



**FURTHER EDUCATION &  
TRAINING PHASE (FET)  
LIFE SCIENCES  
SBA EXEMPLAR BOOKLET  
GRADES 10-12**

## FOREWORD



The Department of Basic Education has pleasure in releasing a subject exemplar booklet for School Based Assessment (SBA) to assist and guide teachers with the setting and development of standardised SBA tasks and assessment tools. The SBA booklets have been written by teams of subject specialists to assist teachers to adapt teaching and learning methods to improve learner performance and the quality and management of SBA.

The primary purpose of this SBA exemplar booklet is to improve the quality of teaching and assessment (both formal and informal) as well as the learner's process of learning and understanding of the subject content. Assessment of and for learning is an ongoing process that develops from the interaction of teaching, learning and assessment. To improve learner performance, assessment needs to support and drive focused, effective teaching.

School Based Assessment forms an integral part of teaching and learning, its value as a yardstick of effective quality learning and teaching is firmly recognised. Through assessment, the needs of the learner are not only diagnosed for remediation, but it also assists to improve the quality of teaching and learning. The information provided through quality assessment is therefore valuable for teacher planning as part of improving learning outcomes.

Assessment tasks should be designed with care to cover the prescribed content and skills of the subject as well as include the correct range of cognitive demand and levels of difficulty. For fair assessment practice, the teacher must ensure that the learner understands the content and has been exposed to extensive informal assessment opportunities before doing a formal assessment activity.

The exemplar tasks contained in this booklet, developed to the best standard in the subject, is aimed to illustrate best practices in terms of setting formal and informal assessment. Teachers are encouraged to use the exemplar tasks as models to set their own formal and informal assessment activities.

A handwritten signature in black ink, appearing to read 'H. M. Mweli'.

MR HM MWELI  
DIRECTOR-GENERAL  
DATE: 13/09/2012

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## 1. INTRODUCTION

Assessment is a continuous planned process of identifying, gathering and interpreting information about the performance of learners, using various forms of assessment. It involves four steps: generating and collecting evidence of achievement, evaluating this evidence, recording the findings and using this information to understand and assist in the learners' development to improve the process of learning and teaching. Assessment should be both informal (Assessment for Learning) and formal (Assessment of Learning). In both cases regular feedback should be provided to learners to enhance the learning experience.

School-based assessment (SBA) forms part of the formal assessment component. It is a purposive collection of learners' work that tells the story of the learners' efforts, progress or achievement in attaining knowledge (content, concepts and skills) in the subject. The advantages of school-based assessment can be summarised as follows:

- It provides a more balanced and trustworthy assessment system, increasing the range and diversity of assessment tasks.
- It improves the reliability of assessment because judgments are based on many observations of the learner over an extended period of time.
- It empowers teachers to become part of the assessment process and enhances collaboration and sharing of expertise within and across schools.
- It has a professional development function, building up practical skills in teacher assessment, which can then be transferred to other areas of the curriculum.

School-based assessment forms part of a year-long formal Programme of Assessment in each grade and subject. The assessment tasks should be carefully designed to cover the content of the subject as well as the range of skills and cognitive levels that have been identified in specific aims. Tests, practical tasks, assignments and projects make up the SBA component in Life Sciences.

Teachers should ensure learners understand the assessment criteria and have extensive experience using it for self- and peer assessment in informal situations before conducting a planned formal assessment activity. Teachers should also have used these criteria for informal assessment and teaching purposes before they conduct any formal assessment so that learners are familiar with the criteria and the assessment process.

## 2 AIMS OF THE PROJECT

Through this publication it is envisaged that TEACHER capacity will be increased in respect of each of the following:

- Differentiating among the nature of the different types of assessment tasks (assignments, projects, practical tasks, tests and examinations)
- Developing assessment tasks that are balanced in terms of cognitive levels, topics and skills
- Developing a marking guideline that:
  - Is appropriate to the task
  - Clearly shows mark allocation and distribution
  - Includes alternative answers
- Developing tasks that contain a variety of question types

Through this publication it is also envisaged that LEARNERS will benefit by:

- Developing an understanding of the differences amongst the nature of the various types of assessment tasks
- Being exposed to assessment tasks that are of the same standard as those that they are exposed to during the course of the year.

## 3. PROGRAMME OF FORMAL ASSESSMENT IN LIFE SCIENCES

- This includes all assessment tasks that make up the formal programme of assessment for the year.
- Formal assessment tasks are marked and recorded by the teacher for promotion and certification purposes.
- All tasks must be subjected to pre- and post-moderation to ensure that appropriate standards are maintained.
- The table that follows shows the number and types of assessment tasks required in the Grade 10 and 11 year.

TERM	Task	Weighting (% of SBA)	% of Promotion Mark
1	Practical Minimum 30 marks	15	25
	Test Minimum 50 marks	10	
2	Test Minimum 50 marks	10	25
	Practical Minimum 30 marks	15	
	Mid-year Exam One paper – 150 marks	25	
3	Test Minimum 50 marks	10	

	Project/Assignment* Minimum 50 marks	15	
<b>Total</b>		<b>100</b>	
<b>Practical exam</b>		20%	<b>75</b>
<b>Final examination (Paper 1 + 2)</b>		80%	

**\*NOTE: At least ONE project and ONE assignment must be done over the Grade 10 - 11 years.**

A description of the requirements for each of the different types of assessment tasks follows below.

### **3.1 Practical tasks**

When designing the practical tasks, the Life Sciences teacher must ensure that:

- All seven skills under Specific Aim 2 listed below are covered over the two practical tasks:
  1. Follow instructions
  2. Handle equipment or apparatus
  3. Make observations
  4. Record information or data
  5. Measure accurately
  6. Interpret information
  7. Design/Plan an investigation
- At least ONE of the practical tasks includes manipulation of apparatus and/or collection of data.
- Any ONE practical task assesses at least three of the seven skills and must include skill 6 and/or 7.
- A minimum of 30 marks are allocated to a practical task.

### **3.2 Research Project**

At least ONE of the tasks across Grades 10 and 11 must be a research project.

When designing the research project, the Life Sciences teacher must ensure that it:

- Is a long-term task (at least 3 weeks of non-contact time)
- Has a minimum mark of 50
- Covers Specific Aims 1, 2 and 3
- Is recorded in Term 3 even if it is given and assessed in Term 1 or Term 2
- Is an investigative task
- Focuses on accessing knowledge through literature research as well as through primary sources such as people
- Includes sub-skills such as:
  - Formulating investigative questions and hypotheses

- Gathering information from a variety of sources
- Manipulating and processing information
- Analysing information
- Identifying patterns
- Evaluating data
- Drawing valid conclusions
- Communicating findings

### **3.3 Assignment**

At least ONE of the tasks across Grades 10 –11 must be an assignment.

When designing an assignment, the Life Sciences teacher must ensure that it:

- Is a short-term task (1 - 1½ hours under controlled conditions)
- Has a minimum mark of 50
- Covers Specific Aims 1, 2 and 3
- Is completed at school and not at home
- Is recorded in Term 3 even if it is given and assessed in Term 1 or Term 2
- Covers a variety of topics
- Includes as many as possible of the following:
  - Analysing and interpreting data
  - Making drawings
  - Plotting graphs
  - Drawing tables
  - Performing calculations
  - Justifying conclusions

### **3.4 Tests and Examinations**

When designing the tests as well as the mid-year and trial examinations, the Life Sciences teacher must ensure that:

- The test is a minimum of 50 marks.
- The test in Term 1 covers all work done in that term.
- The tests in Term 2 and Term 3 should cover the work covered in the respective terms.
- The mid-year examinations cover work completed in Term 1 and Term 2.
- Mainly Specific Aims 1 and 3 are covered.
- Specific Aim 2 (knowledge and understanding of investigations and practical work) is also included, but in a smaller proportion compared to Specific Aims 1 and 3.
- Tests and examinations are balanced in terms of cognitive levels and topic weightings. In this regard weighting grids must be used.
- Tests and examinations are analysed diagnostically and appropriate remedial and intervention strategies are instituted.
- Tests and examinations follow the external examination (in Grade 12) in its design, rigour and format.

#### 4. SCOPE OF THE PROJECT

This publication includes the following:

- Requirements for the Grade 10 and 11 Programme of Assessment for the Life Sciences CAPS curriculum
- A description of the various types of assessment tasks (assignment, project, practical task and test)
- Exemplar assessment tasks (practical task, assignment, test, project and practical exam)
- Marking guidelines for each assessment task

The following exemplars together with their marking guidelines have been included in this publication:

Type of assessment task included in this publication	Number included in this publication (For each grade)	Number required in the Grade 10/11 year	Term in which assessment task is required
Practical	1	2	1 and 2
Assignment	1	1 (if a project is not done)	3
Test	1	3	1, 2 and 3
Project	1	1 (if an assignment is not done)	3
Practical Exam	1	1	4

#### 5 QUALITY ASSURANCE PROCESS FOLLOWED

A team of experts comprised of provincial subject coordinators and subject advisors from provinces was appointed by the DBE to develop and compile assessment tasks. They were required to extract excellent examples of learner tasks from their respective districts and provinces. The panel of experts spent a period of three days at the DBE, developing tasks based on guidelines and policies. Moderation and quality assurance of the tasks were undertaken by subject advisors and a provincial subject coordinator to ensure that they were in line with the CAPS document and circular S1/2017.

## 6 ASSESSMENT TASKS

### 6.1 Gr. 10 Practical Task (Adapted from WC)

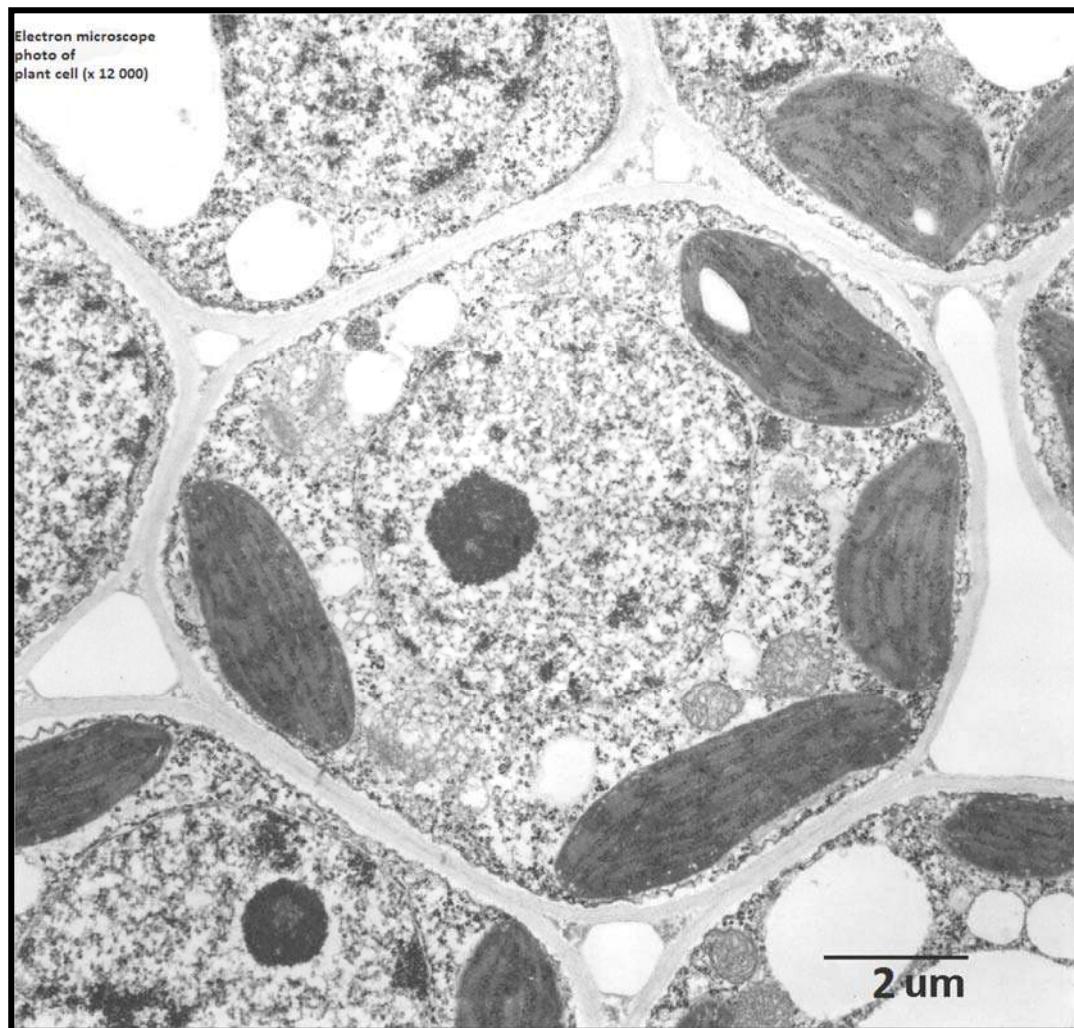
**SURNAME AND NAME:** ..... **GRADE 10:** .....  
**TOTAL: 30** **TIME: 40 min**

#### INSTRUCTIONS

1. You must use a non-programmable calculator where necessary.
2. Write neatly and legibly.

#### QUESTION 1

Study the micrographs below and answer the questions that follow.



1.1 Name THREE observable structures that prove that this is a plant cell.

.....  
.....  
.....

(3)

1.2 What was the magnification under which the cell was viewed under the electron microscope?

.....

(1)

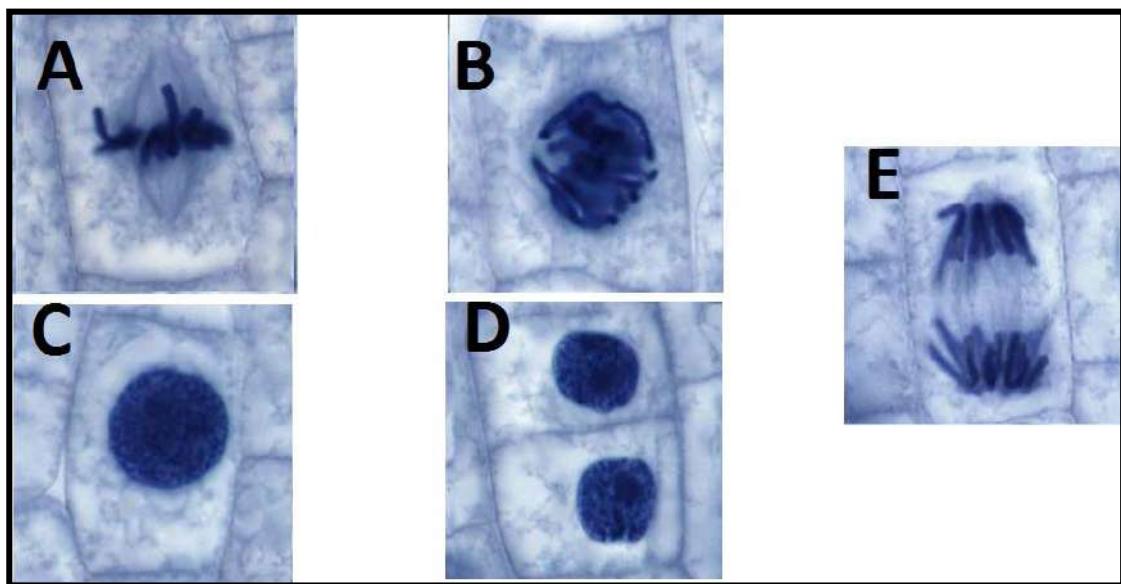
1.3 Calculate the size of the plant cell from the above micrograph.

(5)

(9)

## QUESTION 2

The light micrographs below show cells in different phases of mitosis. Study the micrographs and answer the questions that follow.



2.1

Complete the table below: Identify the phase represented by each diagram and give ONE visible reason for your answer.

Diagram	Phase	Reason for identification
A		
B		
C		
D		
E		

(10)

2.2

If the cell in A had 4 chromosomes, how many chromosomes will be present in each of the two cells in D?

.....

(1)

2.3

Draw a diagram representing the phase before the one shown in micrograph A.



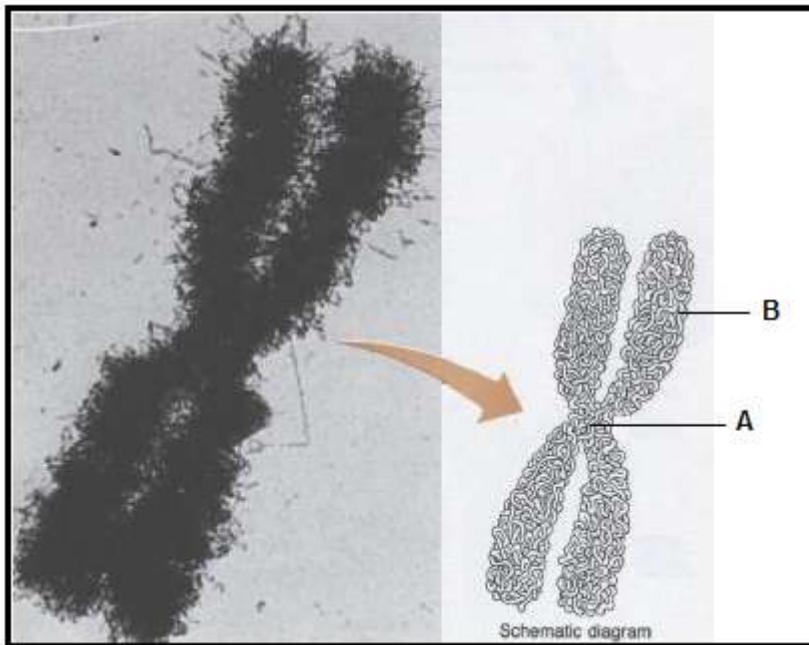
(5)

2.4 State ONE importance of mitosis.

.....  
(1)  
(17)

### QUESTION 3

The micrograph below shows the structure of a chromosome.



3.1 How many chromosomes are found in each human cell?

.....  
(1)

3.2 What is a chromosome made up of?

.....  
Identify labels for parts A and B respectively. (1)

3.3

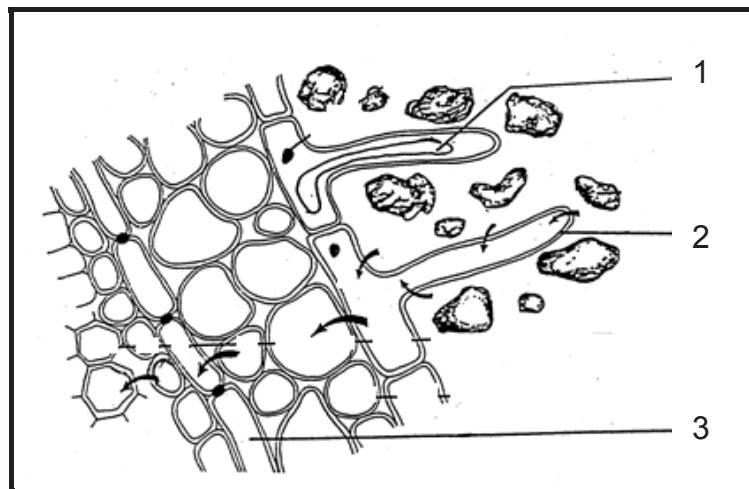
A.....

B.....  
(2)  
(4)

## 6.2 Gr. 10 Assignment (Compiled by team)

## QUESTION 1

1.1 Study the diagram and then answer the questions that follow:

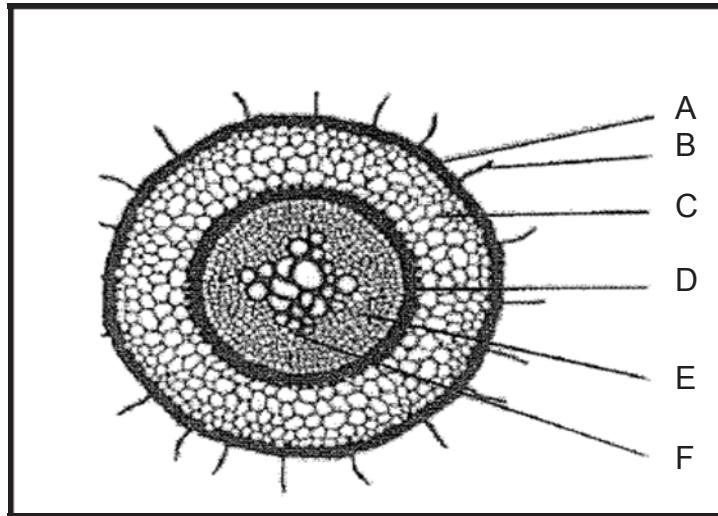


1.1.1 Label parts 1 to 3. (3)

1.1.2 Describe the process of water absorption through the root. (4)

1.1.3 Explain TWO aspects of structural suitability of the xylem to perform its function. (4)  
(11)

1.2 Use the diagram below to answer the questions that follow.



1.2.1 Provide a caption for the diagram. (1)

1.2.2 With reference to the letters A and C, identify the tissue and

discuss the manner in which these tissues are modified to allow water movement into the plant. (4)

1.2.3 What is the purpose of the cambium? (1)

1.2.4 Draw a diagram of a transverse section through the part labelled B. (4)  
(10)  
[21]

## QUESTION 2

2.1 Study the following table illustrating the rate of water absorption by roots and the rate of transpiration through leaves.

