231/2
BIOLOGY
PAPER 2 (THEORY)
JULY/AUGUST 2013
TIME: 2HOURS

KIKUYU DISTRICT INTERSCHOOLS EVALUATION
KENYA CERTIFICATE OF SECONDARY EDUCATION

Instructions to candidates
1. This paper consist of two Sections; A and B
2. Answer all the questions in Section A in spaces provided.
3. 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

<table>
<thead>
<tr>
<th>Section</th>
<th>Question</th>
<th>Maximum Score</th>
<th>Candidate’s Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>08</td>
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<tr>
<td></td>
<td>2</td>
<td>08</td>
<td></td>
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<td></td>
<td>3</td>
<td>08</td>
<td></td>
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<td>4</td>
<td>08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>08</td>
<td></td>
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<tr>
<td>B</td>
<td>6</td>
<td>20</td>
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<tr>
<td></td>
<td>7</td>
<td>20</td>
<td></td>
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<tr>
<td></td>
<td>8</td>
<td>20</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>80</td>
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</tbody>
</table>
1. The diagram below shows the skull of an animal. Study it and answer the questions that follow.

a) Label A and B.  

A ..........................................................  

B: .....................................................................................................................  

b) Which are the adaptations shown above, concerning the animal’s mode of feeding?  

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c) Name two enzymes that are produced in precursor form in human digestive system.  

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d) State the importance of enzyme above being produced in precursor form.  

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2. A cross was made between two pure breeding varieties of plants.  
One with red flowers and the other with white flowers.  
The F1 generation had all plants with pink flowers.  
When the F1 were selfed the F2 products were as follows:-  

Red - 401  
Pink - 819  
White - 408  

Using R for red color and W for white color.  
a) Work out the F2 generation.  

(4 marks)
b) Calculate the phenotypic ratio of F2 generation.

(2 marks)

c) Which type of dominance is exemplified in the cross above?

(1 mark)

d) Give an example of a sex-linked characteristic transmitted on X-chromosome.

(1 mark)

3. a) One of the characteristics of a good respiratory surface is that it must be moist. Why is this so?

(1 mark)

b) Other than being moist, list other two characteristics of a respiratory surface.

(2 marks)

c) (i) Name the part of the brain in a man that controls breathing.

(1 mark)

(ii) Explain how the part named in (i) above controls breathing in a man.

(4 marks)

4. a) (i) Distinguish between primary and secondary growth.

(2 marks)

(ii) What are meristems.

(1 mark)
b) Give the location and function of the following meristematic tissue. (5 marks)

(i) Apical meristem

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(ii) Intercalary meristem

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(iii) Lateral meristem

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5. The diagram below shows a synapse.

![Synapse Diagram]

a) Indicate the direction of the impulse on the diagram. (1 mark)

b) Label D and E (2 marks)

D
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.............................................................................................................................................

E
.............................................................................................................................................
.............................................................................................................................................

c) Compare a simple reflex action with a conditioned reflex action. (3 marks)

<table>
<thead>
<tr>
<th>Simple reflex action</th>
<th>Conditioned reflex action</th>
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<tbody>
<tr>
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d) State the functions of hormones in animals. (2 marks)

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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.

6. An experiment was carried out to investigate heat production in J/r and heat loss in J/hr in a man at different environmental temperature (°C). Heat production and heat loss were determined as air temperature changed. The results were shown in the table below.

<table>
<thead>
<tr>
<th>Air temperature in °C</th>
<th>1 - 5</th>
<th>6 - 10</th>
<th>11 - 15</th>
<th>16 - 20</th>
<th>21 - 25</th>
<th>26 - 30</th>
<th>31 - 35</th>
<th>36 - 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat produced (J/hr)</td>
<td>1420</td>
<td>1080</td>
<td>800</td>
<td>600</td>
<td>480</td>
<td>380</td>
<td>320</td>
<td>280</td>
</tr>
<tr>
<td>Heat lost (J/hr)</td>
<td>0</td>
<td>0</td>
<td>80</td>
<td>140</td>
<td>200</td>
<td>280</td>
<td>400</td>
<td>560</td>
</tr>
</tbody>
</table>

a) Using the same axes, draw graphs of heat production and heat lost in J/hr against air temperature in °C. (7 marks)

b) At what air temperature does the body lose as much heat as it produces? (1 mark)

c) (i) Explain the relationship between heat loss and heat production at 40°C (3 marks)

(ii) Explain why readings for this experiment were not taken for air temperatures above 40°C (12 marks)

d) (i) Explain how sweating helps the body to lose excess heat. (2 marks)

(ii) State three ways in which mammals are adapted to live in regions below sub-zero °C temperatures. (3 marks)

e) Explain the role of hypothalamus in temperature regulation. (2 marks)

7. a) Describe the systole and diastole of the mammalian heart. (13 marks)

b) Describe the mechanism of blood clotting. (7 marks)

8. a) Describe the location and appearance of chromosomes during mitosis. (13 marks)

b) State the roles of the following hormones in human female.

   (i) Follicle stimulating hormone. (2 marks)

   (ii) Luteinizing hormone. (3 marks)

   (iii) Oxytocin (2 marks)