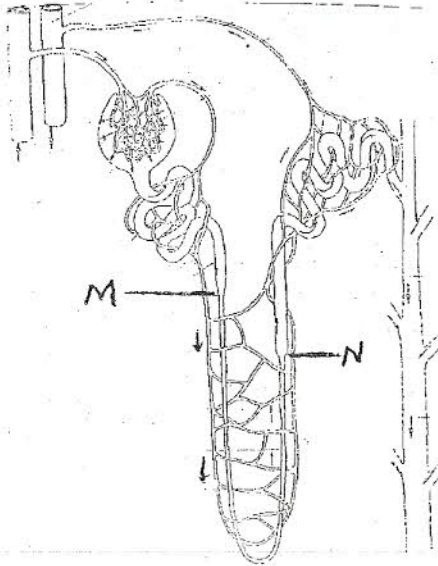
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(e) Besides temperature, name one other factor that may affect the rate of digestion of starch by saliva. (1 mark)

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5. The diagram below represents a mammalian nephron.



- a) Using the letters given in brackets, label the parts where these processes take place.
- ~ ultrafiltration (X) (1 mark)
  - ~ active reabsorption of glucose molecules (Y) (1 mark)
  - ~ reabsorption of water under the influence of antidiuretic hormone (Z) (1 mark)

(b) Explain what occurs in the portion between M and N. (2 marks)

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(c) State the structural modifications of nephrons found in fresh water animals.

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(2 marks)

SECTION B (40 marks)

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

6 A farmer wished to plant certain species of the nitrogen-fixing *Erythrina* trees in his farm. However, these seeds normally take a long time to germinate after sowing. To overcome this problem, he did the following:

He put several *Erythrina* seeds in hot water at 50°C. He removed batches of 20 seeds at one minute intervals and planted them in trays containing moist soil. After 15 days, the number of seedlings that grew in each tray were counted. The results obtained were as shown in the table below:

| Batch order      | Time intervals (minutes) | Germinated seeds | % Germination |
|------------------|--------------------------|------------------|---------------|
| 1st              | 0                        | 3                |               |
| 2nd              | 1                        | 3                |               |
| 3rd              | 2                        | 8                |               |
| 4th              | 3                        | 15               |               |
| 5th              | 4                        | 18               |               |
| 6th              | 5                        | 13               |               |
| 7th              | 6                        | 10               |               |
| 8 <sup>th</sup>  | 7                        | 6                |               |
| 9th              | 8                        | 2                |               |
| 10 <sup>th</sup> | 9                        | 0                |               |
| 11 <sup>th</sup> | 10                       | 0                |               |

- (a) Calculate the percentage germination rate for each batch. (2 marks)
- (b) Use your results to plot a graph showing percentage germination against the duration in which the seeds were soaked in hot water. (6 marks)
- (c) From the graph, give the expected number of seeds that would germinate if soaked for 4.5 minutes. (2 marks)