TIME	A Rate of water absorption (ml per hour)	B Rate of transpiration (ml per hour)
06h00	1,5	0,5
08h00	1,5	2,0
10h00	3,2	4,5
12h00	4,5	6,0
14h00	5,7	7,4
16h00	7,6	9,3
18h00	8,0	5,5

2.1.1 Identify the independent variable (1)

2.1.2 Draw a line graph to illustrate the results of rate of transpiration. (6)

2.1.3 By using the information in the table, indicate the time the sun rises. (1)

2.1.4 When does the maximum transpiration take place? (1)

2.1.5 Describe the trend of:

(a) The rate of water absorption during the course of the investigation. (2)

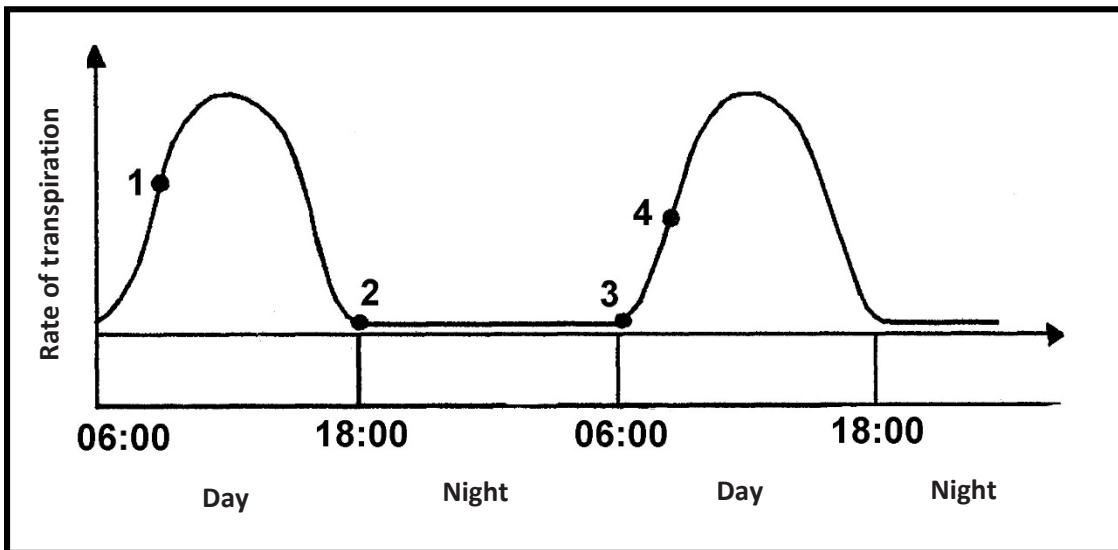
(b) The rate of transpiration during the course of the investigation. (2)

2.1.6 Calculate the difference in the rate of water absorption between 10h00 and 16h00. Show all working. (2)

2.1.7 Explain the effect on the rate of transpiration should fog move over the area after 12h00. (2)  
(17)

2.2

The graph below illustrates the rate of transpiration in a plant under conditions of light and darkness. Study the graph and answer the questions that follow:



2.2.1 Give the numbers which will indicate:

- (i) Open stomata (2)
- (ii) Closed stomata (2)

2.2.2 Mention any TWO conditions in the guard cells responsible for the change at:

- (i) 4 (2)
- (ii) 2 (2)

2.2.3 Draw a labelled diagram of the appearance of the stomata at 1. (4)

(12)

(29)

[50]

### 6.3 Gr. 10 Test

**TOTAL: 50**

**TIME: 50 minutes**

#### INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. ALL drawings must be done in pencil and labelled in blue or black ink.
7. Draw diagrams, flow charts or tables only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

## SECTION A

### QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.3) in the ANSWER BOOK, for example 1.1.4 D.

1.1.1 Which ONE of the following is NOT an abiotic factor in an ecosystem?

- A Light
- B Temperature
- C pH
- D Micro-organisms

(2)

1.1.2 Which of the following describes a community within an ecosystem?

- A All the animals in an area
- B All plants in an area
- C All plants and animals in an area
- D The total number of one species in an area

(2)

1.1.3 The lymphatic system fights infections using:

- A Macrophages and lymphocytes
- B Erythrocytes and antibodies
- C Plasmolysis and erythrocytes
- D Thrombocytes and plasmolysis

(2)

(6)

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.6) in the ANSWER BOOK.

1.2.1 The double-walled sac which encloses the heart

1.2.2 A type of blood system where the blood never leaves the blood vessels

1.2.3 The variety of living organisms on the Earth

1.2.4 A species that occurs only in one specific area or region in the world

1.2.5 The measure of acidity or alkalinity of a solution

1.2.6 All substances having a pH less than 7

(6)

1.3 Indicate whether each of the descriptions in COLUMN I apply to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.5) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 The position of an area in relation to the sun	A: Aspect B: Slope
1.3.2 Temperate with no extremes of temperature, adequate summer rainfall, many animal species occur	A: Succulent Karoo B: Savannah
1.3.3 Organisms that are able to make their own food	A: Autotrophs B: Heterotrophs
1.3.4 Fluid that surrounds cells	A: Lymph B: Tissue Fluid
1.3.5 Carries blood away from the heart	A: Arteries B: Veins

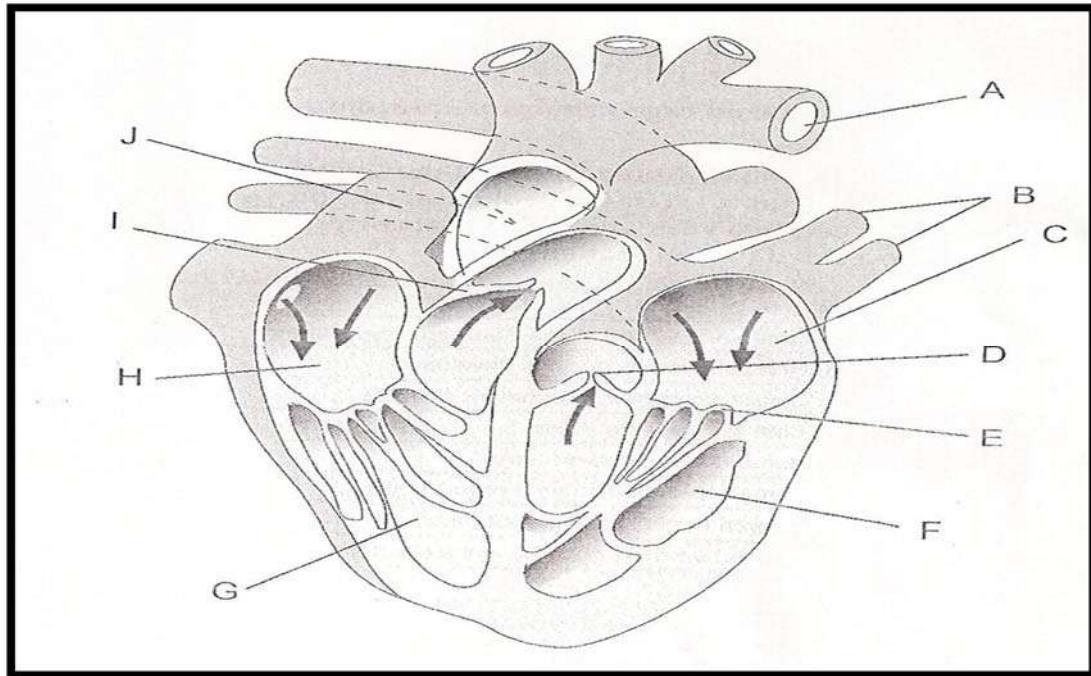
(5x 1) (5)

**TOTAL SECTION A: 17**

## SECTION B

### QUESTION 2

2.1 Study the diagram below and answer the questions that follow.



2.1.1 Label parts A, B, D, and F (4)  
[4]

[4]

2.1.2 State the function of the parts labelled:

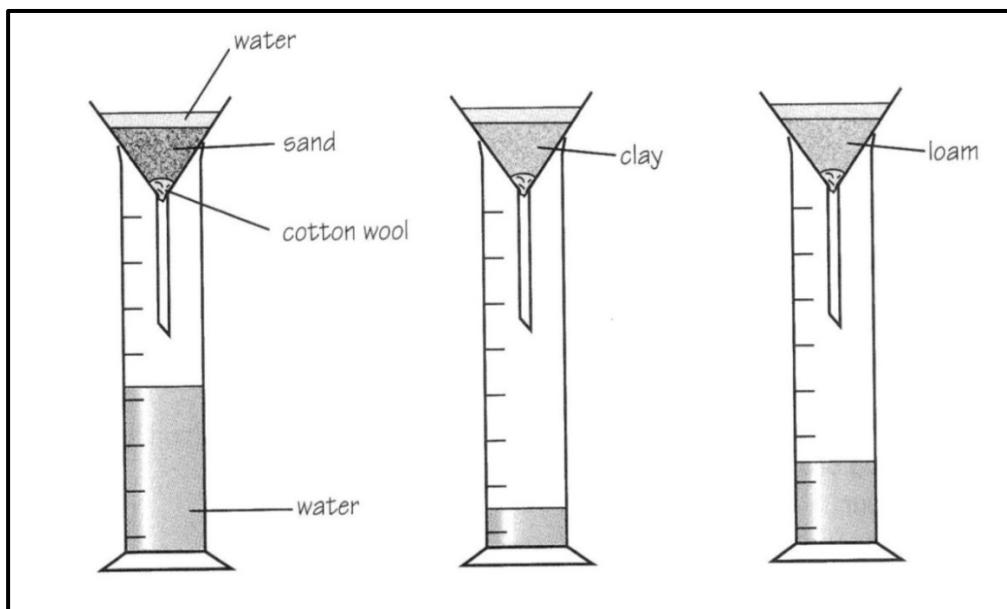
a) A and (1)

b) C (1)

(6)

2.2

An investigation is set up to determine the water-retaining ability for different soil types. Three different soil types (A, B, and C) are used and the same amount of water is poured through the samples



2.2.1 Give a hypothesis for the investigation. (2)

2.2.2 Identify the:

a) Dependent variable (1)

b) Independent variable (1)

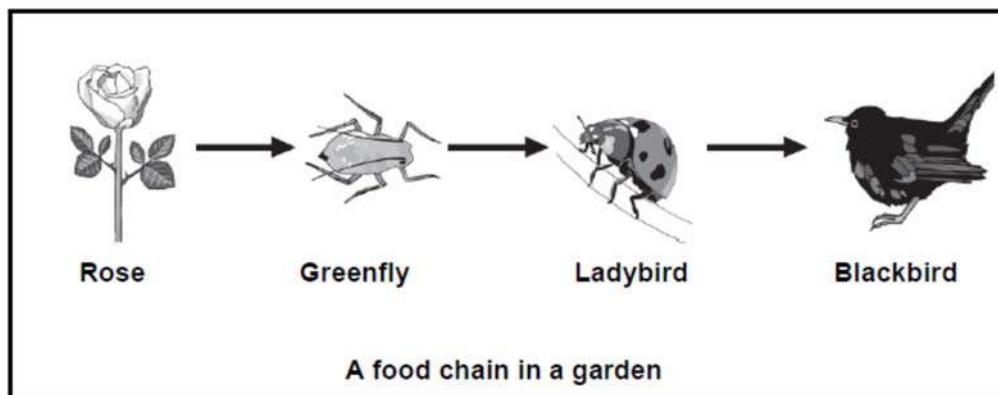
2.2.3 What soil types represent samples A and C? (2)

2.2.4 Name two variables that can be controlled in this investigation. (2)

**(8)  
[14]**

### QUESTION 3

3.1 The diagram below represents a food chain in a garden.



3.1.1 A rose bush contains 1000Kj/m<sup>2</sup>/year of energy and only 10% of this energy is passed on at each trophic level of the food chain. How much energy will be passed on to the blackbird? Show ALL your calculations. (4)

3.1.2 Name the organism above that represents the following:

- (a) Herbivore (1)
- (b) Producer (1)

3.1.3 If all the green flies in this garden were removed, explain what would happen to the populations of the following:

- (a) Rose plants (2)
- (b) Ladybirds (2)
- (c) Blackbirds (2)

**TOTAL SECTION B:** [26]

## **SECTION C**

### **QUESTION 4**

Discuss the cardiac cycle by briefly explaining how the heart functions and also mention how the cycle is regulated.

Content: (5)

Synthesis: (2)

**NOTE:** NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

**TOTAL SECTION C: 7**  
**GRAND TOTAL: 50**

## 6.4 Gr.10 Project (Adapted from Gauteng)

### Total: 50

This project consists of TWO tasks.

Please look at the rubric to see how you will be assessed on the research of your task.

#### Task 1: Background research [17] (40 min. in class)

You need to do research on the biome where you live/will be visited before you are going to do the fieldwork.

1. Write a summary that will include the name of the biome you live in. (Or where you will conduct your fieldwork research). Do research on your biome and identify the type of plants, animals and climate that is typical of your biome. Ensure that you define the following terminology: biome, ecosystem, physiographic factors, biotic and abiotic factors. Write this information in your report. (11)
2. List (after your fieldwork) BOTH positive and negative human impacts on the ecosystem you have studied. (2)
3. You need to write a reference list at the end of your report where you include all the names of the books and authors you have used. Do research on how to do in text referencing as well as a reference list. (4)
4. Submit a report with a title page, which contains a title and your name, as well as the completed task 1 and task 2.

#### Grid to assess Task 1:

Criteria	Allocation of marks		Total
Reference	<b>In text referencing:</b> <ul style="list-style-type: none"><li>• Correct and complete (2)</li><li>• Incomplete/incorrect (1)</li><li>• Not present (0)</li></ul>	<b>Reference list:</b> <ul style="list-style-type: none"><li>• Correct and complete (2)</li><li>• Incomplete/incorrect (1)</li><li>• Not present (0)</li></ul>	4
Report	<b>Human impact:</b> <ul style="list-style-type: none"><li>• None listed (0)</li><li>• 1 listed (1)</li><li>• 2 listed (2)</li></ul>		2
Background information	<ul style="list-style-type: none"><li>• Name of biome (1)</li><li>• Definition required defined (5x1) (5)</li><li>• Description of type of plants in biome (2)</li><li>• Description of type of animals in biome (2)</li><li>• Climate correct (1)</li></ul>		11
Total			17

## Task 2: METHOD AND OBSERVATIONS (Must be completed during the fieldtrip)

- ❖ This symbol indicates an instruction to be performed on a map

### Activity 1: Description of Ecosystem [8]

1. Mark out a 5m x 10 m area as your ecosystem.
2. Use string to mark the boundaries or place some rocks at each corner.
3. Have a good look around your ecosystem without damaging, moving or disturbing anything.
4. Write down a description of your ecosystem, including the following points:
  - ❖ Location of ecosystem (where is it and what is around it) (1)
  - ❖ Size of ecosystem (1)
  - ❖ Main features, such as: a road, a path, large trees, grouping of plants, rocks, type of plants, birds, animals, etc. (2)
5. Draw a map of your ecosystem, include the following on your map:
  - ❖ Heading (1)
  - ❖ Labels of main features of your ecosystem (1)
  - ❖ An arrow to indicate north (1)
  - ❖ A scale bar (1)
6. Take a photo of your ecosystem and include as part of activity 1.

### Activity 2: Biotic Factors [25]

#### Plants

Study the plants in your ecosystem.

Identify TWO plants in your ecosystem. Make use of field guides.

Copy the table below and record this information.

2.1.

Scientific Name	General Name

(4)

## INSECTS

- Observe as many insects as you can from the air, bush, grass and ground in your ecosystem.
- Count how many of each type you have observed.
- Make use of field guides and identify the insects.
- Copy the table below and record this information.

2.2

Insect	Number	What they feed on	Type of consumer

(Two marks per correctly completed row) (4)

- From your observations:

2.3 Draw a food chain that could exist in your ecosystem; include the insects and other organisms that you have observed.

2.4 Indicate the trophic level of each organism in your food chain.

Criteria	Mark allocation
Drew a food chain	1
Arrows in food chain correct	1
Food chain starts with a producer	1
All organisms used in food chain occur in ecosystem	1
Indicated the trophic level of each organism in food chain	1
<b>Total</b>	<b>5</b>

(5)

## Table of ALL the biotic components of your ecosystem.

2.5 Draw a table of all the biotic components studied in your ecosystem under plants and insects and include the following information in your table:

- Name of organism
- Scientific name of organism
- Food source
- Tropic level
- Number of each organism observed, except for producers.
- The following rubric will be used to assess your table.

Criteria	Mark allocation
<b>Heading</b>	Incomplete/Absent 0 Complete (both variables) 1
<b>Descriptive column headings</b>	Incomplete/Absent 0 Complete 1
<b>Descriptive row headings</b>	Incomplete/Absent 0 Complete 1
<b>Format of table</b>	Table completely drawn 1
<b>Data entered in table</b>	All correctly placed 1
<b>Total</b>	<b>5</b>

2.6. Draw a **bar graph** of the different arthropods and the number of each observed. This graph should be recorded in your report. **The following grid will be used to assess your graph:**

Criteria	Mark allocation
Correct type of graph	1
Suitable heading describing both variables and types of graph	2
Bars equal size and spacing equal	1
Suitable scale on y-axis (vertical) Labelling y-axis (vertical)	1
Plotting of bars (all bars correct)	2
<b>Total</b>	<b>7</b>

**TOTAL: 50**

## 6.5 Gr. 10 Practical exam (Taken from FS, 2015)

TIME: 1 hour

TOTAL: 60

### QUESTION 1

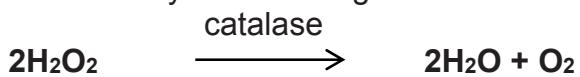
#### FOLLOW INSTRUCTIONS; INTERPRET DATA; RECOGNISE PATTERNS/TRENDS AND MAKE DEDUCTIONS BASED ON EVIDENCE

**Aim:** To demonstrate that different temperatures have an influence on the working of enzymes

Catalase is an enzyme found in most plant and animal tissues. Chicken liver

obtained from a supermarket or butcher can be used as the source of catalase.

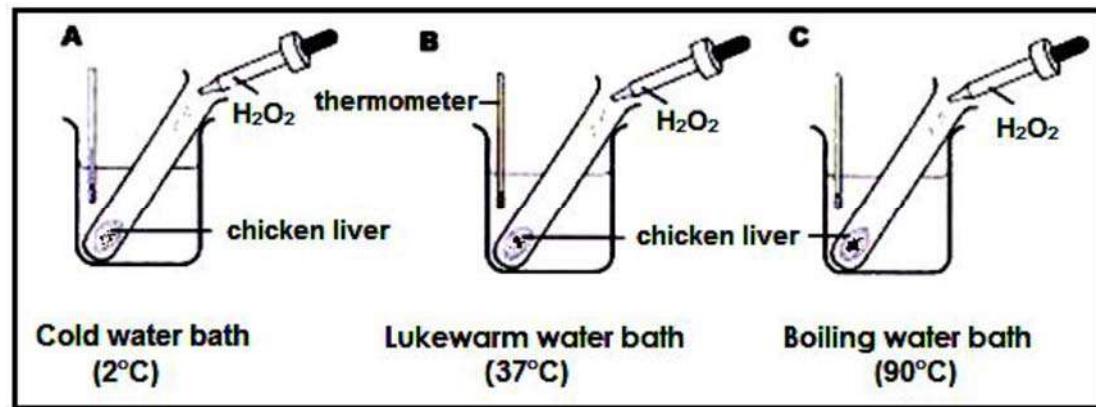
This enzyme speeds up the breakdown of hydrogen peroxide into water and oxygen as indicated by the following reaction.



In the experiment that follows, the oxygen released during this reaction is visible as bubbles. The amount of bubbles released is an indication of the effectiveness of the enzyme catalase.

**Hypothesis:** At a favourable temperature the enzyme will work more effectively and more oxygen bubbles will be released.

