**NAME...................................................................................... ADM/NUMBER............................**

**SCHOOL………………………………....................................... Date..........................................**

**BIOLOGY (231/3)**

**Paper 3 (PRACTICAL)**

**NOVEMBER/DECEMBER 2021**

**TIME: 13/4 hour**

**DIOCESE JOINT EXAMINATIONS**

**Kenya Certificate of Secondary Examinations**

**Instructions to candidates**

(a) Write your name and Admission number in the spaces provided.

(b) Answer **all** the questions in the spaces provided.

(c) You are required to spend the first 15 minutes of the 13/4 hours allowed for this paper reading the whole paper carefully before commencing your work.

(d) This paper consists of 6 printed pages.

(e) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

**For Examiner’s Use Only**

|  |  |  |
| --- | --- | --- |
| **QUESTION** | **MAXIMUM SCORE** | **CANDIDATE SCORE** |
|  | **14** |  |
|  | **13** |  |
|  | **13** |  |
| **40** | |  |

1. You are provided with small pieces of two tissues, labeled P and Q, obtained from an animal.

(a).Cut each specimen into two equal halves. From each specimen, crush one half and leave the other half as a solid piece. Place the solid half of specimen P into a test tube labeled K. Place the solid half of specimen Q into a test tube labeled L.

Put about 2cm3 hydrogen peroxide into each of the test tubes.

(i) State the observations made in the two test tubes. [2marks]

Test tube K …………***less effervescence***

…………………………………………………………………………………………………….

Test tube L …………***more effervescence compared to K***

…………………………………………………………………………………………………….

(ii)Place the crushed specimen P into test tube labeled M and also place the crushed specimen Q into test tube labeled N. Add 2cm3 hydrogen peroxide into test tube M and N. Record the observation for each test tubes M and N in comparison to K and L [2marks]

Test tube M ………***more effervescence compared to K***

…………………………………………………………………………………………………

Test tube N ………***more effervescence compared to L***

………………………………………………………………………………………………….

(iii) Write down an equation for the reaction that was responsible for your observations in the experiments above. [1mark]

***Hydrogen peroxide → water + oxygen gas***

(iv) Name the process represented by the equation in (iii) above. [1mark]

…………***detoxification***

(b) Explain how crushing affected the results of the experiments. [2marks]

***Crushing increased the surface area ;upon which enzyme catalase can speed up the decomposition of toxic hydrogen peroxide ;***

……………………………………………………………………………………….

(c) Apart from the process named in (a) (iv) above, name three other functions of specimen Q [3marks]

***Deamination***

***Blood sugar regulation***

***Thermoregulation***

***Regulation of plasma proteins***

***Haemoglobin regulatiog***

……………………………………………………………………………………….

(d) Explain the importance of the process named in (a) (iv) above in living organisms [3marks]

***Harmful/ toxic substances e.g hydrogen peroxide are broken down; to less harmful substances such as water and oxygen gas; this creates a conducive environment for physiological processes in the cell;the oxygen gas produced can also be used in respiration;***

1. You are provided with specimen labelled **Z** which has been grounded into flour.

Make a solution of the flour provided by adding water and stirring properly. Sieve or decant to obtain a solution from the mixture.

(a) (i) Using the reagents provided test for the presence of starch, proteins and lipids in the solution from specimen Z. Record the procedures, observation, and conclusions in the table below. [9marks]

|  |  |  |  |
| --- | --- | --- | --- |
| **FOODSUBSTANCE** | **PROCEDURE** | **OBSERVATION** | **CONCLUSION** |
| **Starch** | ***To 2ml of solution Z,add iodine solution dropwise;*** | ***Blue-black colour is observed ;*** | ***Starch present;*** |
| **Proteins** | ***To 2ml of solution Z,add equal amount of 10% sodiumhydroxide solution followed by 1% copper (ii) sulphate solution;*** | ***Purple/violet colour is observed ;*** | ***Proteins present;*** |
| **Lipids** | ***To 2ml of solution Z,add 4ml of absolute ethanol and shake .transfer into another test tube half filled with water;*** | ***Formation of white emulsion ;*** | ***Lipids present;*** |

(ii) From the conclusions made in (a) (i) above, suggest the regions of the alimentary canal where the digestion of specimen Z would take place. [3marks]

***Starch –mouth;duodenum;***

***Proteins –stomach;duodenum;***

***Lipids –duodenum;ileum;***

(b) State **one** use of any two food substances found in specimen Z. [2 marks]

***Starch –digested to glucose which is then oxidized during respiration to generate energy;***

***Proteins –digested to amino acids which are then oxidized to release energy during starvation;***

1. You are provided with leaves of specimens **A, B, C, D, and E.**

**(a)** Use the following features in the order in which they are listed, to prepare a dichotomous key: [8 marks]

Type of leaf

Shape of the lamina

Succulent or non-succulent

Leaf margin

***1 a) leaf simple………………………………………………………….go to 2 b) leaf compound………………………………………………………E***

***2 a) leaf with broad lamina ……………………………………………go to 3***

***b) leaf with narrow lamina……………………………………………B***

***3 a) leaf succulent ……………………………………………………… C***

***b) leaf non-succulent……………………………………………………go to 4***

***4 a) leaf with serrated margin ……………………………………………..D***

***b) leaf with smooth margin……………………………………………….A***

………………………………………………………………………………………

(b) (i) Name the likely habitat of specimen **C**. [1mark]

***Desert;***

(ii) Give a reason for your answer in (b) (i) above. [1mark]

***Succulent leaves to store water***

(c) State the significance of the shiny upper surface of specimen **A**. [2marks]

***Shiny to reflect light away; hence reduce the rate of transpiration;***