**NAME:………………………………………………… INDEX NO:……………………**

**SCHOOL:……………………………………………… DATE: .........................................**

**231/2**

**BIOLOGY**

**PAPER 2 (THEORY)**

**DECEMBER, 2021**

**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

**For Examiners use only.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum score** | **Candidates score** |
| **A** | **1** | **5** |  |
| **2** | **2** |  |
| **3** | **5** |  |
| **4** | **4** |  |
| **5** | **8** |  |
| **6** | **7** |  |
| **7** | **13** |  |
|  | **8** | **20** |  |
| **9** | **20** |  |
| **10** | **20** |  |
|  | **Total score** | **80** |  |

*This paper consists of* 8 *printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.*

**SECTION A**

1. When testing a variegated leaf for starch, the following procedure is important
2. The leaf is boiled in water
3. The leaf is then boiled in methylated spirit
4. The leaf is taken back to the hot water
5. The leaf is spread on a white tile and irrigated with iodine solution.
6. Why is the leaf boiled in hot water? (1mk)

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1. Why is the leaf boiled in methylated spirit? (1mk)

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1. Explain why the leaf is dipped in in hot water. (1mk)

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1. Explain the observation made when the leaf is irrigated with iodine solution. (2mks)

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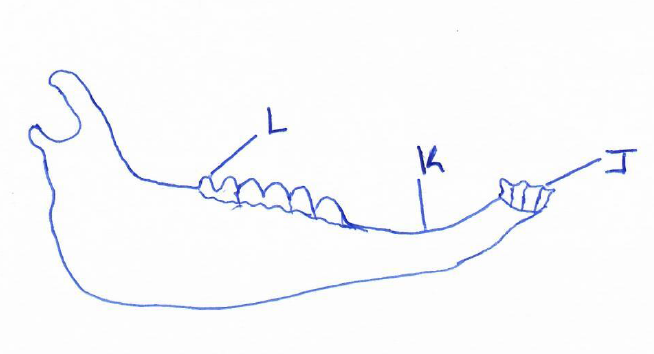
1. What is a variegated leaf? (1mk)

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1. What is to destarch the leaf? (2mks)

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1. The diagram below represents the lower jaw of a mammals.



1. Name the mode of nutrition of the mammal whose jaws is shown above. (1mk)

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1. State one structural and one functional differences between the teeth labeled J and L. (2mks)

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* 1. Name the toothless gap labeled K. (1mk)

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* 1. State the function of the gap. (1mk)

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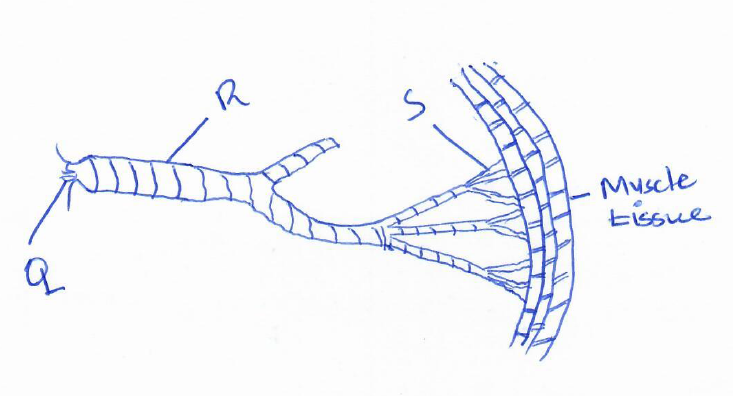
1. Name the substance that is responsible for hardening of the teeth. (1mk)

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1. Distinguish between the terms homodont and hererodent. (2mks)

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1. The diagram below shows the gaseous exchange system of a locust.



1. Name the structure labeled Q. (1mk)

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1. State the function of the part labeled R. (1mk)

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1. How is the part labeled S structurally adapted to its function? (2mks)

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1. Identify the structure that perform the same function as one illustrated above in. (2mks)
   1. Amoeba

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* 1. Fish

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1. Name the causative agents for the following respiratory.

Diseases. (2mks)

1. Whooping Cough.

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1. Pneumonia.

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1. When pure breeding black guinea pigs were crossed with pure breeding white guinea pigs the offspring had a coat with black and white patches.
2. Using letter G to represent the gene for black coat colour and letter H for white colour, workout the genotypic ratio of F2. (5mks)
3. State the phenotypic ratio of F2 generation. (1mk)

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1. Name the term used when two alleles in heterozygous state are fully expressed phenotypically in an organism. (1mk)

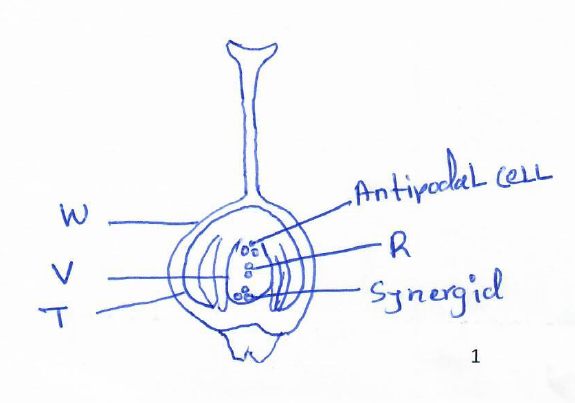
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1. Give an example of a trait in human beings where the condition whose term is named in (c) above expresses it. (1mk)

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1. The diagram below shows an embryo sac.



1. Name the structures labeled D and E. (2mks)

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1. On the diagram label the integuments. (1mk)
2. On the diagram, mark using letter X the point at which the pollen tube enters the embryo sac. (1mk)
3. What is the function of the pollen tube? (2mks)

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1. State two factors that hinders self-pollination in flowering plants. (2mks).

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**SECTION B (40 MARKS)**

**Answer question 6 (compulsory) and any other one question from this section.**

1. 1cm3 of catalase solution was added to equal volumes of hydrogen peroxide solutions at different pH values. The time taken to collect 10cm3 of oxygen was measured. The results were as follows.

|  |  |
| --- | --- |
| pH solution | Time taken to collect gas (minutes) |
| 5.5 | 30 |
| 6.0 | 20 |
| 6.5 | 12 |
| 7.0 | 8 |
| 7.5 | 5 |
| 8.0 | 9 |
| 8.5 | 15 |
| 9.0 | 25 |

1. Plot a graph of time against pH of solution. (6mks)
2. Account for the rate of reaction at:
3. pH. 7.5 (2mks)

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1. pH. 5.5 (2mks)

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1. pH. 9.0 (2mks)

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1. Write a word equation for the reaction above. (1mk)

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1. What is the importance of the reaction you have given in c above? (1mk)

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1. Name an organ in the human body where the above reaction takes place. (1mk)
2. Other than the factor being investigated above name four other factors that affect the rate of enzyme controlled reaction. (4mks)

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1. Describe the functions of a mammalian skin. (20mks)
2. Describe the process of double fertilization in a flowering plant. (20mks)