**Method:** A group of Grade 10 learners set up the experiment as indicated by the following diagrams and instructions.



#### Instructions:

- Mark three test tubes A, B and C
- Add approximately 1 cm<sup>3</sup> of mashed chicken liver to each test tube
- Place the test tubes in the following water baths:

Test tube	Temperature of water bath (°C)	How the temperature was obtained
A	2	-----
B	37	Slightly heating the water in the glass beaker on a tripod and with a Bunsen burner
C	90	Heating the water close to boiling point

- Add the same quantity of hydrogen peroxide in each test tube. It should be enough to cover the chicken liver
- Observe the amount of gas bubbles released in each test tube after a while

**Answer the following questions:**

- 1.1 How did the learners manage to cool down the water bath with test tube A? (1)
- 1.2 What was the purpose of the three water baths? (1)
- 1.3 Predict what they will observe as a result in test tube:
  - (a) B
  - (b) C
(2)
- 1.4 Briefly explain your answer to QUESTION 1.3 (b) (3)
- 1.5 How could the learners improve the reliability of their investigation? (1)
- 1.6 Provide a conclusion for this investigation. (2)

(10)

**QUESTION 2**

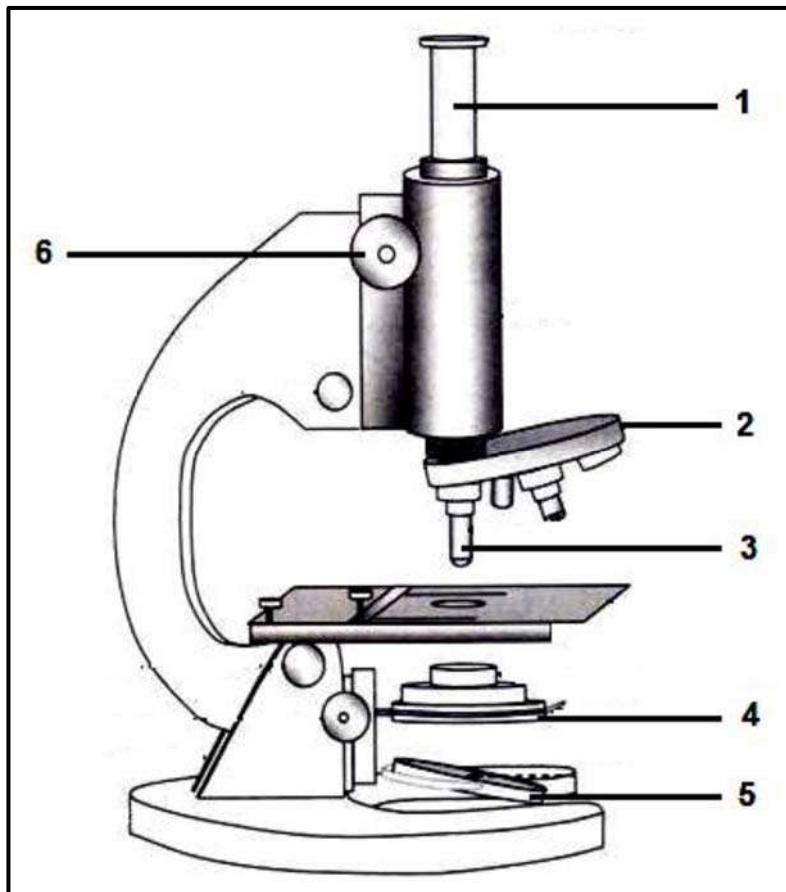
**RECOGNISE AND HANDLE EQUIPMENT OR APPARATUS; ADHERE TO SAFETY RULES; RECORD DATA; MEASURE AND CALCULATE**

2.1

**Aim:** Setting up and using a compound light microscope.

**Method:**

- If available, your teacher will show you a compound microscope or otherwise you can refer to the drawing below
- Handle the microscope with care because it consists of expensive and sensitive parts
- Study the microscope and answer the questions on your answer sheet

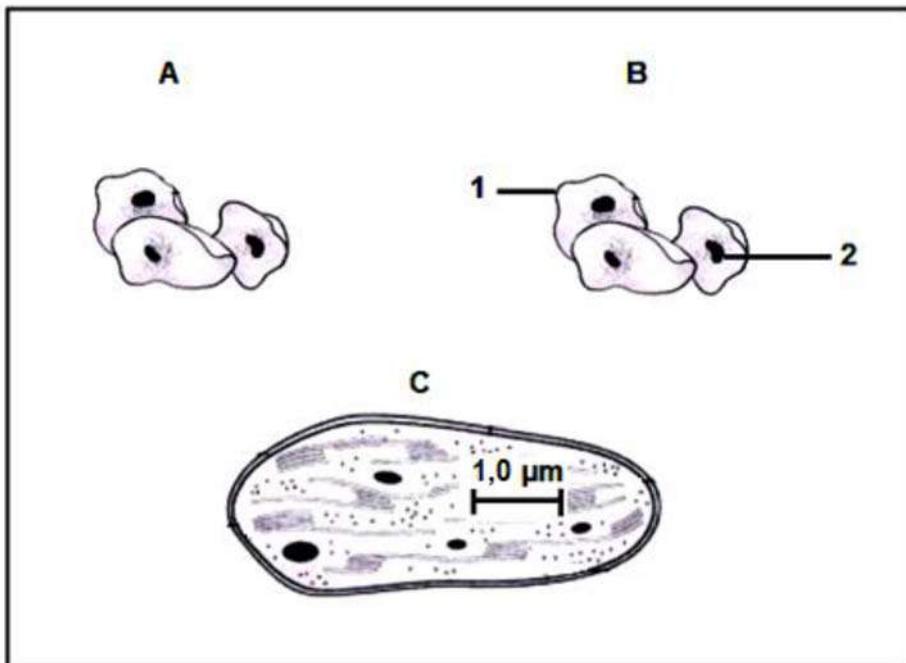


2.1.1 Describe in TWO short steps the most proper way to use part **number 6** until the specimen on the stage is seen in focus through the eyepiece. (2)

2.1.2 Draw a table to present the NAMES and ONE function of each of **parts 3 and 5**. (5)

2.2 When Nomsa investigated the cell structure she made some pencil drawings. **Diagram A** was what she observed by looking at a specimen of cheek epithelium cells through a light microscope. When the teacher assisted Nomsa he added **labels 1 and 2** to **Diagram B**.

**Diagram C** is a chloroplast as seen on a micrograph that the teacher showed.



Remember:  $1000 \mu\text{m}$  (micron) = 1 mm

Answer the following questions:

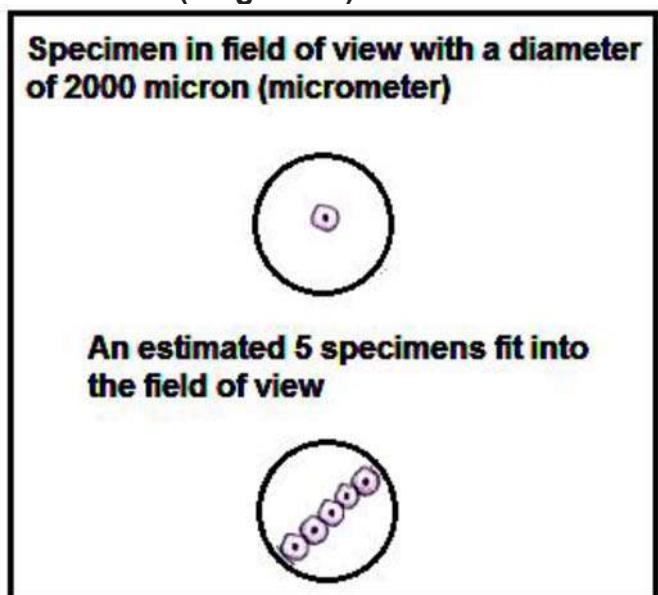
2.2.1 Provide a suitable caption (heading) for **diagram A** (1)

2.2.2 Name the parts that the teacher labelled **1 and 2** (2)

2.2.3 **LEARNERS HAVE A CHOICE ANSWERING THE FOLLOWING QUESTIONS.**

Answer ONLY Question (a) OR Question (b)

(a) The following diagram shows the actual field of view (FOV) of only one cell in **Question 2.2 (diagram A)**.



Calculate the estimated size of the specimen of one epithelium cell.  
Show your working and give the answer in microns ( $\mu\text{m}$ )

(3)

OR

(b) Use a ruler to measure the actual length of the scale and the length of the full specimen in **Question 2.2 (diagram C)**. Use your answers to calculate the actual length of the chloroplast.

**Use the formula:**

Actual length of chloroplast =

$$\frac{\text{measured length of specimen} \times \text{length on scale}}{\text{measured length on scale}}$$

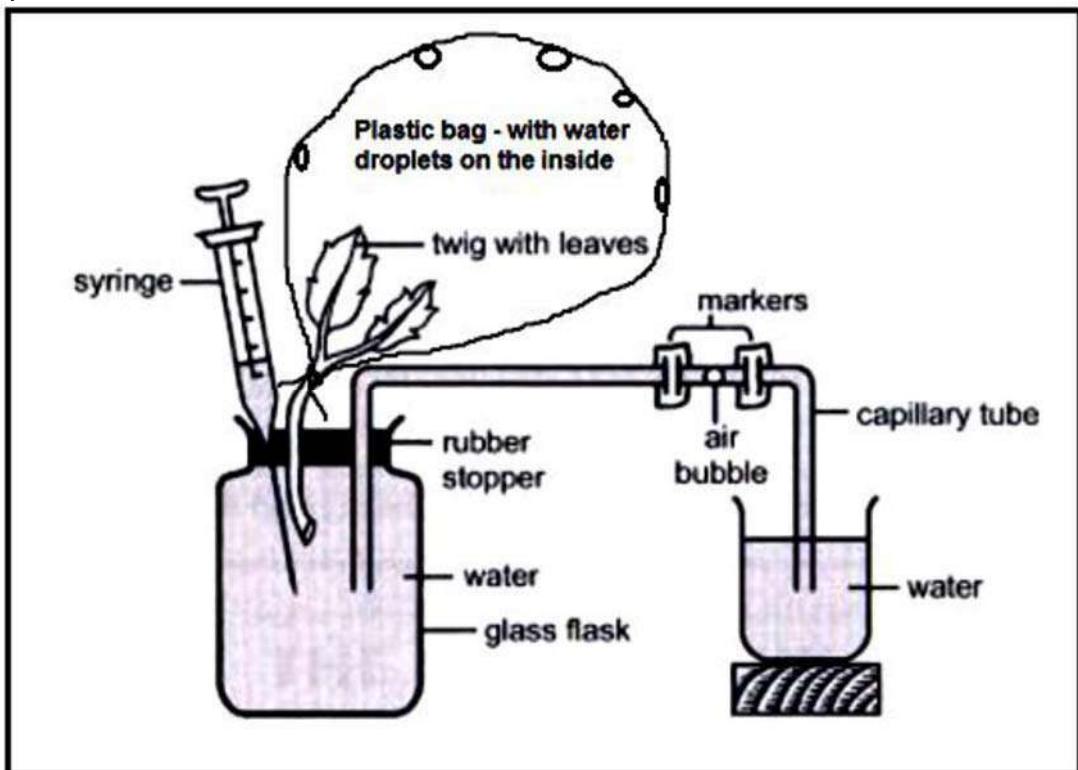
Show all working and give the answer in microns ( $\mu\text{m}$ )

(3)  
(13)

### QUESTION 3

#### PLAN/DESIGN AN INVESTIGATION: IDENTIFY AND CONTROL VARIABLES; INTERPRET INFORMATION AND PREDICT RESULTS

3.1 A group of Grade 10 learners wanted to investigate one of the factors that have an **effect on the rate of transpiration** in plants. They had to plan and design this investigation. Look at the apparatus they used and answer the questions:



3.1.1 Which environmental factor, that has an influence on the rate of transpiration, did the learners investigate? (1)

3.1.2 Identify each of the following for the investigation in QUESTION 3.1:

- (a) Independent variable (1)
- (b) Dependent variable (1)

3.1.3 Name TWO other environmental factors that could influence the validity of this investigation if not well controlled. (2)

3.1.4 Predict how the rate of transpiration for the two factors mentioned in QUESTION 3.1.3 compare to that of the experiment done in QUESTION 3.1. (2)  
(7)

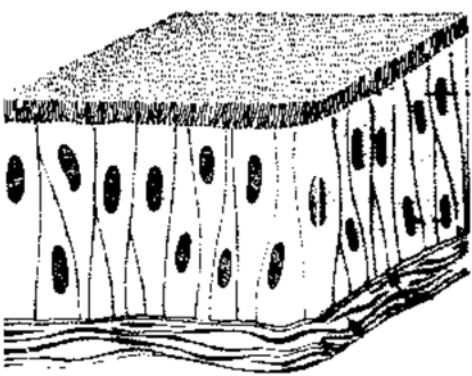
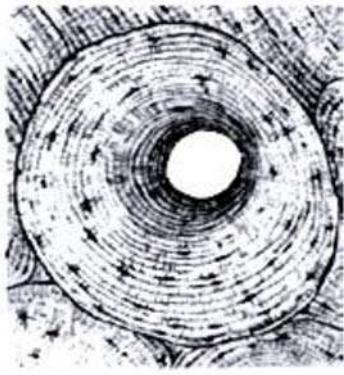
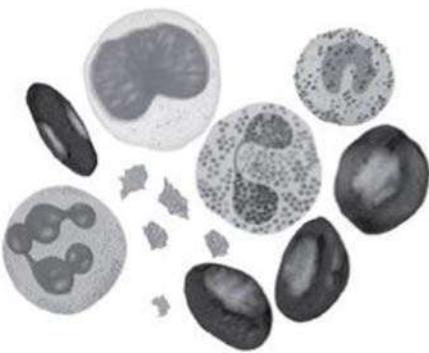
## QUESTION 4

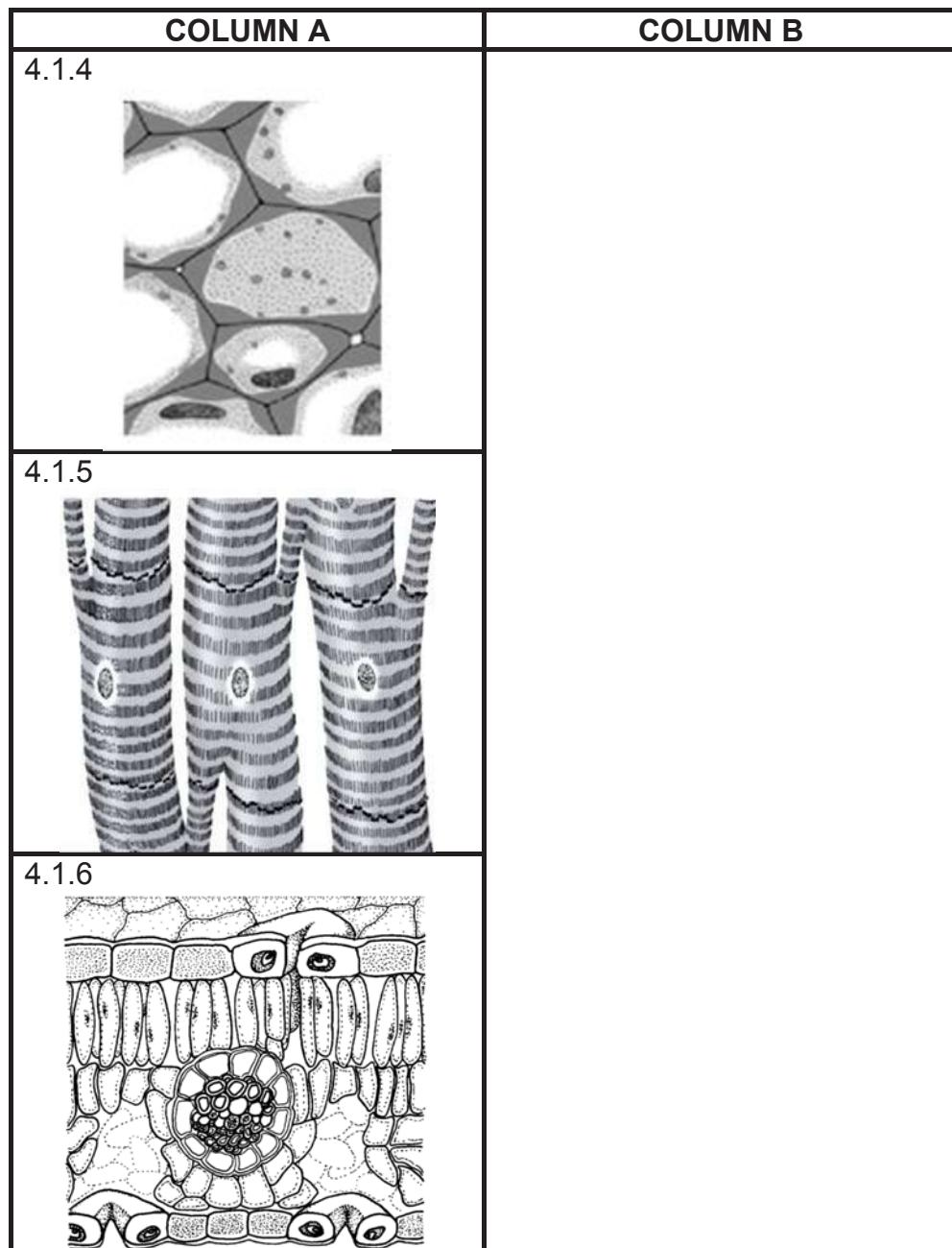
### MAKE OBSERVATIONS BY GROUPING AND COMPARING MATERIALS; INTERPRET INFORMATION BY APPLYING KNOWLEDGE TO PRACTICAL SITUATIONS.

4.1 The following slides and/or micrographs were shown to a group of Grade 10 learners in the laboratory.

Choose the LETTER of the tissue or organ in Column B which best matches the slides/micrographs in Column A

Only write the LETTER of the corresponding item in **Column B** next to the number (4.1.1 to 4.1.6) on your answer sheet.

