INSTRUCTION TO CANDIDATES

- This paper consists of two sections A and B.
- Answer all questions in section A
- Answer question 6 [compulsory] and any other one question [7 or 8] in the spaces provided after question 8 from section B

For Examiner’s Use Only

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<th>Candidates Score</th>
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1. Study the homeostatic scheme below and use it to answer the questions that follow.

- Less hormone A Released
- Normal concentration of sodium ions in Blood
- Excess
- Deficiency
- More hormone A released
- Normal concentration of Sodium ions in Blood

a) Identify the hormone labelled A. (1mk)

b) Name the gland which releases hormone A. (1mk)

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... ...

c) Outline two major sites of action of hormone A. (2mks)

... ...

... ...

d) Identify the feedback labelled C. (1mk)

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... ...

e) State the effect of the feedback labelled B in humans. (1mk)

... ...
f) Name the self regulatory process represented by the above schematic diagram. (1mk)

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g) A person was found to pass out large volumes of dilute urine frequently. Name the disease the person was suffering from. (1mk)

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2. In an experiment a black mouse was mated with a brown mouse, all the springs were black. The offspring’s grew and were allowed to mate with one another. The total number of F2 generation were 192.

a) Using the letters symbols B for genes for black and b for genes for brown, work out the genotypes of the F1 generation. (3mks)

b) From the information above, work out the following for the F2 generation.

(i) Genotypic ratio (2mks)

(ii) Phenotypic ratio (1mk)

(iii) The total number of brown mice. (2mks)
3. The diagrams below illustrate the behaviour of Red Blood Cells when placed into two different solutions X and Y.

![Diagram of Red Blood Cells]

a) Suggest the nature of solutions X and Y. (2mks)
   X ……………………………………………………… Y ………………………………………

b) Name the processes A and B (2mks)
   A ……………………………………………………..  B ……………………………………….

c) what would happen to normal blood cells if they were placed in an isotonic solution. (1mk)
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4. a) Outline the muscular movements in man that occur during the following breathing process. (3mks)

   (i) Inhalation
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   ………………………………………………………………………………………………………
(ii) Exhalation

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b) Give one reason why insect blood has a low capacity for carrying oxygen. (1mk)

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5. a) Explain the role of Genetic mixing in evolution. (2mks)

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b) The ability of some members of a species to survive depends on how fit they are. Explain the expression survival of the fittest. (3mks)

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SECTION B (40 MARKS)
6. In an experiment, 900 viable seeds of a certain species were divided into groups of 100 seeds each. Each group of seeds were placed at different temperatures but same conditions of air and moisture. The percentage germination was determined after 10 days. The table below shows percentage germination at the various temperatures.

<table>
<thead>
<tr>
<th>Temperature °C</th>
<th>0</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
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<tr>
<td>% Germination</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>16</td>
<td>50</td>
<td>84</td>
<td>30</td>
<td>2</td>
<td>0</td>
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(a) Using a suitable scale, draw a graph of percentage germination against temperature on the graph paper provided below. (6mks)
b) Account for germination at

(i) $5^\circ C$  
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(ii) $30^\circ C$  
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(iii) $45^\circ C$.  
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c) Explain the role played by each of the following factors in the germination of seeds.  

(i) Water  
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(ii) Air

7. a) Describe how mammalian heart structure is adapted to its function. (15mks)
b) Describe the process of blood clotting in man when blood is exposed to air. (5mks)

8. Explain how:
a) Desert plants are adapted to their habitats. (12mks)
b) Hydrophytes are adapted to their habitat. (8mks)

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