**MARKING SCHEME**

231/3

Biology paper 3

(Practical)

1 ¾ HRS

December 2021.

**MOKASA MOCK**

***Kenya Certificate of Secondary Education 2021***

231/3

Biology paper 3

(Practical)

TIME: 1 ¾ HRS

December 2021.

**1.** You are provided with irish potato tuber labeled specimen **K,** use it to answer questions that follow.

Cut out two cubes whose sides measure 1cm from the irish potato provided

Label three test-tubes as, **A**, **B** and **C**  and put them into the test-tube rack.

**A )** Crush one cube to obtain a paste and add about 15 cm3 of distilled water to the paste to form a solution and then carry out the following procedure;

**i)** Use a measuring cylinder to pour 10 cm3 of potato extract solution into test-tube **A**.

**ii)** Use the measuring cylinder to transfer 5 cm3 of potato solution extract from test-tube **A** to test- tube **B**.

**iii)** Use the measuring cylinder to add 5 cm3 of distilled water to test-tube **B**. Place a stopper in test-tube **B** and shake it.

**iv)** Remove the stopper. Use the measuring cylinder to transfer 5 cm3 of the liquid in test- tube **B** to test-tube **C**.

**v)** Use the measuring cylinder to add 5 cm3 of distilled water to test-tube **C**. Place a stopper in test-tube **C** and shake it. Using a measuring cylinder reduce the volume of solution **C** to 5 cm3.

**a)** Table below shows the percentage concentration of the potato extract solution.

|  |  |
| --- | --- |
| test-tube | percentage concentration of potato extract solution |
| **A** | 100.00 |
| **B** | **50.00** |
| **C** | **25.00** |

Complete the Table above by calculating and writing in the percentage concentration of potato extract solutions in test-tube **B** and **C**. **2mks**

**b )** Using a measuring cylinder pour 1 cm3 to each of hydrogen peroxide to the contents in test tube **A** to **C** and make the observations **3mks**

|  |  |
| --- | --- |
| **Test tube** | **Observations** |
| **A** | **A lot/ more/ high amount of effervescence/bubbles** |
| **B** | **Moderate/ average amount of bubbles/effervescence** |
| **C** | **Little / few/small amount of effervescence/bubbles** |

**( i)** What was the aim of the investigation above **1mk**

**To determine the effect of catalase (enzyme) concentrarion on the rate of reaction/oxygen production**

(ii) write the word equation for the reactions taking place in the test tubes **1mk**

**catalase**

**Hydrogen peroxide Water + Oxygen**

**enzyme**

**(iii)** What will be the expected observation if the irish potato was replaced with a piece of mammalian liver **1mk**

**More effervescence/ bubbles produced when of liver was used as compared to when of irish potato was used.**

**(iv)** Explain your answer in c (iii) above **2mk**

**Liver is animal excretory organ; liver has a high concentration of catalase enzymes to break down high level of toxic hydrogen peroxide produced in the liver.**

**(B)**  Crush the remaining cube to obtain the paste. Use the reagents provided to and carry out food test on the extract. **(4mks**)

|  |  |  |  |
| --- | --- | --- | --- |
| TEST | PROCEDURE | OBSERVATIONS | CONCLUSION |
| **Iodine test** | **To 2 ml of food substance/ potato extract (solution) add 2/3 drops of iodine solution and shake** | **The colour changes to blue – black** | **Starch present** |
| **Benedict’s test** | **To 2 ml of food substance/ potato extract (solution) add equal amount of Benedict’s solution and heat to boil** | **The blue colour of Benedict’s solution is retained/ remain** | **Reducing sugars absent** |

**2.** You are provided with specimens labeled **L** and **M**. Study them then answer questions that follow:

a) Identify the specimens. **(2mk)**

**L**..**Axis vertebra**

**M..Lumbar vertebra**

b) Name the part of the body where each is found. **(2mk)**

**L**..**Neck region**

**M..Abdominal region**

c) State **three** adaptive characteristic features of the bone **L**. **(3mks)**

**Has an odontoid process that fits into the neural canal of the atlas and allows for rotational movements of the head.**

**Has a broad neural spine for attachment of neck muscles.**

**Has a neural canal for passage of spinal cord**

**Has a neural arch that protects the spinal cord**

d)State two observable differences between bones L and M. **(2mks)**

|  |  |
| --- | --- |
| Bone L | Bone M |
| **Has short transverse processes** | **Large,well-developed transverse processes** |
| **Has an odontoid process** | **Lacks odontoid process** |

e) Study the diagrams below and answer questions that follow.

C

**I)** Identify the bone labelled C in the diagram. **(1mk)**

**Humerus**

**II)** Name the type of joint and bone formed at the proximal and distal end of bone B **(4mks)**

Proximal end.