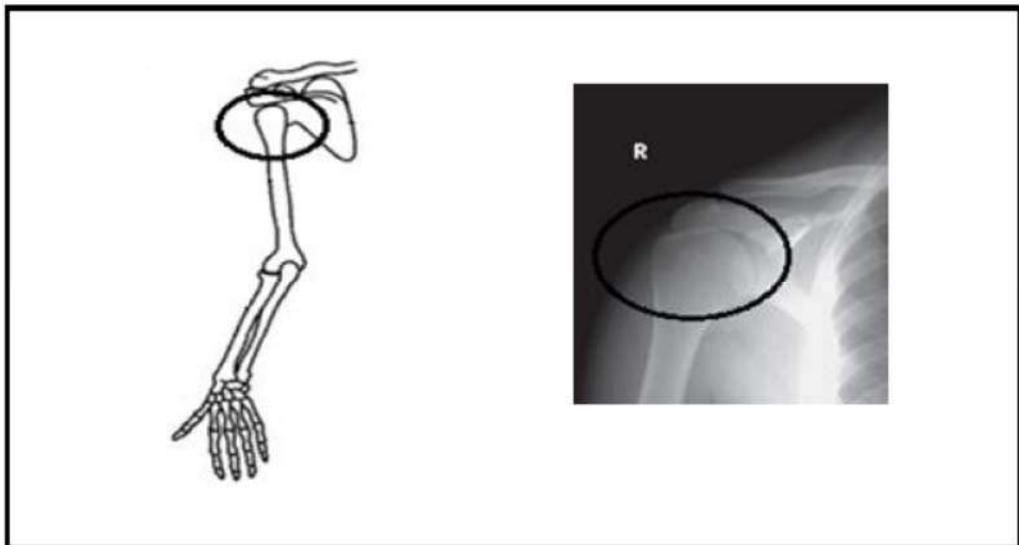
COLUMN A	COLUMN B
4.1.1 	<b>A</b> Bone tissue <b>B</b> Collenchyma <b>C</b> Parenchyma <b>D</b> Cardiac muscle tissue <b>E</b> Dicotyledonous leaf <b>F</b> Smooth muscle <b>G</b> Squamous epithelium <b>H</b> Blood tissue <b>I</b> Ciliated epithelium <b>J</b> Nerve tissue
4.1.2 	
4.1.3 	



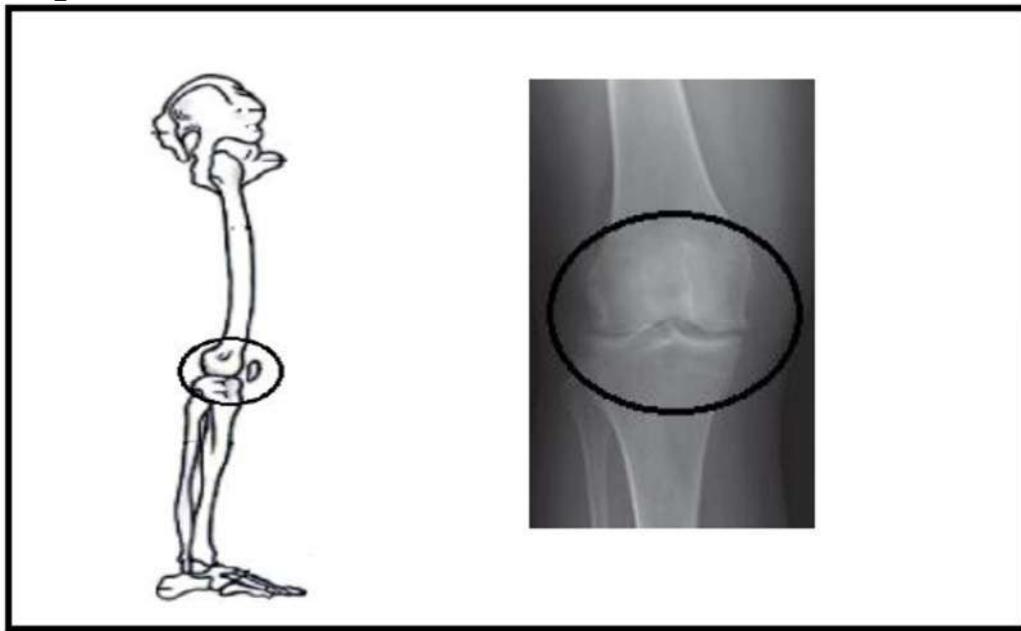
(6)

4.2 Study the following diagrams and accompanying X-ray photos of parts of the human skeleton:

**Diagram X**



**Diagram Y**



4.2.1 Name the joints indicated by the circles and briefly explain the type of movement that takes place at each in:

(a) Diagram X  
(b) Diagram Y

(2)  
(2)  
(4)  
(10)

## QUESTION 5

### PLAN AN INVESTIGATION; HANDLE EQUIPMENT; COLLECT, RECORD, INTERPRET, PRESENT, ANALYSE AND EVALUATE DATA

5.1 Read the following passage.

Grade 10 learners went on a trip to a farm as part of their practical work on “**Investigating relationships in an Ecosystem**”. The farm is situated in a typical grassland biome between 1500 and 3000 metres above sea level. Summers can be either cool and wet or sometimes very hot and dry. The soil is dark with fertile upper layers. The type of grasses that grow on the farm is determined by the pH of the soil. Grasslands have a rich variety of plant species. Grasses are the dominant vegetation with occasional trees and shrubs. This type of vegetation serves as food for animals such as blesbok, springbok and black wildebeest. Small mammals such as hare, vlakvark and meerkat as well as meat eaters like jackal and rooikat are regularly seen on the farm.

The Grade 10 class, under supervision of the teacher, conducted their investigation on a Friday and Saturday during the month of September. They were divided into small groups where each group had to plot an area of 10 m x 10 m. They used material such as rope, thermometers, glass bottles, formaldehyde, cotton wool, compasses and insect nets. The learners investigated both abiotic and biotic factors and recorded their data.

*Adapted from “Oxford Successful Life Sciences”*

#### Answer the following questions:

5.1.1 Define the term ecosystem. (2)

5.1.2 Mention TWO planning steps that the learners had to keep in mind before going on the trip. (2)

5.1.3 Why did the learners need the following material?

- (a) Rope (1)
- (b) Glass bottles, formaldehyde and insect nets (1)

5.1.4 Identify the following from the passage:

- (a) ONE physiographic factor (1)
- (b) ONE edaphic factor (1)
- (c) TWO producers (2)
- (d) TWO predators (2)

5.2 The learners used thermometers to measure the environmental temperature over a period of 24 hours. Their findings were recorded in the following table.

Time of day	Environmental temperature (°C)
12:00	26
14:00	28
16:00	26
18:00	23
20:00	18
22:00	15
24:00	13
02:00	11
04:00	11
06:00	12
08:00	16
10:00	23
12:00	26

5.2.1 During which 2-hour interval did the temperature drop the most? (1)

5.2.2 What was the maximum temperature in this 24-hour period? (1)

5.2.3 Draw a line graph to show the environmental temperature changes over the 24-hour period. (6)  
(20)  
[60]

## 6.6 Gr. 11 Practical task

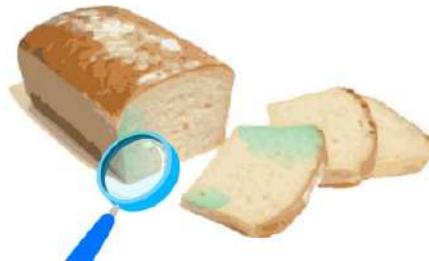
### TERM 1 THE PREVALENCE OF BREAD MOULD (*Rhizopus sp.*) GR.11

#### PRACTICAL SBA TASK

TOTAL: 30

NAME: \_\_\_\_\_

Mould is something that we often take for granted, as something that makes us have to throw the bread away or the cheese smell bad.



Mould is, in fact, a fascinating organism which has had many different uses over the years and our lives would not be the same without it.

Most of us know that food seems to become mouldy more quickly in the summer than in the winter when it is colder. Food in refrigerators seems to keep longer than food left out in the sun. Is this true? Does temperature really affect the rate at which mould grows?

#### AIM

To investigate whether *Rhizopus sp.* grows faster at higher temperatures than at lower temperatures.

#### HYPOTHESIS

1. State a hypothesis for this experiment (2)

---

#### MATERIALS/APPARATUS

**NB. This must be done at school. Use ONLY one loaf of bread for the grade**

- 15 slices of bread – Any sort will do but it is perfectly fine to use cheap white sliced bread as then you will know that all of the slices are a similar size, weight and thickness. You must make a note of the brand and use-by date so that anybody else wanting to repeat the bread mould experiment can use the same type.
- 15 sealable sandwich bags / sandwich bags with ties.
- 1 piece of film or clear plastic with a 10 x 10 cm grid drawn onto it.
- Clean knife
- Chopping board
- Marker pen
- Mask
- Gloves

## METHOD

1. Label the bags as follows:

A1, A2, A3, A4, A5

B1, B2, B3, B4, B5

C1, C2, C3, C4, C5

2. Cut 15 slices of bread into 10 x 10 cm squares using the chopping board and knife.
3. Put each 100 cm<sup>2</sup> slice of bread into a bag and seal the bags tightly.
4. Put the 5 'A' bags into the freezer, the 5 'B' bags into the refrigerator and the 5 'C' bags somewhere in a warm room. Because the bags in the freezer and fridge will not be getting much light, it is best to cover the 'C' bags to make sure that light is a constant.
5. Every 24 hours, preferably at exactly the same time every day, using the plastic grid, count the number of square centimeters of mould on each slice of bread. If the mould covers more than half a square, count it as 1 cm, if less than half a square, count as 0 cm. You must never open the bags.
6. You should repeat these counting processes for 10 days or until there are **significant measurable results**.
7. Keep a careful note of your results for each slice of bread for the entire duration of the investigation.
8. Calculate the average results for sample types A, B and C.
9. Once you have finished, safely dispose of all the bags without opening them.

## PRECAUTIONS

Please note that some people are allergic to mould; ask your doctor or parents. Always wear gloves and a mask, wash your hands, and don't eat or drink whilst you are performing this study.

## OBSERVATIONS

The number of squares covered by mould on each slice of bread

	Day 1			Day 2			Day 3			Day 4			Day 5		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
A 2	B 2	C 2	A 2	B 2	C 2	A 2	B 2	C 2	A 2	B 2	C 2	A 2	B 2	C 2	
A 3	B 3	C 3	A 3	B 3	C 3	A 3	B 3	C 3	A 3	B 3	C 3	A 3	B 3	C 3	
A 4	B 4	C 4	A 4	B 4	C 4	A 4	B 4	C 4	A 4	B 4	C 4	A 4	B 4	C 4	
A 5	B 5	C 5	A 5	B 5	C 5	A 5	B 5	C 5	A 5	B 5	C 5	A 5	B 5	C 5	
Slice number															

	Day 6			Day 7			Day 8			Day 9			Day 10		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1	A	1	1	A	1	1	A	1	1	A	1	1	A	1	1
2	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
3	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
4	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
5	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
A v e	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C

Slice number

## RESULTS

Because each square of bread is  $100 \text{ cm}^2$ , you can express your results as a percentage. For each of the bread types A, B or C calculate the average amount of mould grown over the ten days and write these figures into a **table**.

2.

*Table: The percentage mould coverage for each bread type over a period of 10 days*

(4)

3. Plot this information in three **line graphs** on the same system of axes.



(6)

## DISCUSSION

4. Where does mould come from? (How did it get into the bread?)

---

(1)

5. From the table, describe your results.

---

---

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(3)

**6. CONCLUSION**

Write a conclusion for this investigation.

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(2)

7. How did you ensure reliability in this investigation?

---

(1)

8. State TWO ways in which the validity of this investigation was ensured.

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(2)

9. Suggest ONE way on how the results of the investigation can be used by the food industry.

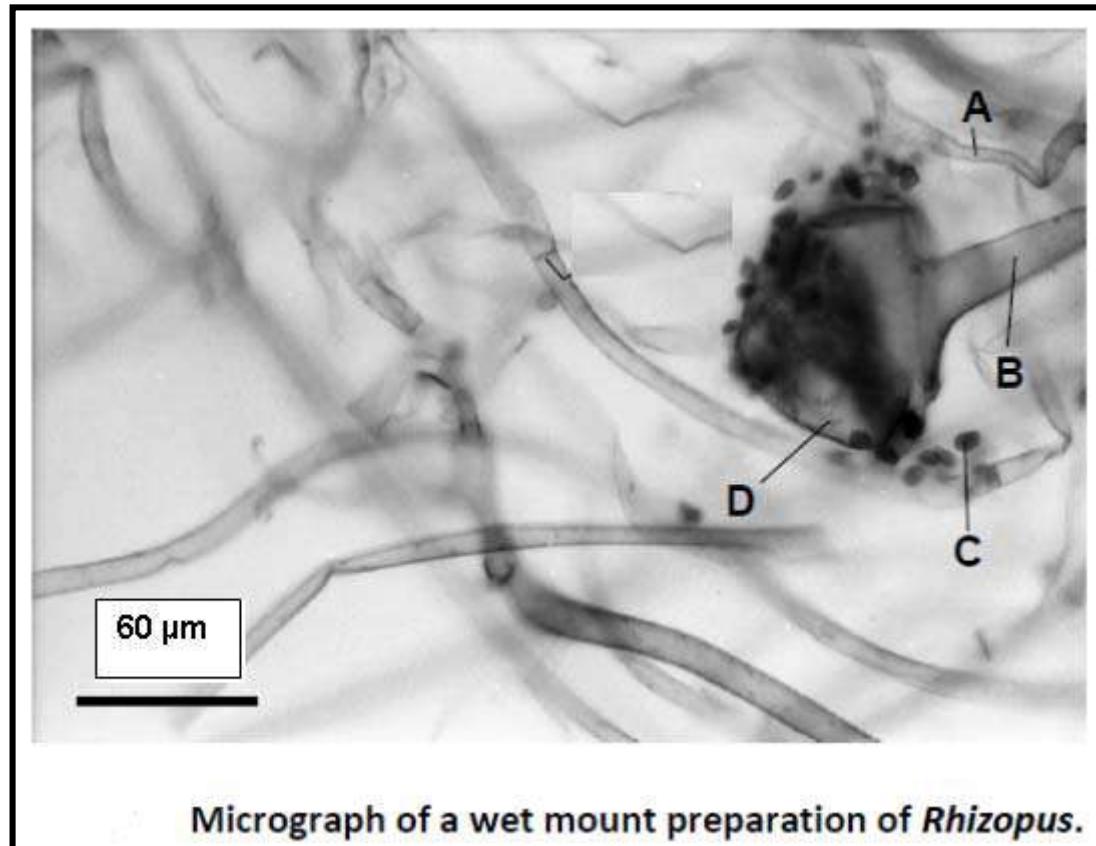
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(2)

Questions 10 and 11 are based on the following micrograph:



10 Identify the parts labelled A, B, C, D.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_

(4)

11 Use the scale line to calculate the length of the structure labelled C.  
(Show all workings)

(3)  
[30]

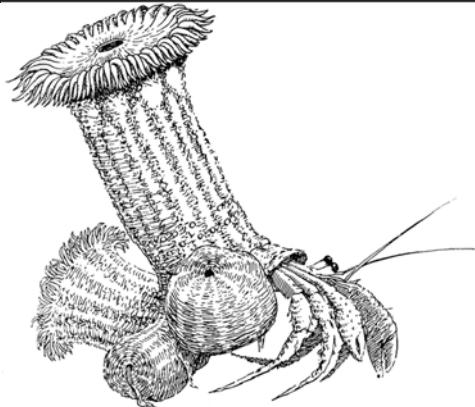
## 6.7 Gr. 11 Assignment

Term 3  
Total: 50

Population Ecology  
Time: 60 minutes

### QUESTION 1

Study the diagrams below. Identify the interactions between the organisms. Classify them as: parasitism, mutualism or commensalism.



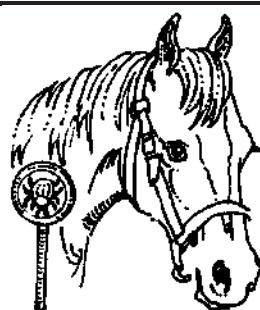
A. As the hermit-crab moves about in search of food, the anemone is brought into contact with a greater supply of food and the crab is protected by the anemone's stinging cells

(2)



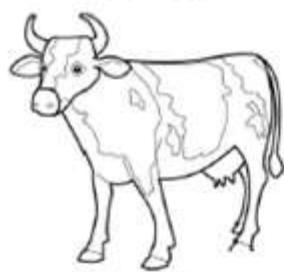
B. In return for shelter, the clownfish cleans the anemones, chasing away their predators and dropping scraps of food for the anemone to eat

(2)



C. Ticks on horses, if not treated, can lead to tick fever.

(2)

**COWS**

Graze in a herd in open fields

**CATTLE EGRET**

Eat insects that get stirred up by large herds of animals

D

(2)



E Ants protect the Acacia from herbivores and kill any plants that start to grow near the tree. The Acacia makes nectar for the ants to eat.

(2)

(10)

**QUESTION 2**

Read the following passage on tsunamis carefully and then answer the questions that follow.

*'Tsunamis are huge waves that begin when the sea floor is violently shaken by an earthquake, a landslide or a volcanic eruption. According to a newspaper report, the death toll from the earthquake-generated tsunami in Asia on 26 December 2004 is estimated at 275 950. This is the second highest earthquake death toll recorded in history.'*

*'The deadliest earthquake on record occurred on 23 January 1556 in China when an earthquake of a magnitude of 8,0 killed an estimated 830 000 people. The earthquake that hit Asia had a magnitude of 9,0 on the Richter scale.'*

*(Note: The magnitude strength of an earthquake is measured on a Richter's scale.)*

Study the table below which shows information on some of the earthquake-generated tsunamis which occurred between 1918 and 2003.

Earthquake-generated tsunamis			
Year	Country	Magnitude on the Richter's scale	Number of deaths
1918	Philippines	8,3	102
1925	Philippines	6,8	428
1950	India	8,7	574
1953	Turkey	7,5	1 070
1974	Pakistan	6,2	5 300
1976	Philippines	8,0	6 500
1985	Mexico	8,1	9 500
1995	Japan	6,8	5 502
2003	Algeria	6,9	2 266

2.1 How many people in total were killed in the Philippines by tsunamis from 1918 to 2003? (Show all workings.) (2)

2.2 Name TWO causes of tsunamis. (2)

2.3 Draw a bar graph to show the number of people killed by tsunamis between 1918 and 2003 in Turkey, Pakistan, Mexico, Japan and Algeria. (7)  
(11)

### QUESTION 3

Four pots of the same size were filled with equal amounts of soil. Seeds were planted in each pot as follows:

Pot A – 25 bean seeds  
 Pot B – 3 pea seeds and 3 bean seeds  
 Pot C – 5 pea seeds and 7 bean seeds  
 Pot D – 9 pea seeds and 9 bean seeds

The seeds were watered well and left in a place with enough sunlight. After two weeks the number of plants in each pot was counted. The average height of the plants above the ground was also measured.

The results are shown in the table below.

	Number of plants	Average height of plants (cm)
Pot A	8	2
Pot B	6	6
Pot C	8	5
Pot D	8	3

3.1 In which pot (A, B, C or D):

- (i) Will intraspecific competition occur? (1)
- (ii) Will the least competition occur? (1)
- (iii) Was a single population found? (1)
- (iv) Will the most interspecific competition occur? (1)

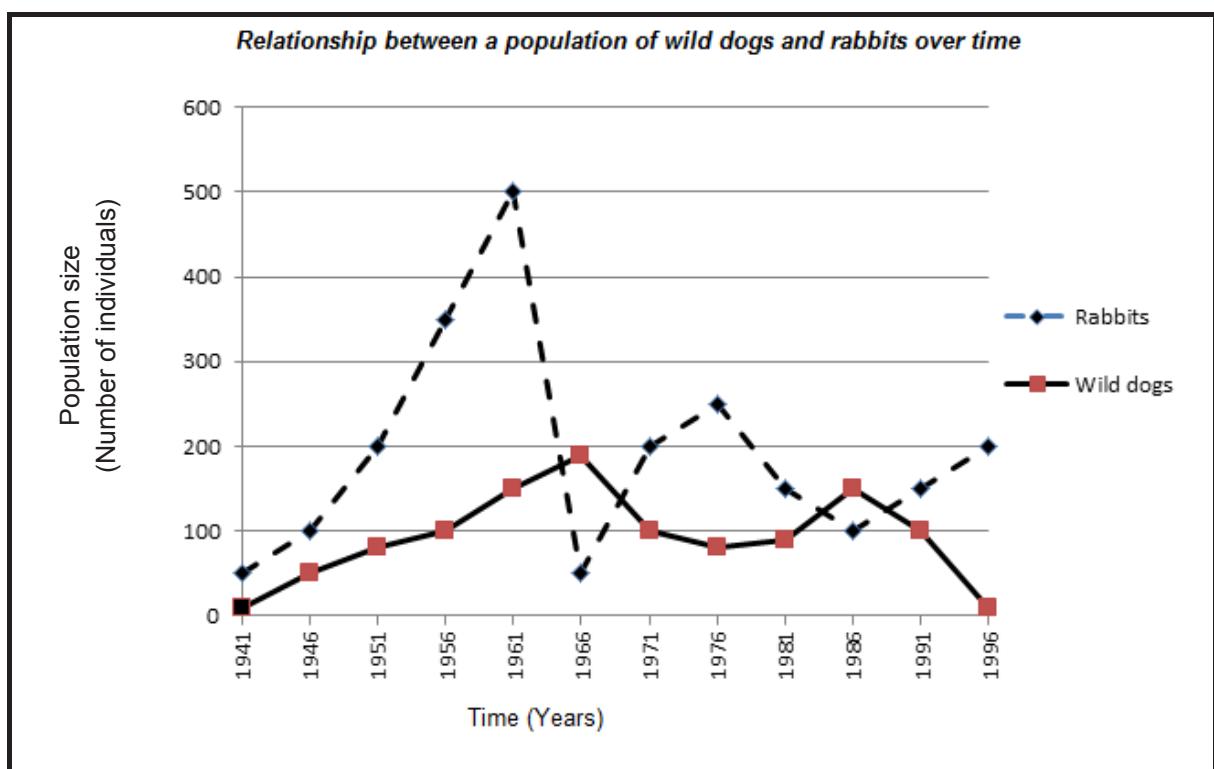
3.2 What is the carrying capacity of the pots? (1)

3.3 Why was the average height of the plants used instead of a single reading only? (1)

(6)

#### QUESTION 4

Study the graph below and answer the questions that follow.



4.1 How many of the following were there in 1966?

- (i) Rabbits (1)
- (ii) Wild dogs (1)

4.2 What is the maximum number of rabbits that have survived in this environment? (1)

4.3 What effect does a small number of wild dogs have on the rabbit population?  
Explain your answer. (2)

4.4 Name ONE technique that can be used to estimate the size of the rabbit population. (1)

(6)

## QUESTION 5

A group of students wanted to determine the population size of two species of butterflies. Their results are indicated in the table below.

