**MARKING SCHEME**

**BIOLOGY (231/3)**

**Paper 3 (PRACTICAL)**

**2018 TIME: 13/4 hours**

1. You are provided with specimen labelled **D** which has been ground 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 D. Record the procedures, observation, and conclusions in the table below. [9mks]

|  |  |  |  |
| --- | --- | --- | --- |
| **FOODSUBSTANCE** | **PROCEDURE** | **OBSERVATION** | **CONCLUSION** |
| **Starch** | ***To 1cm3 of solution D, add 3 drops of Iodine solution;*** | ***Blue-black colour observed;*** | ***Starch present;*** |
| **Proteins** | ***To 2cm3 of solution D, add equal amount of Sodium hydroxide then add copper sulphate dropwise;*** | ***Purple colour observed;*** | ***Proteins present;*** |
| **Lipids** | ***Rub a little solution D on a paper. Pass the paper over a flame. Hold the paper against light and observe;*** | ***A translucent spot observed;*** | ***Lipids present;*** |

(ii) From the conclusions made in (a) (i) above, suggest the regions of the alimentary canal where the digestion of specimen D would take place. (3mks)  ***Starch – Mouth/Duodenum ;***

 ***Proteins – Stomach;***

 ***Lipids – Duodenum;***

 (b) State the **one** use of any two food types found in specimen D. (2 marks)

***-Starch – Produce energy;***

 ***-Protein – Body building/Repair of worn out tissues/structural;***

 ***Lipids – Insulation against heat loss;***

 ***Shock absorber/Cushions vital organs;***

 ***Storage form;***

 ***Release of energy;***

 ***Release of metabolic water;***

2. 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: (10 marks)

Type of leaf

Shape of the lamina

Succulent or non-succulent

Leaf margin

Leaflet attachment.

***1(a) Simple leaf ------------------------------------------------------go to 2;***

 ***(b) Compound leaf -------------------------------------------------go to 5;***

***2(a) Broad leaf lamina ----------------------------------------------go to 3;***

 ***(b) Leaf lamina long and slender --------------------------------B;***

***3(a) Succulent leaf ------------------------------------------------- C;***

 ***(b) Non-succulent leaf ------------------------------------------- go to 4;***

***4(a) Smooth leaf margin ------------------------------------------ A;***

 ***(b) Serrated leaf margin ----------------------------------------- D;***

***5(a) Leaflets attached to main midrib --------------------------E;***

 ***(b) Leaflets attached to many smaller midribs ---------------;***

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

***Dry/Semi-arid/Arid;***

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

***-Succulent to store water;***

(c) State the significance of the shiny upper surface of specimen **A**. (1 mark)

***-Has a cuticle to reflect away excess light;***

 ***-Prevent soaking water during rains;***

3. 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. (3mks)

Test tube K - ***Bubbles/foam observed;***

Test tube L ***– More bubbles/foam than in test tube 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. (2mks)

Test tube M ***– More bubbles/foam than in test tube K;***

Test tube N ***– Numerous bubbles/foam than in test tube L;***

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

 ***2H2O2 2H2O + O2;***

 ***Hydrogen peroxide Water + Oxygen;***

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

 ***Detoxification;***

(b). Identify the substance that may be present in specimens P and Q that may have caused the observations made in the experiments. (1 marks)

 ***- Catalase enzyme;***

(c) Explain how crushing affected the results of the experiments. (3 marks)

***-Increases the surface area; that comes into contact with Hydrogen peroxide; exposing more catalase enzyme to react with hydrogen peroxide;***

(d) What is the importance of the substance named in (b) above in a living organism? (3 marks)

***-Reacts with the toxic Hydrogen peroxide; produced in the body in metabolic processes; converting it into harmless substances, Water and Oxygen;***