**Name…………………………………………………………………………………. ADM No……….. Class…………**

**Candidates Signature……………………………. Date…………………………….**

**231/2**

**PAPER 2**

**THEORY**

**BIOLOGY**

**2 HRS**

Kenya certificate of secondary education (K.C.S.E)

INSTRUCTIONS

1. This paper consists of two sections A and B
2. Answer all questions in section A in the spaces provided.
3. In section B answer question 6 and either question 7 or 8 in the spaces provided
4. Candidates should answer the questions in English

|  |  |  |  |
| --- | --- | --- | --- |
| SECTION | QUESTION | MAXIMUM SCORE | CANDIDATE SCORE |
| A | 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |
| 5 |  |  |
| B | 6 |  |  |
| 7 |  |  |
| 8 |  |  |

***This paper consists of 12 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

1. Below is a diagram of a cell.



1. Identify the structure labeled K,X and Y. **(3 marks)**

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1. Explain why structure X are more on one side than the other. **(2 marks)**

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1. What is the role of the material in structure Y. **(2 marks)**

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1. Other than transport give any other function of vascular bundles in plants. **(1 mark)**

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1. A shoot of seedling exposed to light on one side bends toward source of light as it grows.
2. Identify the response shown by the shoot . **(1 mark)**

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1. Explain how the bending toward source of light occurs. **(3 marks)**

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1. Identify a control experiment which could be set for this experiment. **(1 mark)**

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1. When a car descends rapidly downhill one feels an unpleasant sensation in the ear.
2. Explain how the unpleasant sensation occurs. **(3 marks)**

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1. How can the sensation be relieved. **(1 mark)**

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1. Pure breed black cow was crossed with a white bull. The resultant was offspring with a coat of roan color (mixture of black and white).
2. Using letter B for black color and W for white color work out genotypic ratio of F2 generation and selfing. **(1 mark)**
3. Give the name given to condition where two genes express themselves equally in heterozygous state. **(1 mark)**

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1. Identify a trait in human being that exhibit the condition identified in 3(b) above.

**(1mark)**

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1. What is back cross. **(1 mark)**

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1. a) Distinguish between pyramid of numbers and pyramid of biomass. **(2 marks)**

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**b)** From an ecological study, students formed the following food web.

 Hawk

 Lizard Small birds

Cartepillar small insects large insects

 Earthworm Green plants

 Decaying leaves

 From the food web, construct two food chains with lizard as tertially consumer.

 **(2 marks)**

 **c) i)** Which organism has the least biomass in the ecosystem. **(1 mark)**

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**ii)** Give reasons for your answer. **(3 marks)**

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1. **a)** Give **3** structural differences between muscles found on the rib cage and the ones in

 Endothelium of artery of a mammal. **(3 marks)**

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 **b)** What is the difference between ball and socket joint & hinge joint? **(1 mark)**

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 **c)** Give **two** functions of synovial fluid. **(2 marks)**

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 **d)** State **two** advantages of having an exoskeleton. **(2 marks)**

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**SECTION B.**

***Question 6 is compulsory.***

 **Choose either question 7 or 8 and answer in space after question 8**

1. an experiment was carried out to investigate the effect of temperature on rate of reaction catalyzed by an enzyme .The results are as shown below

|  |  |
| --- | --- |
| Temperature | Rate of reaction in mg of product per unit time |
| 5 | 0.2 |
| 10 | 0.6 |
| 15 | 0.9 |
| 20 | 1.2 |
| 25 | 1.6 |
| 30 | 2.2 |
| 35 | 3.1 |
| 40 | 3.8 |
| 45 | 3.5 |
| 50 | 2.9 |
| 55 | 2.2 |
| 60 | 1.2 |

1. On the graph provided draw a graph of rate of reaction against temperature. **(6 marks)**



1. Determine when the rate of reaction is 2.5mg of product per unit time. **(2 marks)**
2. Account for the shape of the graph between
3. 50c – 400c **(2 marks)**

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1. 450c – 600c **(2 marks)**

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1. Other than temperature give two other ways of increasing rate of reaction between 50c and 400c **(2 marks)**

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 **e) i)** Identify a digestive enzyme in human that requires acidic conditions for its working. **(1 mark)**

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 **ii.** Explain how the acidic condition above is achieved. **(1 mark)**

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1. **i)** Enzyme in region of alimentary canal below stomach requires alkaline condition. Name substances responsible for neutralization. **(1 mark)**

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**ii)** Name part of alimentary canal where neutralization takes place. **(1 mark)**

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**g. i)** What are enzyme co factors. **(1 mark)**

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 **ii)** Identify o**ne** metallic element used as enzyme cofactor. **(1 mark)**

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1. **a)** Describe the process of fertilization in a flowering plant. **(15 marks)**

**b)** State the changes that take place in a flower after fertilization **(5 marks)**

1. Explain how mammalian skin is adapted to its functions. **(20 marks)**

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