	October 2016	November 2016	
	Number marked and released in first sample	Number in recaptured/second sample	Number marked in recaptured/second sample
Species A	20	300	10
Species B	25	75	5

5.1 Define the term population. (3)

5.2 Estimate the number of butterflies of species A in the area by using the following formula:

$$P = \frac{F \times S}{M}$$

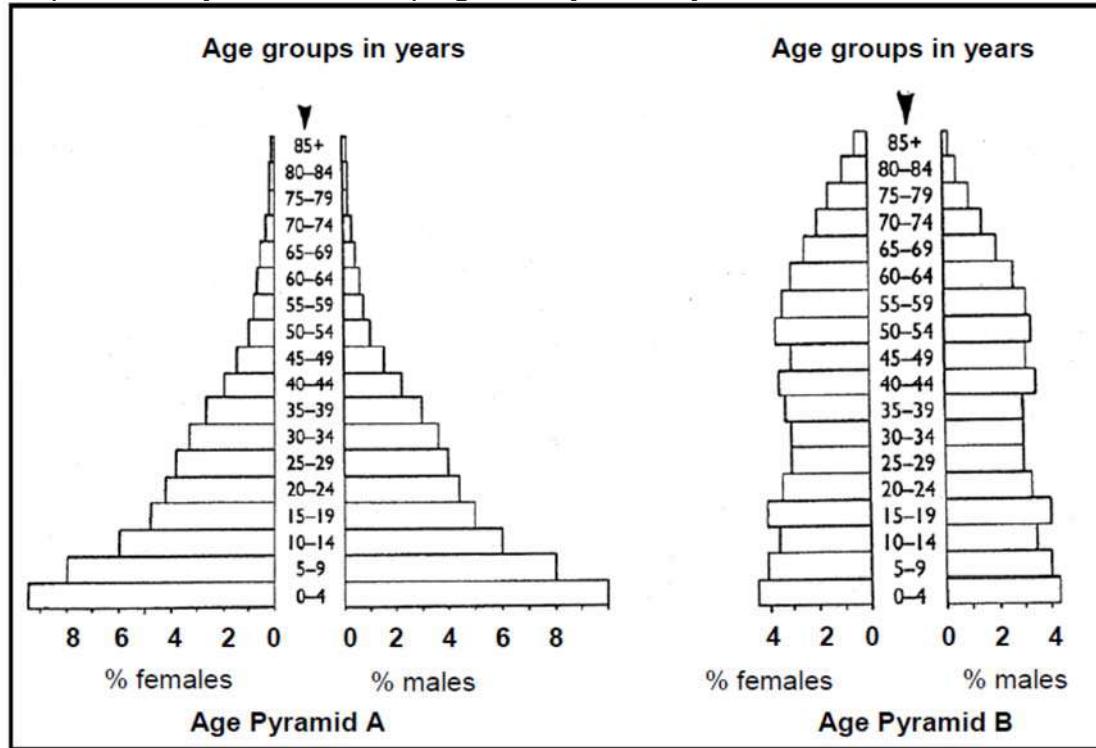
$F$  = Number caught in the first sample  
 $S$  = Number caught in the second sample  
 $M$  = Number marked in the second sample

5.3 Show all workings. (3)

Suggest TWO reasons why there were differences in the numbers between species A and species B in the recaptured/second sample. (4) (10)

## QUESTION 6

The diagrams below represent the age distribution of the human population of a developed country and a developing country in one year at a certain time.



6.1 What percentage of the female population in Pyramid A is aged between 5 and 9 years? (1)

6.2 Which age group in Pyramid A makes up exactly 5% percent of the male population in Pyramid A? (1)

6.3 What percentage of the female population in Pyramid B are aged 65 to 69 years? (1)

6.4 Which group (male or female) in Pyramid B has the larger percentage reaching old age? (1)

6.5 Which pyramid represents the population distribution of a developed country? (1)

6.6 Give TWO reasons for your answer to QUESTION 6.5. (2)  
(7)

[50]

## 6.8 Gr. 11 Test

**TOTAL: 50**

**TIME: 50 minutes**

### INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to EACH question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. ALL drawings must be done in pencil and labelled in blue or black ink.
7. Draw diagrams, flow charts or tables only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and a compass, where necessary.
11. Write neatly and legibly.

## SECTION A

### QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.4) in the ANSWER BOOK, for example 1.1.5 D.

1.1.1 Antibodies are proteins that...

- A break down pathogens.
- B catalyse biochemical reactions.
- C are produced by T-cells that kill disease-causing viruses.
- D bind with specific antigens.

1.1.2 Vaccination can control the spread of a(n)...

- A genetic disorder.
- B infectious disease.
- C nutritional deficiency.
- D environmental disease.

1.1.3 Which part of the flower produces male gametes?

- A Petal
- B Ovary
- C Pollen
- D Ovule

1.1.4 Study the statements about sexual reproduction in plants and answer the question that follows.

- (i) It generates variation in unstable environments.
- (ii) Seeds facilitate dispersal of offspring to more distant locations.
- (iii) Seed dormancy allows growth to be suspended until hostile environmental conditions are reversed.
- (iv) Offspring can be reproduced very rapidly.

Which statements are an advantage of sexual reproduction in plants?

- A (i), (ii), (iii) and (iv)
- B (i) and (iv)
- C (ii), (iii) and (iv)
- D (i), (ii) and (iii)

(4 x 2) (8)

1.2 Give the correct **biological term** for each of the following descriptions. Write only the term next to the question number (1.2.1 to 1.2.9) in the ANSWER BOOK.

- 1.2.1 A disease causing parasites, like a bacterium.
- 1.2.2 A type of reproduction that does not involve the fusion of male and female gametes.
- 1.2.3 Organisms that do not have a true nucleus. (3)

1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 to 1.3.3) in the ANSWER BOOK.

COLUMN I	COLUMN II
1.3.1 Requires water to undergo sexual reproduction	A: angiosperms B: pteridophytes
1.3.2 A division of plants with a vascular system, seeds and no flowers	A: gymnosperms B: angiosperms
1.3.3 The beginning of the growth of the seed.	A: pollination B: germination

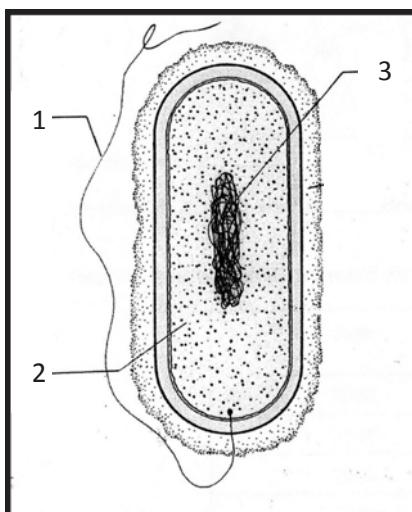
(3 x 2) (6)

**TOTAL SECTION A: 17**

## SECTION B

### QUESTION 2

2.1 Study the following diagram of bacteria and answer the questions that follow:



2.1.1 Identify parts numbered 1 and 3. (2)

2.1.2 Is this a eukaryotic or prokaryotic cell? (1)

2.1.3 Give a reason for your answer in QUESTION 2.1.2. (2)  
(5)

2.2

A student investigated the population of bacteria on the skin of people's hands following washing and drying. The same washing method was employed, but two drying methods were used: hot air blower and paper towel.

Swabs were used to take samples from the dried skin and bacteria were cultured from the swabs.

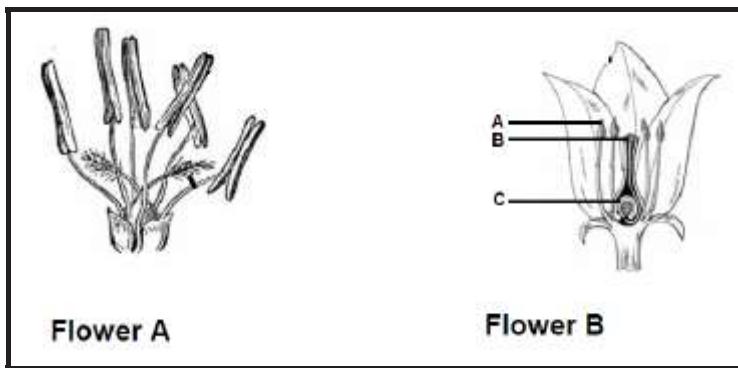
Bacterial population on hand skin following washing and drying		
Sample	Air-dried skin ( $\times 10^8 \text{cm}^2$ )	Towel-dried skin ( $\times 10^8 \text{cm}^2$ )
1	8.91	1.11
2	9.75	0.98
3	6.14	0.42
4	8.72	1.02

2.2.1 State the aim of the investigation. (2)

2.2.2 Draw a bar graph to show the number of bacteria on four samples of skin after they have been towel-dried. (6)  
(8)  
[13]

### QUESTION 3

3.1 Study the diagrams of the structures of two flowers below.



- 3.1.1 Provide labels for A, B and C. (3)
- 3.1.2 What major group of plants does the plants above belong to? (1)
- 3.1.3 Which flower (A or B) is probably pollinated by wind? (1)
- 3.1.4 Give a reason for your answer in question 3.1.3. (1)
- 3.1.5 What type of reproduction (sexual or asexual) will parts C take part in? (1)
- 3.1.6 Give a reason for your answer in question 3.1.5. (1)  
**(8)**

3.2 Angiosperms are group of plants that produce seeds by means of sexual reproduction.

- 3.2.1 Name one advantage and one disadvantage of sexual reproduction in plants. (2)
- 3.2.2 Name one way plants can produce asexually. (1)
- 3.2.3 A seed bank in Norway has been storing seeds of a rare and endangered plant. To keep the seeds fresh, 120 of the seeds of this plant were selected to be grown. Out of these 120 seeds, only 90 germinated.

What percentage of the seeds was not fertile? Show all your workings.

(2)  
**(5)**  
**[13]**  
**TOTAL SECTION B:**

26

## **SECTION C**

### **QUESTION 4**

Our natural immune system destroys pathogens that enter our body. Explain how the body's natural immunity will destroy a pathogen that enters the body.

Content: (5)

Synthesis: (2)

**NOTE:** NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

**TOTAL SECTION C:** 7  
**GRAND TOTAL:** 50

## 6.9 Gr. 11 Project

This project consists of THREE parts.

### PART 1

Please look at the rubric to see how you will be assessed on the research.

#### Research

You need to do research on social grants in South Africa.

Your research must include the following:

- The different types of social grants in South Africa.
- Who qualifies for social grants in South Africa?
- The effect of social grants on the South African economy.

Submit YOUR report with a title page, which contains a title and your name.

Your research must also contain in-text referencing; including a list of all resources used.

#### Grid to assess your research:

Criteria	Allocation of marks		Total
Reference	<b>In text referencing:</b> <ul style="list-style-type: none"><li>• Correct and complete (2)</li><li>• Incomplete/incorrect (1)</li><li>• Not present (0)</li></ul> <b>Reference list:</b> <ul style="list-style-type: none"><li>• Correct and complete(2)</li><li>• Incomplete/incorrect (1)</li><li>• Not present (0)</li></ul>		<b>4</b>
Report	1. The different types of social grants in South Africa (described) 2. Who qualifies for social grants in South Africa? (explained) 3. The effect of social grants on the South African economy.		<b>4</b> <b>4</b> <b>8</b>
Total			<b>20</b>

## PART 2

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

**AIM: Examining the views between boys and girls about social grants given to young girls.**

## PLANNING FOR THE INVESTIGATION

1. Suggest planning steps that must be considered when doing an investigation using humans.

(4)

**Use a tally chart to record the data collected (to be handed in)**

(Your sample size should be 20 girls and 20 boys)

Questions to be asked	Girls		Boys	
	Yes	No	Yes	No
Must the social grant be given to teenagers who got pregnant whilst at school?				
Does a social grant lead to an increase in teenage pregnancy?				
Does a social grant given to teenagers lead to food security?				

(6)

**PART 3****DATE :** \_\_\_\_\_**MARKS :** 20**NAME:** \_\_\_\_\_**TIME:** 30min

- 1 Draw a table to record the data collected. (6)
- 2 Draw a suitable graph to represent the data in the table. (7)
- 3 Draw conclusions from the results obtained. (3)
4. How can the reliability of this investigation be improved? (2)
- 5 State TWO factors that could affect the validity of this investigation. (2)

**GRAND TOTAL: 50**

## 6.10 Gr. 11 Practical exam (Taken from FS, 2016)

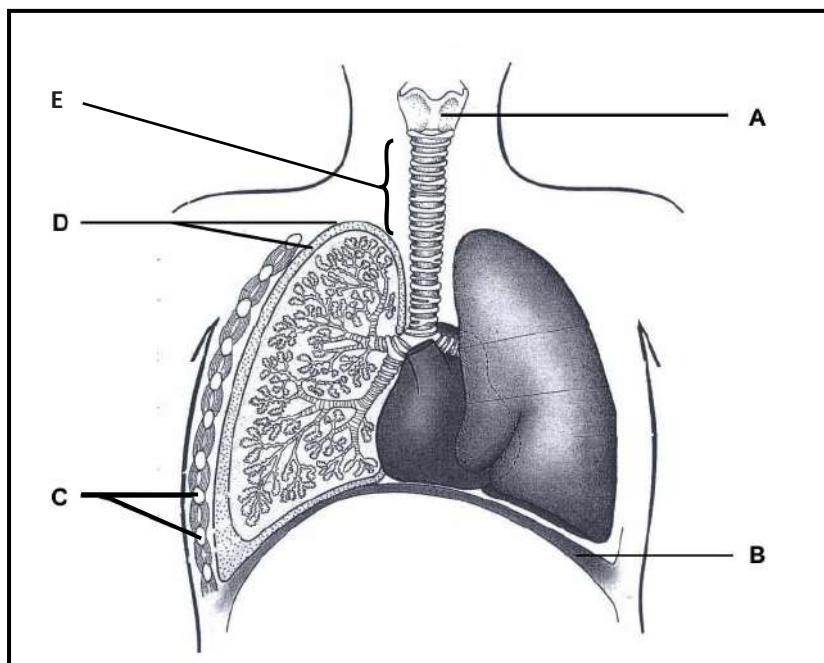
TIME: 1 hour

TOTAL: 60

### QUESTION 1

#### MAKE OBSERVATIONS: DRAWINGS AND DESCRIPTIONS

1.1 The diagram below represents some parts of the human gaseous exchange system.



1.1.1 Identify the parts labelled:

- (a) **A**
- (b) **B**
- (c) **C**

(3)

1.1.2 Give the LETTER and the NAME of the part that contains fluid that prevents friction when breathing. (2)

1.1.3 Explain TWO ways in which **E** is adapted to perform its functions. (4)

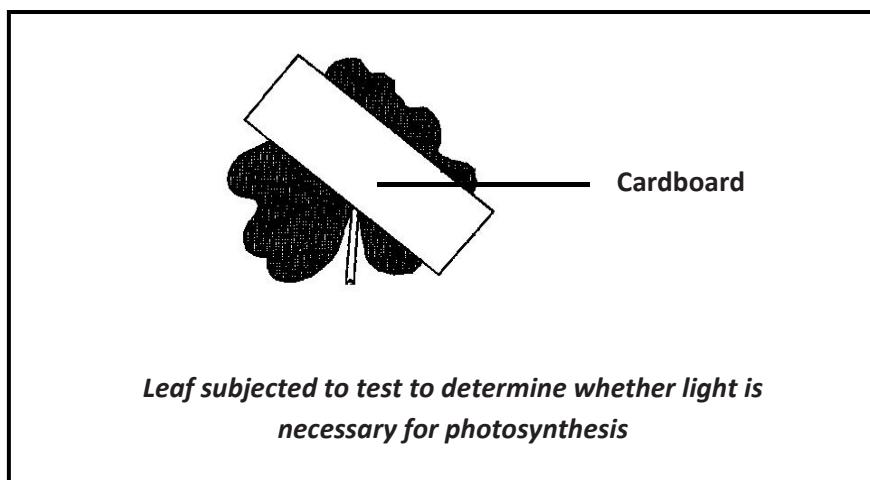
(9)

## QUESTION 2

### PLANNING / DESIGNING AN INVESTIGATION: MAKING DRAWINGS

2.1 In an investigation to determine whether light is necessary for photosynthesis, a leaf was obtained from a plant that was first placed in a dark cupboard for 48 hours before it was again exposed to light.

Refer to the diagram below to answer the questions that follow.



2.1.1 Explain why the plant was placed in a dark cupboard. (2)

2.1.2 State TWO possible reasons why only part of the leaf was covered with cardboard. (2)

2.1.3 Draw a labelled diagram of the leaf to show the results after the starch test at the end of the investigation. (3)  
(7)

## QUESTION 3

### MAKE OBSERVATIONS: MAKE DEDUCTIONS BASED ON EVIDENCE

3.1 In the year 2015, a group of nutritionists made suggestions for improving the diet of people in South Africa. The table below shows the average diet of South Africans in 2015 and the recommendations for a better diet.

Foodstuff	Average diet in kg per person per year	
	In 2015	Recommended better diet
Dairy products (excluding butter)	26	26
Meat	56	48
Fish	8	8
Oils and fats	22	19
Sugars	48	40
Fruit	55	63
Potatoes	96	111
Other vegetables	65	75
Nuts	6	6
Grain products	73	87

3.1.1 List THREE foodstuffs that are recommended to be reduced. (3)

3.1.2 State TWO possible reasons why these foodstuffs need to be reduced. (2)

3.1.3 Name THREE foodstuffs that are recommended to be increased. (3)

3.1.4 State TWO possible reasons why these foodstuffs need to be increased. (2)

**(10)**

## QUESTION 4

### CONDUCTING AN EXPERIMENT: FOLLOW INSTRUCTIONS AND HANDLE APPARATUS

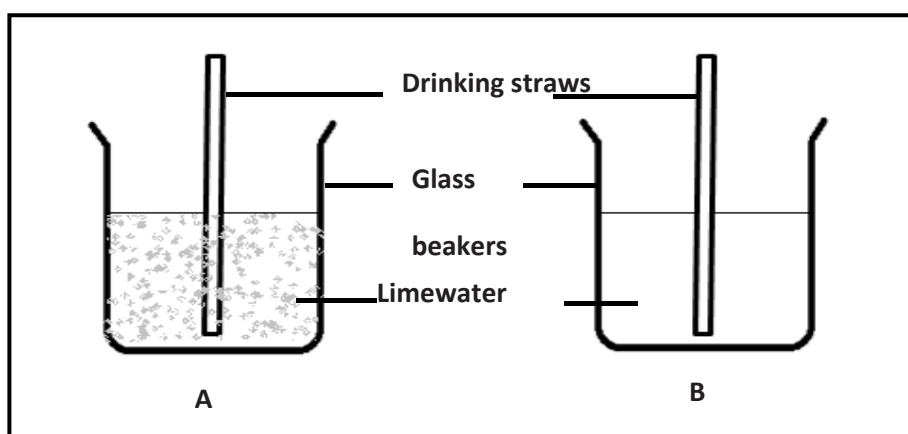
Learners wanted to investigate which gas is released by living organisms

#### Apparatus

- 2 glass beakers
- 2 drinking straws
- Clear limewater

#### Method

- Label the glass beakers **A** and **B**.
- One glass beaker (**A**) is the experiment and the other glass beaker (**B**) is the control.
- Half-fill each glass beaker (**A** and **B**) with clear limewater.
- Insert a drinking straw into each glass beaker.
- Leave glass beaker **B** to stand aside.
- Take a deep breath and exhale air gently through the straw into glass beaker **A**.
- Observe and record any colour changes in both glass beakers.