(i)Bone…**Pelvic/hip girdle**

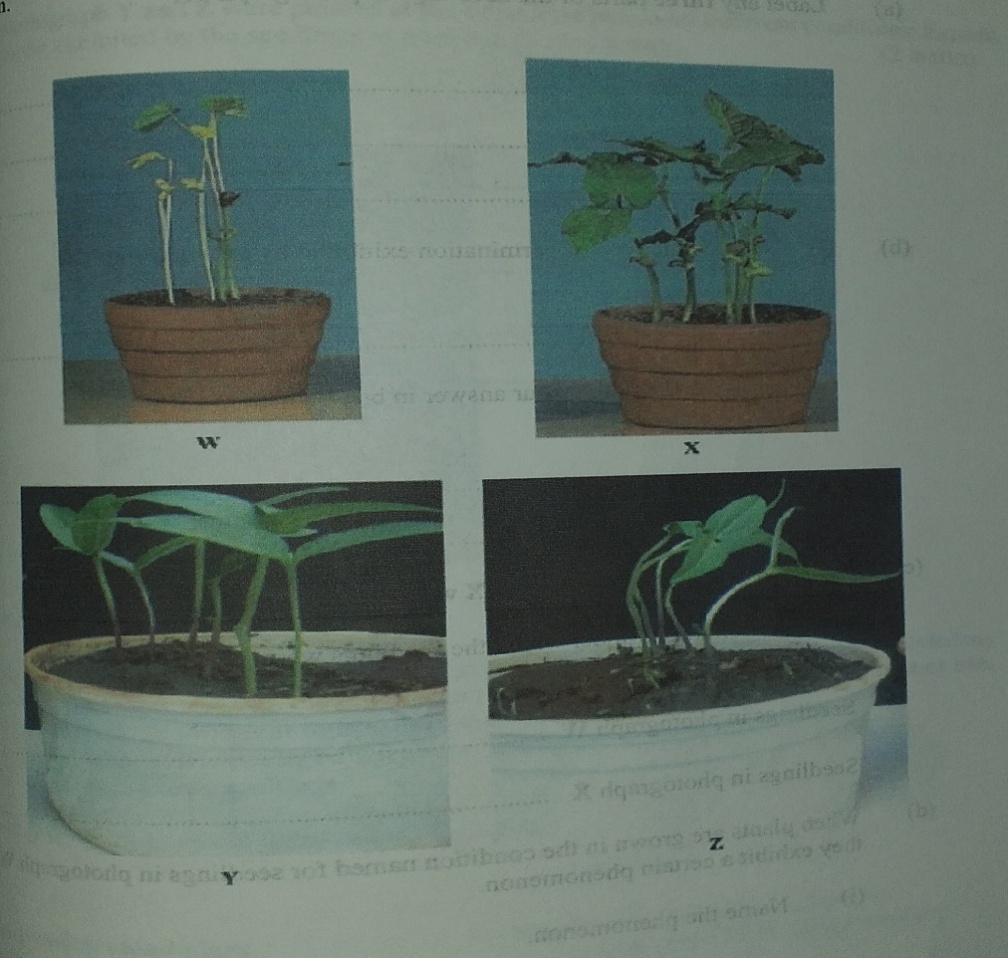
(ii)Type of joint…**ball and socket join**

Distal end:

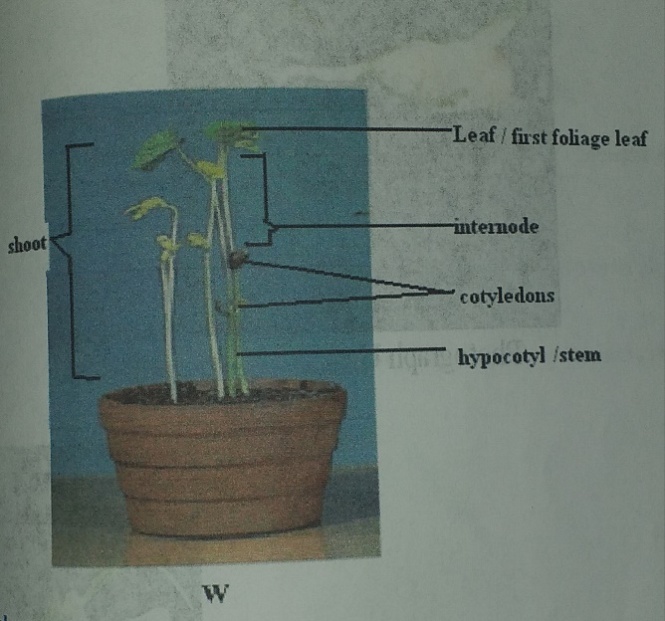
(i)Bone(s)…**Tibia and fibula**

(ii)Type of joint…**Hinge joint**

3. The photo graphs labelled **W, X, Y** and **Z** show seedlings that were grown under different conditions. Examine them.



(a) Label any **two** parts of the seedlings in photograph **W**. **(2 marks)**



(b)(i)Name the type of germination exhibited by the seedlings. (**1 mk)**

***Epigeal***

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

***Cotyledons move above the ground/above soil***

(c)Seedlings in photographs **W** and **X** were planted at the same time. State the conditions under which the seedlings were grown. **(2 Mks)**

(i) Seedlings in photograph **W**.

***Grown in the dark/insufficient light/absence of light***

(ii) Seedlings in photograph **X**.

***Grown in light/sufficient light/adequate light***

(d) When plants are grown in the condition named for seedlings in photograph **W**, they exhibit a certain phenomenon.

(i) Name the phenomenon. **(1 mk)**

***Etiolation***

(ii) State the significance of the phenomenon named in d(i). **(1 mk)**

***To reach /search/obtain/seek light***

(e) Using observable features only, state **two** differences between the seedlings in photographs **W** and **X**. **(2mks)**

|  |  |
| --- | --- |
| **W** | **X** |
| Long internodes/stems | Short internodes/stem |
| Long and thinner stem | Short and thicker stem |
| Yellow/light green leaves | Green leaves |
| Small leaves | Large/big leaves |

(f) Seedlings in photographs **Y** and **Z** were planted at the same time but under different conditions. Explain how the response exhibited by seedlings in photograph Z occurred. **(2 mks)**

***Seedling subjectedto unidirectional/source of light; causes Auxins to migrate/diffuse/move to the dark side of the shoot; high auxins conc*. On *the dark side;causing faster cell elongation on that side than on the lit side hence the bending***

***N/B sequence must be right***