**LIFE SCIENCES GRADE 11**

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| --- | --- |
| **Total** |  |
|  | **30** |

**Practical Task Term 3 2024: Gaseous Exchange and Nutrition**

**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Duration:** 30 minutes

**INSTRUCTIONS TO LEARNERS:**

**Read the following instructions carefully before answering the questions.**

1. This is a formal SBA task and needs to be done under supervised conditions in the classroom.
2. Each learner completes this task on his/her own (under test conditions).
3. Present your answers per the instructions of each question.
4. Draw all diagrams in pencil and labels in blue ink.
5. The diagrams in this task may NOT be drawn to scale.

**QUESTION 1**

Grade 11 learners investigated the digestion of fat in milk. The learners set up 5 test tubes containing the substances shown in the table 1 below and managed to obtain the results as shown.

Table 1

|  |  |
| --- | --- |
|  | **Test tube number** |
| **Contents in the test tube** | **1** | **2** | **3** | **4** | **5** |
| Milk (ml) | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Indicator (ml) | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Enzyme (ml) | 1.0 | 1.0 | 1.0 | 1.0 | 0.0 |
| Distilled water (ml) | 1.0 | 0.9 | 0.8 | 0.6 | 0.5 |
| Alkaline solution (ml) | 0.0 | 0.1 | 0.2 | 0.4 | 0.5 |
| Temperature (˚C) | 35 | 35 | 35 | 35 | 35 |

The indicator changes from colour **Pink** in alkaline conditions to **colourless** in acidic conditions.

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Table 2 shows the times taken for the indicator in each test tube to become colourless.

Table 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test tube number** | **1** | **2** | **3** | **4** | **5** |
| **Time (minutes)** | 4.5 | 7.8 | 16.5 | 22.1 | no change |

 1.1 Why were the 5 test tubes kept at the same temperature? (1)

 1.2 Give a reason why test tube 5 did not contain any enzyme. (1)

 1.3 Name the enzyme used in this investigation. (1)

 1.4 Explain why the indicator changes from pink to colourless. (2)

 1.5 In a second investigation, the student set up TEST TUBE 3 again.

 but added 1ml of bile salts to the test tube. The indicator became

 colourless in 2.5 minutes. Explain why. (4)

 **(9)**

**QUESTION 2**

An enzyme extracted from the stomach breaks down protein. Boiled egg white is made mainly of protein. A learner investigated the effects of temperature activity of the enzyme on the digestion of the egg white.

* The learners set up six test tubes each containing the same concentration
* of enzyme and hydrochloric acid.
* Each tube was placed in a water bath at a different temperature.
* All the tubes were left in the water bath for 5 minutes.
* A cube of egg white of the same size was added to each of the tubes.
* The time taken for the cube of egg white to disappear in each tube was
* recorded.
* The diagram below shows the six test tubes and the results.



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Tube** | **A** | **B** | **C** | **D** | **E** | **F** |
| **Temperature of contents(˚C)** | 20 | 30 | 40 | 50 | 60 | 70 |
| **Time for cube of egg white to disappear (mins)** | 17 | 5 | 9 | 12 | did not disappear | did not disappear |

|  |  |  |
| --- | --- | --- |
| 2.1 | State the: a) Independent variable b) Dependent variable  | (1)(1) |
| 2.2 | Explain why hydrochloric acid was added to the test tubes. | (1) |
| 2.3 | Calculate the difference in the time taken to digest the cube of egg white between test tubes B and D. | (2) |
| 2.4 | Draw a bar graph to show the results of test tubes A, B, C and D | (6) |

 . **(13)**

**Question 3**

Gaseous exchange is the biological process by which gases move passively by diffusion across a surface. At each cell in the body, O2 is exchanged for a waste gas called CO2. Your bloodstream then carries this waste gas back to the lungs where it is removed from the bloodstream and then exhaled. In humans this vital process is automatically performed by the lungs and respiratory system.

3.1 Explain why it is not advisable to sleep in an unventilated room where a heater is switched on. (3)

* 1. Draw a labeled diagram of an alveolus and indicate both the direction of gaseous exchange and the direction of blood flow. (5)  **[8]**

**TOTAL: 30**