4.1 Sate why clear limewater was used. (1)

4.2 List TWO variables (factors) that should be kept constant in both beakers. (2)

4.3 What colour change was observed in beaker:

4.3.1 **A** (1)

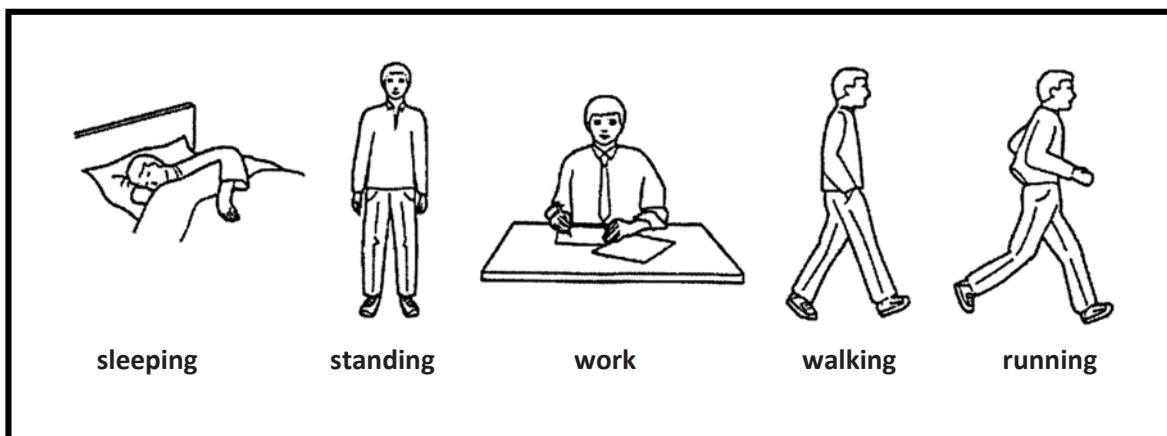
4.3.2 **B** (1)

4.4 What conclusion can be drawn from this experiment? (2)  
(7)

## QUESTION 5

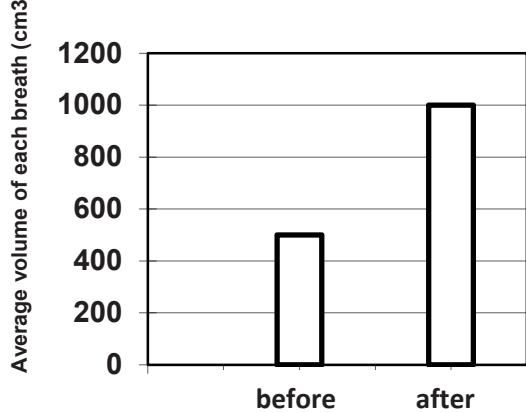
### INTERPRET DATA BY RECOGNISING PATTERNS OR TRENDS AND DOING CALCULATIONS

5.1 The diagrams below show the results of an investigation that was done to determine how much energy, in kilojoules (kJ), is needed by a man to do various activities for an hour. The bar graphs illustrate the effect of exercise on the man's rate and depth of breathing. Study the diagrams and bar graphs and answer the questions that follow:

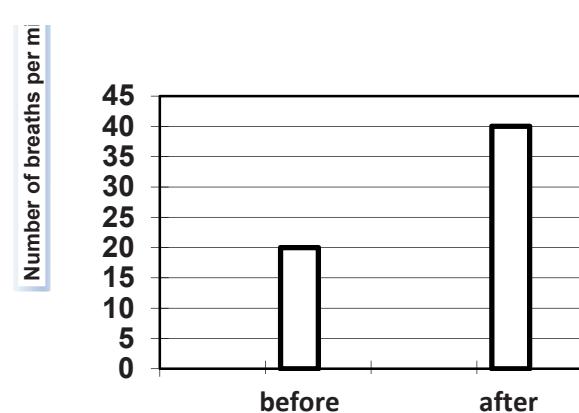


*The effect of exercise on the man's rate and depth of breathing*

Graph A



Graph B



5.1.1 Identify an activity that used 20 kJ per minute. (2)

5.1.2 Sleeping uses 300 kJ of energy per hour. Suggest what this energy is used for. (2)

5.1.3 According to graph A, state the effect of exercise on the depth of breathing. (1)

5.1.4 Give the total volume of air that passes in and out of the man's lungs each minute after exercise. Show ALL the calculations. (3)

5.1.5 The main reason for breathing during exercise is to take in oxygen which is used for energy release. Briefly explain why the man continues to breathe heavily shortly after an exercise. (2)

5.1.6 It was claimed that the air that the man was breathing contained 150 particles (such as pollen grains) per  $500\text{ cm}^3$  of air.

(a) Calculate the number of particles he would inhale per hour when he is not exercising. Show ALL the calculations. (3)

(b) Briefly explain why very few of these particles would reach the alveoli. (2)

(15)

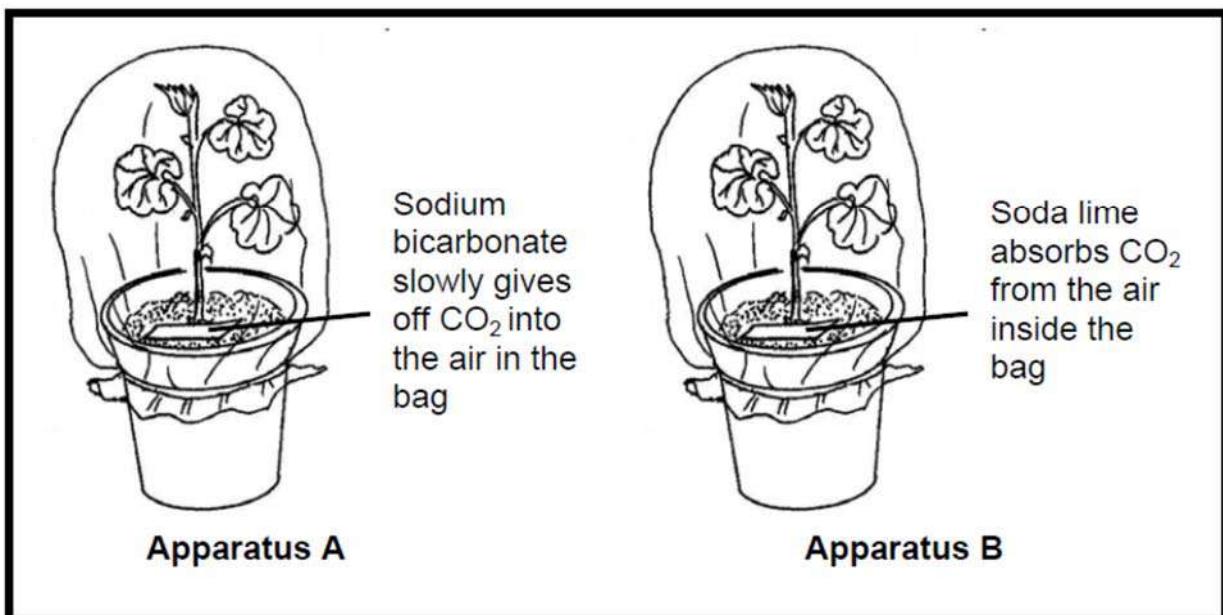
## QUESTION 6

### CONDUCTING AN EXPERIMENT: PLANNING / DESIGNING AN INVESTIGATION AND MAKE DEDUCTIONS BASED ON EVIDENCE

A group of Grade 11 learners wanted to investigate whether carbon dioxide is necessary for photosynthesis. They followed the following procedures:

- Two potted, destarched geranium plants were well watered and placed on a brightly lit windowsill.
- A dish of sodium bicarbonate solution was placed on the soil beside the plant in apparatus **A**, while a dish of soda lime was placed on the soil beside the plant in apparatus **B**.
- Each plant was covered with a transparent plastic bag as shown in the diagram below.

Study the diagram and answer the questions that follow.



6.1 Why were the plants left on a brightly lit windowsill? (2)

6.2 After 48 hours a leaf from each plant, **A** and **B**, was tested for the presence of starch. Describe the procedure they used to test for the presence of starch in the leaves. (5)

6.3 In which plant (**A** or **B**) would:

- (a) The leaves remain brown after the starch test (1)
- (b) There be a higher concentration of oxygen in the plastic bag (1)

6.4 Give ONE reason for your answer to QUESTION 6.3 (b). (1)

6.5 State the independent variable for Apparatus **A**. (1)

6.6 State ONE way how the learners could ensure that their results were reliable. (1)

(12)

**TOTAL: [60]**

## 7 MARKING GUIDELINES

### 7.1 Gr. 10 Practical task

#### QUESTION 1

1.1.1 Chloroplast present✓  
Cell wall present✓  
Has a large vacuole✓ (3)

1.1.2 12 000 x✓ (1)

1.1.3 Plant cell: Width of plant cell (largest diameter) is about 110 mm✓  
Scale line: 19 mm = 2 um✓  
True size of plant cell: measured size x true length of scale line✓  
Measured of length of scale line✓  
$$\frac{110 \text{ mm} \times 2 \text{ um}}{19 \text{ mm}} = 11.6 \text{ um (or 0.0116)} \checkmark$$
 (5)

(9)

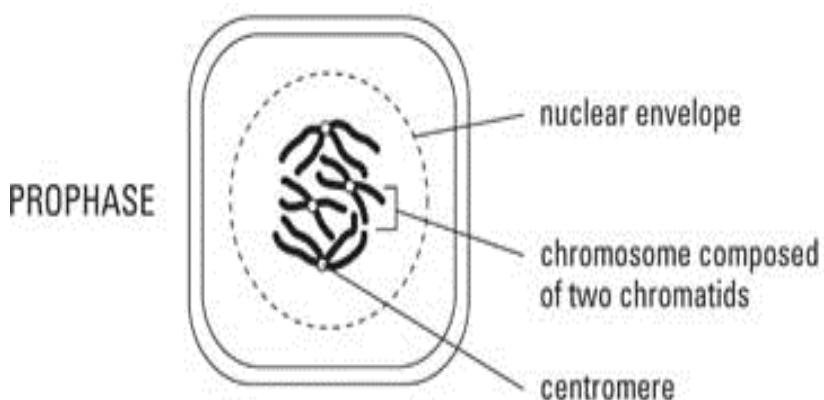
2.1.1

Diagram	Phase	Reason for identification
A	Metaphase✓	Chromosomes arranged in equatorial region✓
B	Prophase✓	Chromosomes become visible✓
C	Interphase✓	All cell contents are intact✓
D	Telophase✓	Two new cells are formed✓
E	Anaphase✓	Daughter chromosomes are moving apart✓

(10)

2.1.2 4✓ (1)

2.1.3



Mark allocation:

Correct drawing	1 mark
Heading	1 mark
Any three correct labels	3 marks

(5)

2.1.4 Growth✓

Repair/replace worn-out tissues✓

Asexual reproduction in some plants and animals✓

[ANY 1]

(1)  
(17)

### QUESTION 3

3.1.1 46✓ (1)

3.1.2 DNA✓ (1)

3.1.3 A: centromere✓  
B: chromatid✓ (3)  
(4)

**TOTAL :** 30

## ANALYSIS GRID

### Practical Activity Gr. 10

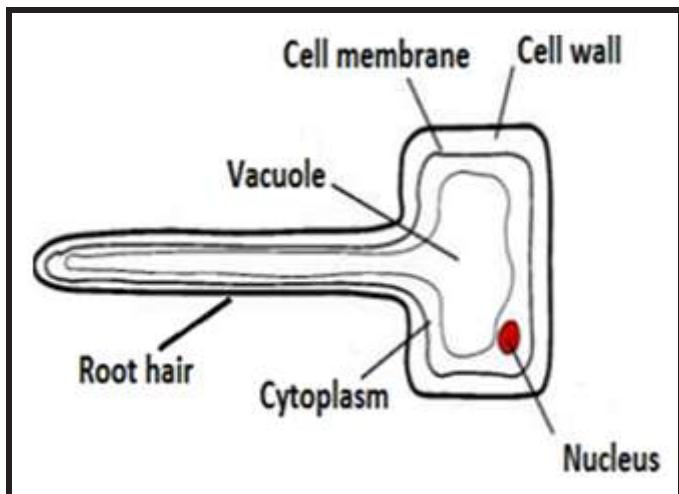
Questions	Cognitive levels				Skills of Specific Aim 2			
	A	B	C	D	Recording of data	Design/plan	Interpretation	Measure
1.1.1		3			✓			
1.1.2	1				✓			
1.1.3			5			✓	✓	
2.1.1	5	5				✓		✓
2.1.2		1						✓
2.1.3		5				✓		✓
2.1.4	1							
3.1.1	1							
3.1.2	1							
3.1.3	2							
<b>Total</b>	<b>11</b>	<b>14</b>	<b>5</b>	<b>0</b>				

## 7.2 Gr. 10 Assignment

## QUESTION 1

1.1	1.1.1	1	vacuole✓		
		2	cell wall✓		
		3	endodermis / casparyan strips✓		(3)
	1.1.2		Water enters root hairs by osmosis. ✓ In the soil it is a region of high concentration ✓ In the root hairs it is a region of lower concentration ✓ Water moves through the semi-permeable membranes of the cells✓ Water then moves across the cortex of the root ✓ Via endodermis into the xylem tissue ✓	[Any 4]	(4)
	1.1.2		They are elongated ✓ to allow transport of water ✓ to great heights They are non-living✓ to facilitate the rapid movement✓ of water		
	1.1.3		Have large lumens ✓ to allow for unrestricted flow of water ✓ Cross walls are absent ✓ to allow easy passage of water✓	[Any 2x2]	(4) (11)
1.2	1.2.1		Cross section through a dicotyledonous root. ✓		(1)
	1.2.2		A – epidermis ✓ - Single layer of cells to allow for easier diffusion of water. ✓ C – cortex /parenchyma ✓ - large intercellular spaces allow for movement of water ✓		(4)
	1.2.3		Meristematic✓ tissue able to divide into xylem and phloem as the root needs it✓/secondary growth		(1)
	1.2.4		Root hair		

## Root hair



### Mark allocation for drawing:

Correct pencil diagram ✓

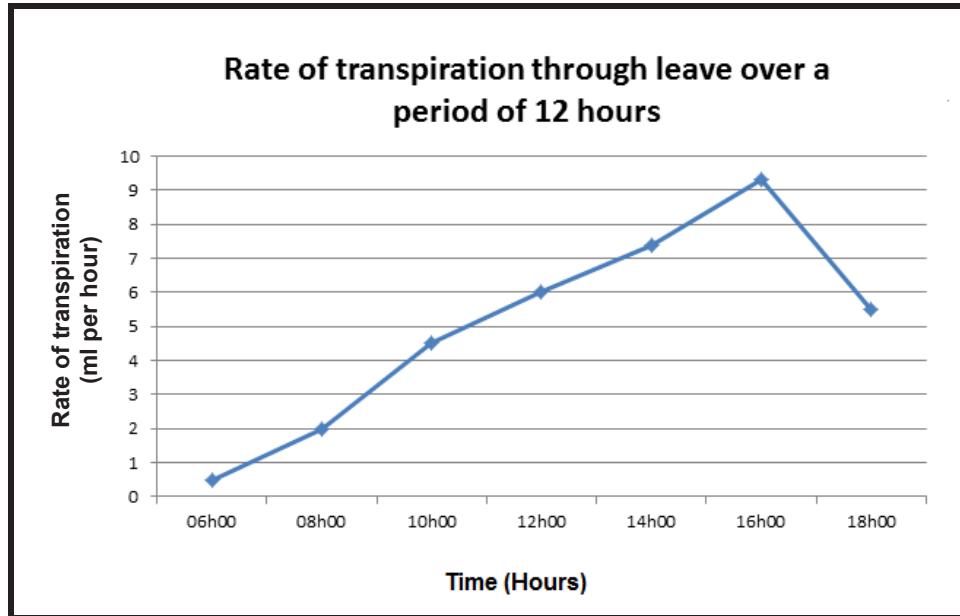
Caption correct✓  
Any 2 correct labels✓✓

(4)  
**(10)**

## QUESTION 2

2.1 2.1.1 Time✓ of the day. (1)

2.1.2



### ***Checklist for the mark allocation of the graph***

Correct type of graph	1
Title of graph	1
Correct label for X-axis (including units) and Y-axis	1
Appropriate scale for Y-axis and the width of the bars	1
Plotting of bars	1- 1 to 5 bars plotted correctly 2- All 6 bars plotted correctly

**NOTE:** - If the wrong type of graph is drawn  
- Marks will be lost for correct type of graph (6)

2.1.3 08h00✓ (1)

2.1.4 16h00✓ (1)

2.1.5 (a) The rate of water absorption remains constant✓ between 06h00 and 08h00 and then increases✓ until 18h00 (2)

(b) The rate of transpiration increases✓ from 06h00 until 16h00 and then decrease✓ at 18h00. (2)

2.1.6 7,6 ml per hour✓ – 3,2 ml per hour✓ =4,4 ml per hour✓ (2)

2.1.7 High levels of humidity✓ cause a decrease✓ in the rate of transpiration. (2) (17)

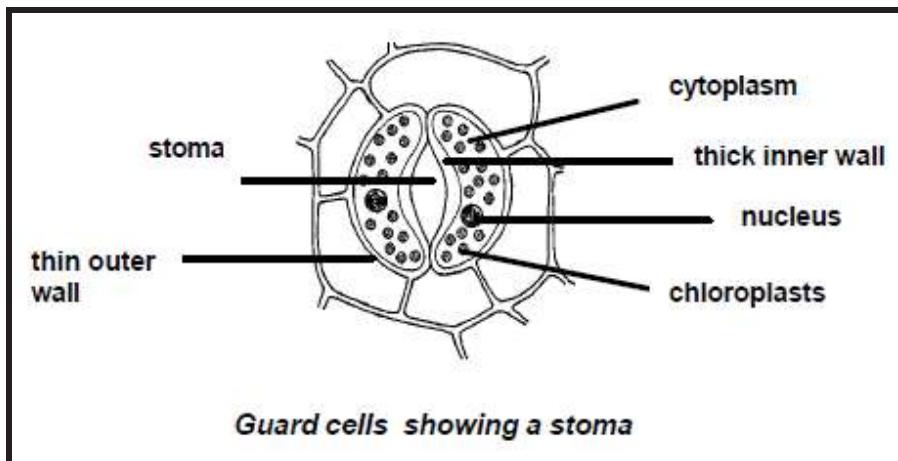
2.2 2.2.1 (i) 1✓ and 4✓ (2)

(ii) 2✓ and 3✓ (2)

2.2.2 (i) Increase in temperature✓ Increase in wind speed✓ Increase in light intensity✓ Decrease in humidity✓ [ANY 2] (2)

(ii) Decrease in temperature✓ Decrease in wind speed✓ Decrease in light intensity✓ Increase in humidity✓ [ANY 2] (2)

2.2.3



Mark allocation for drawing:

Correct pencil diagram✓

Caption correct✓

Any 2 correct labels✓

(4)  
(12)  
[50]

## ANALYSIS GRID: Grade 10 Assignment

Question	Cognitive levels				Topic <b>Transpiration</b>
	A	B	C	D	
1.1.1	3				✓
1.1.2	4				✓
1.1.3		4			✓
1.2.1	1				✓
1.2.2	2	2			✓
1.2.3	1				✓
1.2.4	2	2			✓
2.1.1			1		✓
2.1.2	1	1	4		✓
2.1.3		1			✓
2.1.4		1			✓
2.1.5			4		✓
2.1.6		2			✓
2.1.7				2	✓
2.2.1				4	✓
2.2.2			4		✓
2.2.3	2	2			✓
<b>Total</b>	<b>16</b>	<b>15</b>	<b>13</b>	<b>6</b>	

### 7.3 Gr. 10 Test

#### SECTION A

##### QUESTION 1

1.1	1.1.1	D✓✓		
	1.1.2	C✓✓		
	1.1.3	A✓✓	(3 x 2)	(6)
1.2	1.2.1	Pericardium✓		
	1.2.2	Closed system/ Closed blood system✓		
	1.2.3	Biodiversity✓		
	1.2.4	Endemic✓		
	1.2.5	pH✓		
	1.2.6	Acids/ Acidic✓	(6)	
1.3	1.3.1	A only ✓✓		
	1.3.2	B only ✓✓		
	1.3.3	A only ✓✓		
	1.3.4	B only ✓✓		
	1.3.5	A only ✓✓	(5 x 1)	(5)

**TOTAL SECTION A: 17**

## SECTION B

### QUESTION 2

2.1	2.1.1	A- Aorta	(1)
		B- Pulmonary vein	(1)
		C- Semi-lunar valve✓.	(1)
		D- Left ventricle ✓	(1)
	2.1.2.	(a) A- takes oxygenated blood to the rest of the heart✓.	(1)
		(b) C- receive oxygenated blood from the lungs✓.	(1)
			(6)
2.2	2.2.1	Water moves at the same✓ rate in all soil types ✓/ Different soil types have different water holding capacities.	(2)
	2.2.2	a) <b>Dependent variable</b> - Amount of water collected ✓	(1)
		b) <b>Independent variable</b> - Soil type ✓	(1)
	2.2.3	A- Sand ✓	
		C- Loam ✓	(2)
	2.2.4	i) Soil sample ✓	
		ii) Amount of water ✓	(2)
			(8)
			(14)

### QUESTION 3

3.1	3.1.1	a) Greenfly ✓	(1)
		b) Rose ✓/Plant	(1)
	3.1.2	<b>Greenfly:</b> $10/100 \times 1000 = 100$ ✓ KJ/m <sup>2</sup> /year ✓ (any correct method)	

**Ladybird:**  $10/100 \times 100 = 10 \checkmark \text{KJ/m}^2/\text{year}$

3.1.3 **Blackbird:**  $10/100 \times 10 = 1 \checkmark \text{KJ/m}^2/\text{year}$  (4)

- a) The population of the rose plants will increase ✓ because nothing will be eating them. ✓ (2)
- b) The ladybird population will decrease ✓ or they will all die because of lack of food. ✓ (2)
- c) The blackbirds will decrease ✓ because their source of food is no more. ✓ (2)

(12)

**TOTAL SECTION B:** 26

## **SECTION C** **QUESTION 4**

### **Atrial systole**

- A small patch of special tissue in the right atrium called the sino-atrial node (SA node) sends electrical impulses to the muscle fibres of both the left and right atria. ✓
- The two atria contract at the same time ✓
- The tricuspid and bicuspid valves open ✓
- The blood flows into the two ventricles which are relaxed. ✓ Any x [2]

### **Ventricular systole**

- The two ventricles contract at the same time. ✓
- The blood is forced into the aorta and pulmonary artery. ✓
- The tricuspid and bicuspid valves close. ✓
- This prevents blood from flowing back into the atria. ✓ Any x [2]

### **Regulation of the cardiac cycle**

- Changes in blood pressure are picked up by receptors in the walls of the aorta. ✓
- These impulses passed along nerves to the medulla oblongata of the brain. ✓

- Information is sent back to the SA node which sends impulses to either speed up the heartbeat ✓ if the pressure is low or slow down the heartbeat if the pressure is high ✓. This is how the heart rate is decreased or increased. ✓

**Any x [1]**

**(5)**

## ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)
<b>Generally</b>	All information provided is relevant to the topic	Ideas are arranged in a logical/cause-effect sequence
<b>In this essay</b>	Only information relevant to cardiac cycle and how it is regulated is given.	Information regarding cardiac cycle and how it is regulated is given logical in each step.
<b>Mark</b>	1	1

**Synthesis** (2)

**TOTAL SECTION C:** (7)

**GRAND TOTAL:** 50

GRID CONTROLLED TEST  
2017

GRADE 10

GRID CONTROLLED TEST 2017										GRADE10									
Question nr	Cognitive Levels			SPECIFIC AIMS				Knowledge Strands			Environmental Studies								
	A	B	C	D	SA1	SA2	SA3	Life Processes											
1.1	1.1	6									4	2							
	1.2	3	3								2	4							
	1.3	4		1							2	3							
	<b>Total Question 1</b>	<b>13</b>	<b>3</b>	<b>1</b>							<b>8</b>	<b>9</b>							
	2.1	4	2								6								
	2.2	1	2	3	2						8								
	<b>Total Question 2</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>						<b>6</b>	<b>8</b>							
	3.1	2	6		4														
	<b>Total Question 3</b>	<b>2</b>	<b>6</b>			<b>4</b>									<b>12</b>				
	4.1	2			5										7				
<b>Total Question 4</b>					<b>2</b>	<b>5</b>									<b>7</b>				
Question 1	13	3	1	2															
Question 2	5	4	3	4															
Question 3	2	6																	
Question 4	2		5	3															
<b>Total</b>	<b>22</b>	<b>13</b>	<b>9</b>	<b>6</b>												<b>21</b>	<b>29</b>		
<b>Norm</b>	40%	25%	20%	15%												<b>48%</b>	<b>52%</b>		
<b>Marks</b>																<b>29</b>	<b>1</b>		
<b>Total</b>																<b>50</b>			

## 7.4 Gr. 10 Project

### Gr. 10 Project: Environmental Studies

Practical Skills						
Follow instructions	Handle equipment	Make observations	Record information	Measure	Interpret	Design/Plan
✓	✓	✓	✓	✓	✓	✓

Refer to the task for all the marking guideline rubrics.

## 7.5 Gr. 10 Practical exam

### QUESTION 1

1.1 They put ice cubes✓ inside the water bath (1)

1.2 To create different temperatures✓ to investigate enzyme activity (1)

1.3 (a) A large amount of gas (oxygen) bubbles will be visible✓ (1)

     (b) No gas bubbles/oxygen will be visible✓ (1)

1.4 Because of the high temperature (boiling water) the enzyme catalase in the chicken becomes inactive /denatures✓ and will not be able to break down hydrogen peroxide✓ into water and oxygen✓ (no gas bubbles) (3)

1.5 Repeat the investigation several times✓/increase the sample size by using more examples of enzymes (1)

1.6 Enzymes are sensitive to changes in temperature ✓✓/  
High temperatures denature enzymes/  
Low temperatures make them temporarily inactive (2)

**(10)**

### QUESTION 2

2.1.1 Look at the stage from the side while turning the coarse adjustment knob ✓ so that the objective lens and stage move closer to each other ✓ (2)

2.1.2

Part	Function
3 - Objective✓	Magnifies the image✓
5 - Light source✓/ mirror	Provides light to shine right through the specimen✓

✓for table (5)

2.2.1 Cheek epithelium cells ✓ (1)

2.2.2 1 - cell membrane ✓

2 - nucleus✓ (2)

2.2.3 (a) Estimated size of specimen =  $\frac{2000}{5}$  ✓  
= 400✓ µm (micron) (3)

(b) Actual length of chloroplast = 60mm x 1µm✓

12mm ✓

$$= 5\sqrt{\mu\text{m}} \quad (3)$$

**(Adapt figures 60 mm and 12 mm to the page size that was printed at school)**

**(13)**

### **QUESTION 3**

3.1.1 Humidity✓ (1)

3.1.2 (a) Humidity✓ (1)

(b) Rate of transpiration✓ (1)

3.1.3 - sunlight ✓

- heat✓

- wind ✓ (any) (2)

**(mark 1<sup>st</sup> TWO only)**

3.1.4 Rate of transpiration will be faster for both factors✓✓ (2)  
**(7)**

### **QUESTION 4**

4.1.1 I✓

4.1.2 A✓

4.1.3 H✓

4.1.4 B✓

4.1.5 D✓

4.1.6 E✓ (6)

4.2.1 (a) Ball-and-socket joint✓ - allows movement in any direction✓ (2)

(b) Hinge joint✓ - permits movement in only one plane ✓ (2)

**(10)**

### **QUESTION 5**

5.1.1 A particular area in which living✓/biotic components interact with each other and with non-living✓/abiotic components (2)

5.1.2 Learners should deal with:

- ethical issues ✓ (e.g. getting permission to do the survey)
- logistical arrangements ✓ (materials needed)
- deciding on the method/procedure ✓ to be used
- how the data will be collected, recorded ✓ etc.

(2)

**(mark first TWO)**

5.1.3 (a) To mark out their plot✓

(1)

(b) To collect and kill small invertebrates✓

(1)

5.1.4 (a) altitude ✓

(1)

(b) soil colour ✓ / soil pH

**FIRST ONE**

(1)

(c) grasses✓ trees / shrubs

**FIRST TWO**

(2)

(d) jackal✓, rooikat ✓

(2)

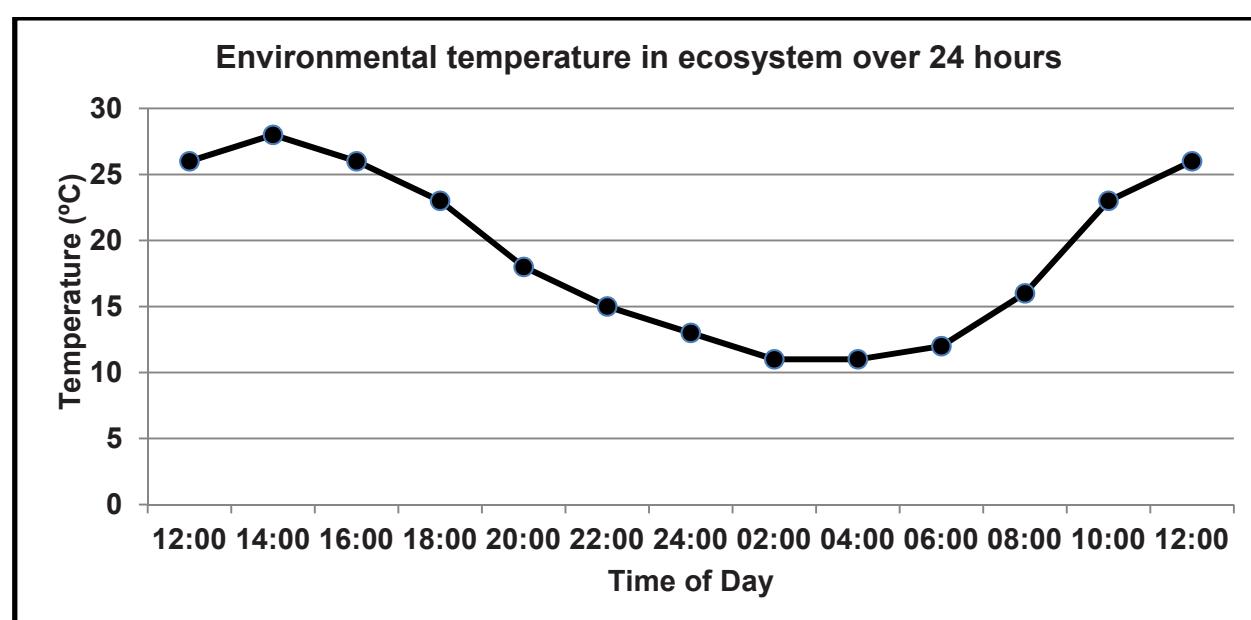
5.2.1 18:00 - 20:00 ✓

(1)

5.2.2 28 °C ✓

(1)

5.2.3



### ***Mark allocation of the graph***

Correct type of graph and connect points	1
Caption of graph (including both variables)	1
Correct label for X-axis + scale	1
Correct label, scale and unit for Y-axis	1
Drawing of graph	1- 1 to 12 correctly plotted 2 - all correctly plotted

#### **Note:**

If the wrong type of graph is drawn:

- marks will be lost for "correct type of graph"

If axes are transposed:

- marks will be lost only for labelling of X-axis and Y-axis

(6)

(20)

**TOTAL: [60]**

**LIFE SCIENCES INVESTIGATIONS: ANALYSIS GRID**  
**Practical Exam Gr. 10**

Questions	Skills of Specific Aim 2						
	Design/plan	Interpretation	Measure	Recording of data	Making observations	Handling apparatus	
1.1	1						
1.2	1						
1.3					2		
1.4					3		
1.5						1	
1.6					2		
2.1.1		2					
2.1.2				5			
2.2.1			1				
2.2.2			2				
2.2.3 (a) & (b)				1	2		
3.1.1						1	
3.1.2						2	
3.1.3						2	
3.1.4					2		
4.1		6					
4.2.1		2			2		
5.1.1					2		
5.1.2						2	
5.1.3		2					
5.1.4					6		
5.2.1					1		
5.2.2					1		
5.2.3			6				
Total	2	4	11	11	1	23	8

60

## 7.6 Gr. 11 Practical task

**Note to teacher: Grow the mould in the class/school – the learners can do the observations at school. Each learner must do his/her own observations. The answers below are just an example.**

### TERM 1 – THE PREVALENCE OF BREAD MOULD

1. Hypothesis: Mould grows faster/slower at higher/lower temperatures than at lower/higher temperatures ✓✓ (2)

or

Temperature has no influence on the growth of mould ✓✓

2.

Bread type	Percentage mould coverage per day									
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
A	0	0	0	0	0	0	0	0	0	0
B	0	0	0	0	2	5	13	15	19	24
C	0	4	12	23	32	46	55	64	70	76

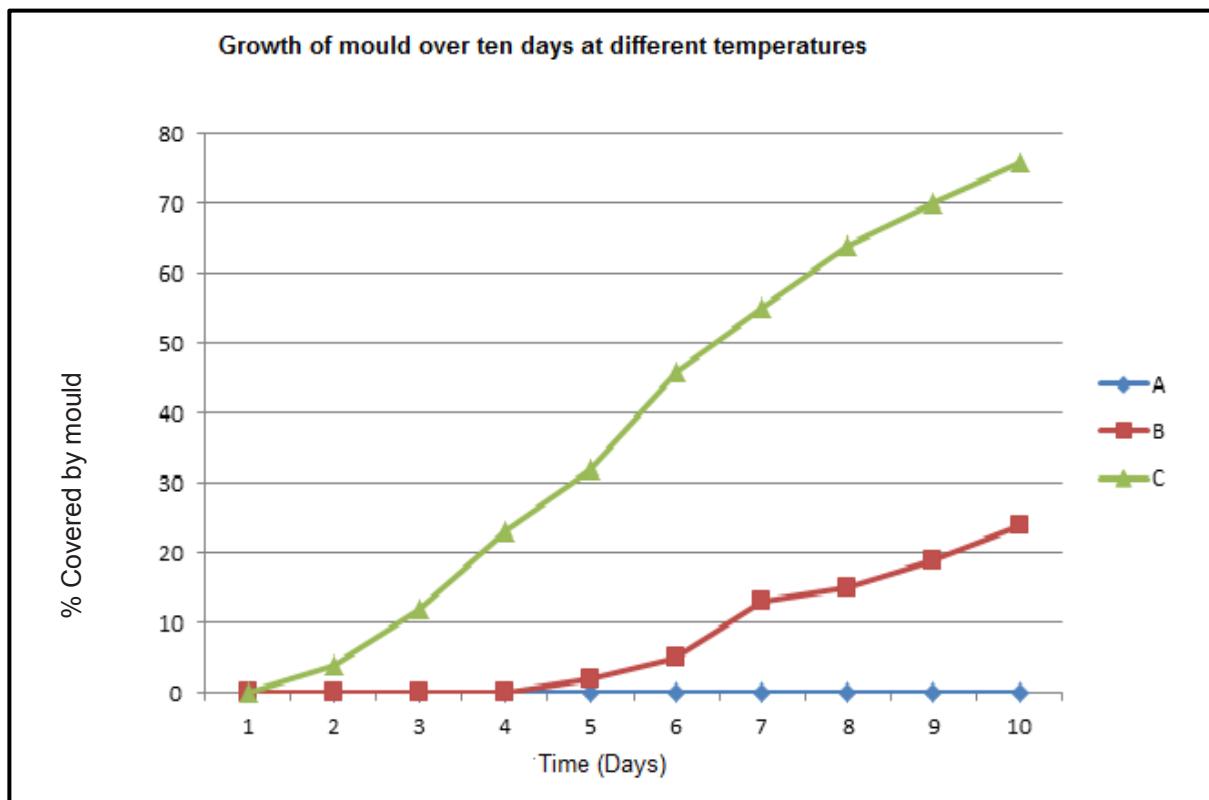
Table = ✓

Marking criteria for table

Drawing a complete table	1
Complete data for each bread type	None complete = 0 1 complete = 1 2 complete = 2 3 complete = 3

(4)

3.



#### Marking criteria for table

Correct type of graph	1
Suitable heading describing variables	1
Labelling (x-axis and y-axis)	1
Suitable scale (x-axis and y-axis)	1
Plotting of graphs	1/2 graphs correct = 1 3 graphs correct = 2

(6)

4. Spores in the air settle on the bread ✓

(1)

5. *Refer to exemplar table*

A – no growth over 10 days ✓

B – no growth from days 1 – 4, then slow increase in growth from

days 5–10.✓

C – no growth on day 1, growth increases rapidly from day 2 – 10. ✓ (3)

## 6. CONCLUSION

Bread mould does grow faster at higher temperatures ✓ than at lower temperatures. ✓ (2)

7. Five replications of each sample (A, B and C) at different temperatures ✓ (1)

OR

Repeat the investigation

## 8.

- Same type of bread ✓
- Same size of bread ✓
- Same sealable bags ✓
- Eliminate the influence of light in all three ✓
- Results taken at the same time of day ✓
- Same person taking the results ✓
- No bags were opened ✓ (Any 2) (2)

9. Storage and sales of bread must take this into account to prevent spoilage. ✓

Companies baking bread need to know at which temperature bread mould grows best. ✓ (2)

10. A – hypha ✓

B – sporangiospore ✓

C – spore ✓

D - sporangium ✓ (4)

11. The length of C is :  $\frac{2,5}{18} \times 60$  ✓ = 8,3 µm ✓

(3)

(30)

## Practical Activity Gr. 11

### Questions

	Cognitive levels				Skills of Specific Aim 2			
	A	B	C	D	Recording of data	Measure	Interpretation	Design/plan
1			2					✓
2	1	1	3		✓		✓	
3	1	3	2		✓		✓	
4	1						✓	
5		3					✓	
6			1		✓		✓	
7			2				✓	
8				2				✓
9				2				✓
10		4				✓		
11		3			✓		✓	
<b>Total</b>	<b>2</b>	<b>14</b>	<b>10</b>	<b>4</b>				

## 7.7 Gr.11 Assignment

Term 3

Total: 50

### QUESTION 1

- A Mutualism ✓✓
- B Mutualism ✓✓
- C Parasitism ✓✓
- D Commensalism ✓✓
- E Mutualism ✓✓

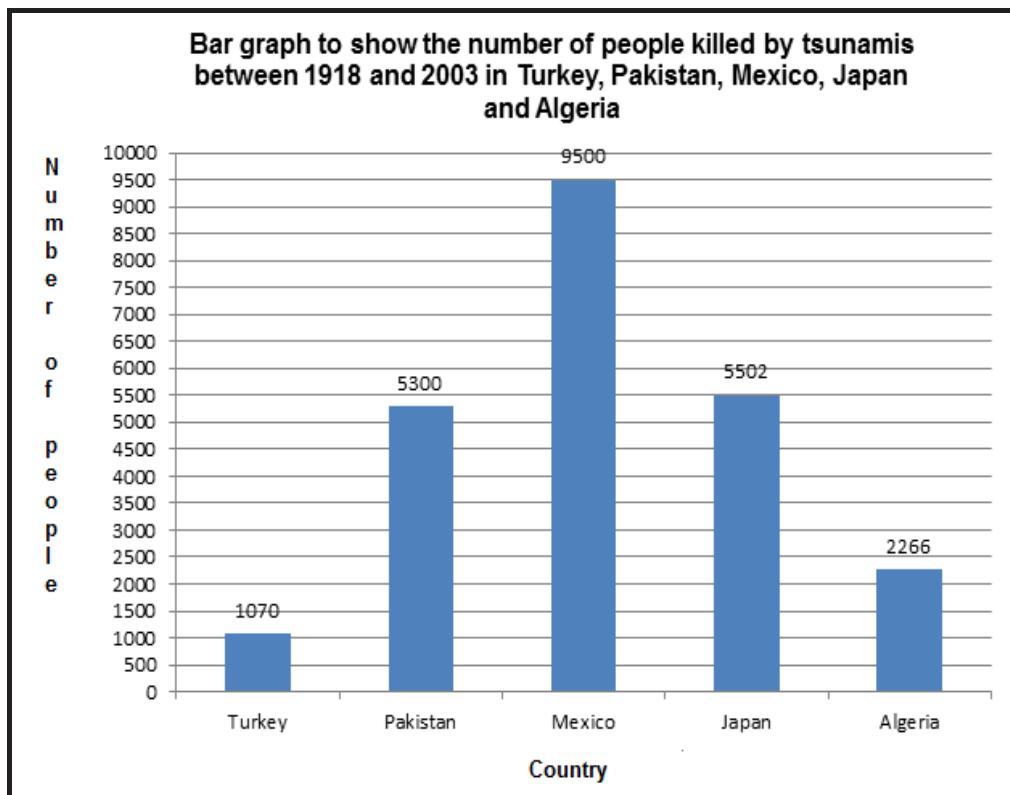
(5 x 2) (10)

### QUESTION 2

2.1  $(102 + 428 + 6\ 500) \checkmark = 7\ 030 \checkmark$  (2)

2.2 - Earthquake ✓  
- Landslide ✓  
- Volcanic eruption ✓ (Mark first TWO) (Any) (2)

2.3



### Marking criteria

Heading	Complete and correct ✓
Type of graph	Bars not connecting, same width and spaces between bars the same ✓
Scale y-axis	✓
Labelling	Label of both axes correct ✓
Plotting	1-2 bars correct ✓ 3-4 bars correct ✓✓ All 5 bars correct ✓✓✓ (Mark ONLY the first 5 bars)
	(7) (11)

### QUESTION 3

3.1 (i) A ✓ (1)  
 (ii) B ✓ (1)  
 (iii) A ✓ (1)  
 (iv) D ✓ (1)

3.2 6 ✓ (1)

3.3 To improve the reliability of the results ✓ (1)  
 (6)

### QUESTION 4

4.1 (i) 50 ✓ (1)  
 (ii) 190 ✓ (1)

4.2 500 ✓ (1)

4.3 The effect will not be too drastic ✓ because the rabbits will be able to reproduce ✓ because they have a better chance for survival (2)

4.4 Mark-recapture ✓ (1)  
 (6)

### QUESTION 5

5.1 A group of organisms of the same species ✓ living in the same habitat ✓ at the same time ✓ (3)

5.2 
$$P = \frac{F \times S}{M}$$
  

$$= \frac{20 \times 300}{10} ✓$$
  

$$= 600 ✓$$
 (3)

5.3 **Species B:**  
 - Could have died (life cycle) ✓✓  
 - Could have flown away ✓✓

- Could have been caught by predators ✓✓

**Species A:**

- Life cycle: more butterflies appeared ✓✓
- More butterflies could have entered the area
- More food available
- Less predators

Any (2 x 2) (4) (10)

**Mark first TWO only**

**QUESTION 6**

6.1	8 ✓ %	(1)
6.2	15-19 ✓ years	(1)
6.3	3 ✓ %	(1)
6.4	Women ✓	(1)
6.5	Pyramid B ✓	(1)
6.6	Low birth rate ✓ Low mortality rate ✓/Higher life expectancy	(2) (7) [50]

**ANALYSIS GRID: Grade 11 Assignment**

Question	Cognitive levels				Topic Population Ecology
	A	B	C	D	
A		2			✓
B		2			✓
C		2			✓
D		2			✓
E		2			✓
2.1	2				✓
2.2	2				✓
2.3	2	2	3		✓
3.1				4	✓
3.2		1			✓
3.3			1		✓
4.1	2				✓
4.2	1				✓
4.3				2	✓
4.4	1				✓
5.1	3				✓
5.2		3			✓
5.3			4		✓
6.1		1			✓
6.2		1			✓
6.3		1			✓
6.4		1			✓
6.5	1				✓
6.6		2			✓
<b>Total</b>	<b>14</b>	<b>22</b>	<b>8</b>	<b>6</b>	

## 7.8 Gr. 11 Test

### SECTION A

#### QUESTION 1

1.1	1.1.1	D✓✓		
	1.1.2	B✓✓		
	1.1.3	C✓✓		
	1.1.4	D✓✓	(4 x 2)	(8)
1.2	1.2.1	Pathogen✓		
	1.2.2	Asexual✓		
	1.2.3	Prokaryotes✓		(3)
1.3	1.3.1	B only✓✓		
	1.3.2	A only✓✓		
	1.3.3	B only✓✓	(6 x 2)	(6)

**TOTAL SECTION A:** 17

### SECTION B

#### QUESTION 2

2.1	2.1.1	1 – flagellum ✓ 3 – DNA/nucleoid ✓	(2)
	2.1.2	prokaryotic ✓	(1)
	2.1.3	No true nucleus✓ and no membrane bound organelles✓.	(2)
			(5)

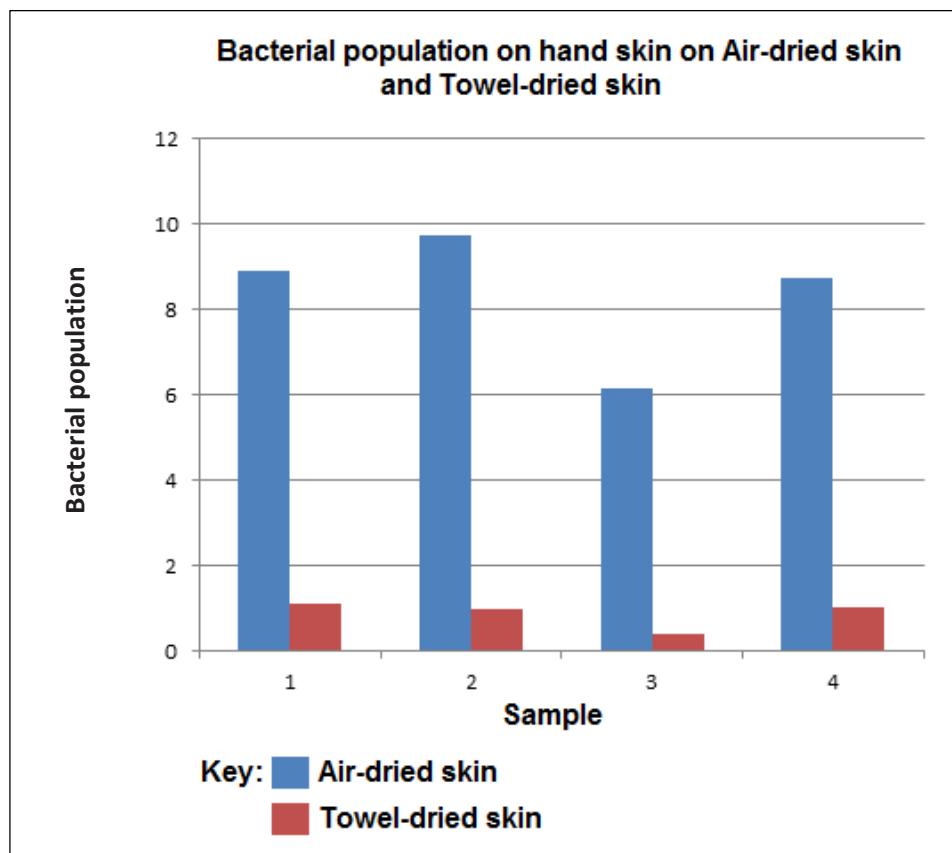
2.2 2.2.1 To find out which method of drying is better✓ – air blowing or towel drying✓.

**OR**

To investigate the effect of two different methods of drying hands, after washing✓, on the number of bacteria on the skin of the hands✓.

(2)

2.2.2



Correct type of graph	1
Title of graph (with both variables)	1
Correct label for X-axis and Y-axis	1
Correct scale for Y-axis and for X-axis	1
<b>Drawing of bar graph</b>	1 – 1 to 3 drawn correctly 2 – all 4 drawn correctly

(6)  
(8)

### QUESTION 3

3.1      3.1.1      A - Anther ✓  
                    B - Stigma✓  
                    C - Ovule/ovary✓      (3)

3.1.2      Angiosperms✓      (1)

3.1.3      A✓      (1)

3.1.4      Large anthers✓ ; Feathery stigmas✓      [Any 1]      (1)

3.1.5      Sexual✓      (1)

3.1.6      Sexual reproduction✓      (1)

**(8)**

3.2      3.2.1      Advantage:      It allows genetic variation ✓  
                    Leave behind any parasites/diseases that parent  
                    might have had ✓  
                    Lead to new species developing. ✓  
                    **(Any ONE – mark first one)**

Disadvantage:      Only females can produce offspring. ✓  
                    One has to find a mate ✓  
                    No guarantee that desirable traits will be retained  
                    in the offspring. ✓  
                    It takes longer to build a population.  
                    (Lengthy process) ✓  
                    **(Any ONE – mark first one)**      (2)

3.2.2      Sideway shoots / lateral buds/ cuttings ✓      (1)

3.2.3      
$$\frac{120 - 90}{120} \times 100 \text{ ✓}$$
  
                    = 25% ✓      (2)

**(5)**  
**[13]**

**TOTAL SECTION B: 26**

## **SECTION C**

### **QUESTION 4**

When the pathogen invades the body the **B cells (B lymphocytes)** ✓ will detect the antigens ✓ on the pathogen and produce **antibodies**. ✓

These antibodies will attach themselves to the antigens✓ on the pathogen, causing them to clump together. ✓

The **T cells (T lymphocytes)** will destroy them ✓ and the **phagocytes (Macrophages)** ✓ will engulf them through a process called phagocytosis ✓

[Any 5] (5)

### **ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Marks</b>	<b>Descriptions</b>
<b>2</b>	Well structured – demonstrates insight and understanding of question
<b>1</b>	Attempted but with significant gaps in the logic and flow of the answer
<b>0</b>	Not attempted/nothing written other than question number

**Synthesis** (2)

(7)

**TOTAL SECTION C: 7**

**GRAND TOTAL: 50**

**ANALYSIS GRID: Grade 11 Test**

Question	Cognitive levels				Topic	
	A	B	C	D	Biodiversity of plants	Classification of microorganisms
1.1.1	2				2	
1.1.2	2				2	
1.1.3	2					2
1.1.4		2				2
1.2.1	1				1	
1.2.2	1					1
1.2.3	1				1	
1.3.1		2				2
1.3.2.		2				2
1.3.3.		2				2
2.1.1.	2				2	
2.1.2	1				1	
2.1.3		2			2	
2.2.1			2		2	
2.2.2.	1	1	2	2	6	
3.1.1	3					3
3.1.2	1					1
3.1.3		1				1
3.1.4			1			1
3.1.5		1				1
3.1.6			1			1
3.2.1	2					2
3.2.2	1					1
3.2.3				2		2
4		2	4	1	7	
<b>Total</b>	<b>20</b>	<b>15</b>	<b>10</b>	<b>5</b>	<b>26</b>	<b>24</b>

## 7.9 Grade 11 Project

### GRADE 11 PROJECT: MEMORANDUM (HUMAN ECOLOGY / HUMAN IMPACT)

Practical Skills						
Follow instructions	Handle equipment	Make observations	Record information	Measure	Interpret	Design/Plan
✓		✓	✓	✓	✓	✓

#### PART 1: RESEARCH

*This section will be assessed as per learner response. Refer to the criteria as per criteria provided in the grid.*

(20)

#### PART 2: PLANNING FOR THE INVESTIGATION

#### PART 3

- 1 Ask for permission  
Determine the sample size  
Decide on the recording tool  
Decide when this research will be conducted / Time  
[Any other possible planning step/s] (4)
- 2 2 marks per question (as per tally chart). (3x2) (6)  
**(10)**

##### 1.1.1 Criteria for assessing table:

Table drawn with independent variable on left-hand side and dependent on right-hand	1
Title of the table	1
Correct labels on both columns	2
Data corresponds with the method	2

### 1.1.2 Criteria for assessing graph:

Correct type of the graph with both boys and girls included	1	(6)
Title of the graph	1	
Correct label for Y-axis and appropriate scale for Y-axis	1	
Correct label for X-axis and appropriate width for X-axis	1	
Drawing of the bars	1: 1 - 5 plotted correctly plotted 2: 6 - 11 plotted correctly plotted 3: All correctly plotted	

### 1.1.3 Conclusion-based on learners' data (In part 2)

Possible answers:

- *Most girls/ boys agree that the social grant must be given to teenage mothers than boys/girls✓*
- *Most girls/ boys agree that the social grant leads to teenage pregnancy than boys/girls✓*
- *Most girls/ boys agree that the social grant given to teenage mothers lead to food security than boys/girls✓*

(3)

### 1.1.4 Repeat in a different population✓

Increase the sample size✓

(2)

### 1.1.5 Age of the learners✓

Gender of the learners✓

The fact that they are getting or not getting the child grant✓ (Any 2) (2)  
(20)

## 7.10 Gr.11 Practical exam

### QUESTION 1

1.1.1 (a) Larynx✓  
(b) Diaphragm✓  
(c) Ribs✓ (3)

1.1.2 D✓ Pleura✓ (2)

1.1.3 - The C-shaped (cartilaginous) rings✓ to keep it open✓ at all times  
- Ciliated epithelium✓ to trap dust particles✓  
- Mucus✓ to moisten the inflowing air✓/antiseptic (Any 2 x 2) (4)  
**(Mark first TWO only)**

(9)

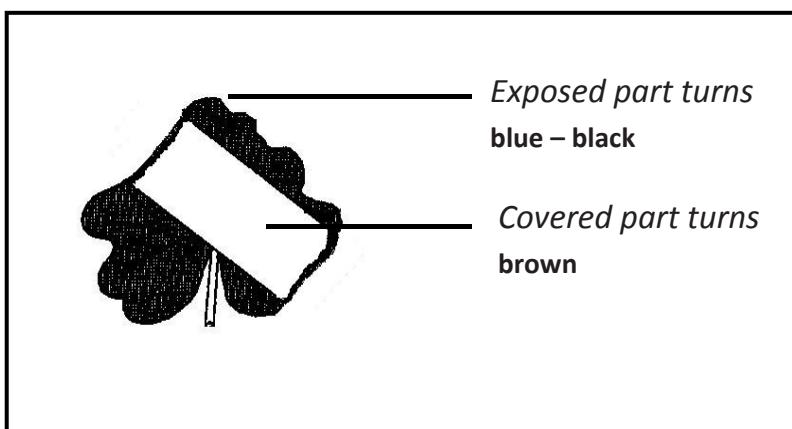
### QUESTION 2

#### 2.1

2.1.1 - To destarch✓ it to ensure no starch is present at the start of the experiment✓ (2)

2.1.2 - To prevent light from falling on covered part✓  
- Shade the part from light✓  
- To serve as a control✓ (2)  
**(Mark first TWO only)**

#### 2.1.3



**Result of light test for photosynthesis**

**Mark allocation:**

Caption✓	
Two correct labels✓✓	(3)
	(7)

**QUESTION 3**

3.1.1 - Meat✓  
- Oil and fat✓  
- Sugar✓ (3)  
**(Mark first THREE only)**

3.1.2 - Sugar, oil and fat have a high energy✓/cholesterol content  
- Can lead to obesity✓  
- Heart diseases✓  
- Diabetes✓ Any 2 x 1 (2)  
**(Mark first TWO only)**

3.1.3 - Fruit✓  
- Potatoes✓  
- Grain products✓  
- Other vegetables✓ Any (3)  
**(Mark first THREE only)**

3.1.4 - These foods have a low energy✓/cholesterol content  
- A high vitamin✓/mineral content  
- Prevents cancer✓  
- Have a high roughage content✓ Any 2 x 1 (2)  
**(Mark first TWO only)** (10)

**QUESTION 4**

4.1 To test for the presence of carbon dioxide✓ (1)

4.2 - Same amount of limewater✓  
- Same size of glass beaker✓ (Mark first TWO only) (2)

4.3.1 The clear limewater turned milky✓ in beaker A

4.3.2 No change in the limewater✓ in beaker B (2)

4.4 Exhaled air✓ contains carbon dioxide✓ (2)  
(6)

## QUESTION 5

5.1.1 Walking✓✓ (2)

5.1.2 For metabolic processes✓✓/cellular respiration/digestion/excretion

OR

For physiological processes/breathing/heartbeat (1)

5.1.3 Doubles it✓/increase/deepens/becomes more (1)

5.1.4  $(1000 \times 40)✓$

$= 40\ 000✓\ cm^3✓$  (3)

5.1.5 The metabolic rate/heartbeat is still high✓✓/pay back the oxygen

debt/prevent or breakdown of lactic acid (2)

5.1.6 (a)  $150✓ \times (20 \times 60)✓ = 180\ 000✓$  (150 particles x 20 breaths/min x 60 min)

OR

$150✓ \times 1200✓ = 180\ 000✓$  (3)

(b) Particles are caught in the moist mucous membrane✓✓/hair in the nostrils remove pollen particles from the air that enters (2)

(12)

## QUESTION 6

6.1 To enable plants to obtain light,✓ which is essential for photosynthesis✓ (2)

6.2- Boil a leaf in a beaker with water✓

- Until it is soft to break the cells✓
- Remove the leaf and place it in a beaker/test tube with ethanol✓
- To remove the chlorophyll✓ from the leaf
- Remove the leaf from the ethanol and place it in hot water✓ to soften it
- Place the leaf on a white tile✓/glass pane
- And cover it with iodine solution✓
- To observe the colour change to black✓

any (5)

6.3 (a) B✓

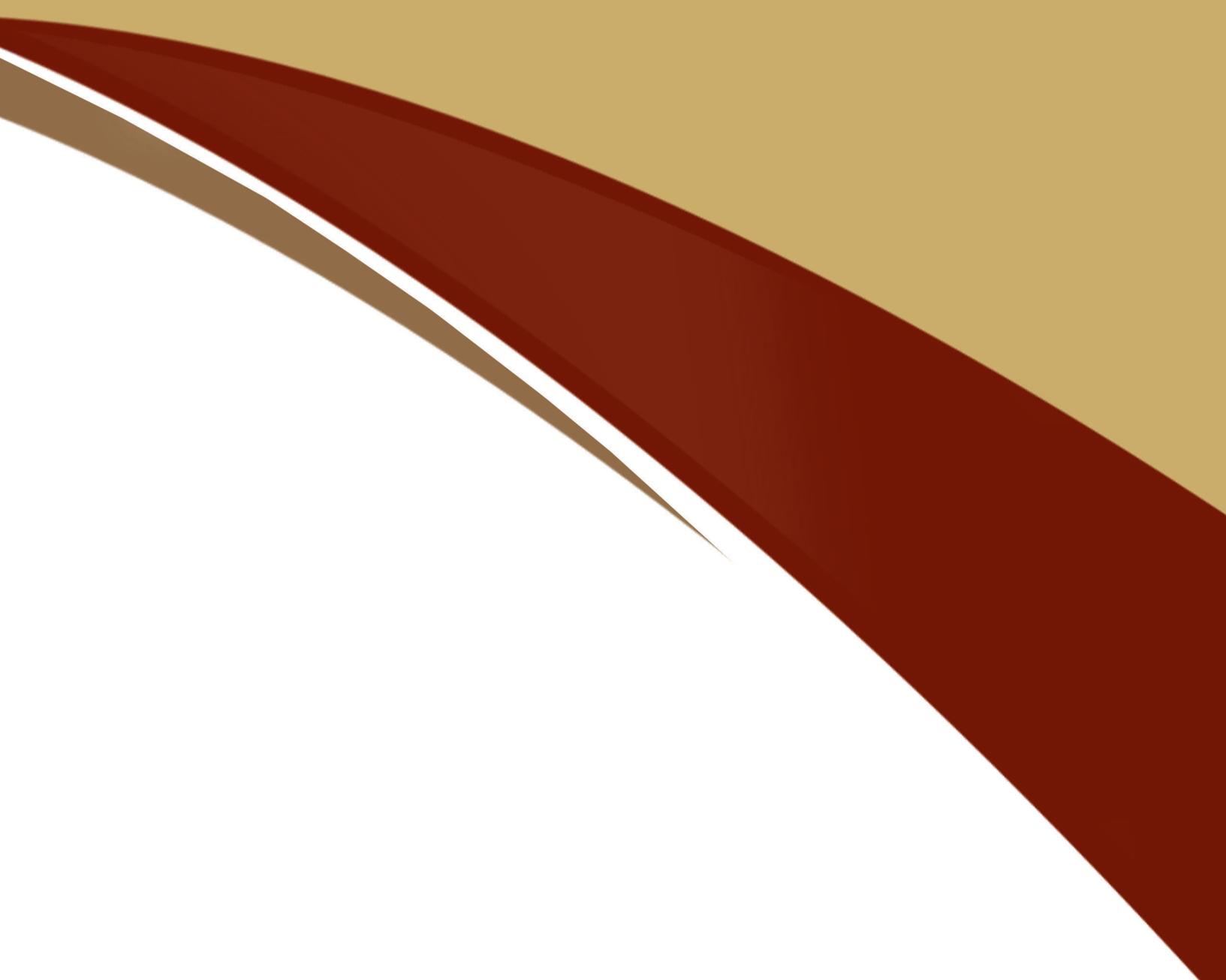
(b)	A✓	(2)
6.4	In apparatus A photosynthesis will occur at a greater rate✓ than in apparatus B and more oxygen will be released <b>(Mark first ONE only)</b>	(1)
6.5	Sodium bicarbonate✓	(1)
6.6	- Repeat the investigation✓ - Use another plant species✓ to do the investigation <b>(Mark first ONE only)</b>	any (1)
		<b>TOTAL: (12)</b> <b>[60]</b>

Questions

Skills of Specific Aim 2	Design/plan			
	A	B	C	D
1.1	3			3
1.2	1	1		2
1.3	2	2		4
2.1	2			
2.2		2		
2.3		3		3
3.1	3			3
3.2		2		2
3.3	3			3
3.4		2		2
4.1	1		1	
4.2		2	2	
4.3.1	1			1
4.3.2	1			1
4.4	2			2

1.1      1.2      1.3      2.1      2.2      2.3      3.1      3.2      3.3      3.4      4.1      4.2      4.3.1      4.3.2      4.4

	Total						60			
	24	14	12	10	3	9	0	0	29	10
5.1.1								2		
5.1.2			2					2		
5.1.3			1					1		
5.1.4				3				3		
5.1.5				2				2		
5.1.6				5				5		
6.1		2						2		
6.2		5				5				
6.3			2					2		
6.4				1				1		
6.5				1				1		
6.6				1					1	
	<b>24</b>	<b>14</b>	<b>12</b>	<b>10</b>	<b>3</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>29</b>	<b>10</b>



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