Preamble for Agricultural Science

The Examinations Council of Zambia has made adjustments to the assessment of **Agricultural Science** at Grade 12 level so as to be in line with the revised **Agricultural Science** Senior Secondary School Syllabus of 2013 developed by Curriculum Development Centre (CDC) of the Ministry of General Education.

Purpose

The purpose of assessing Agricultural Science at Grade 12 will be to evaluate candidates' knowledge skills and values across the Agricultural Science syllabus as well as certification of candidates. Furthermore, the purpose will be to give feedback to educators on the effectiveness of instructions, prepare learners for tertiary and vocational training, and determine the extent to which school graduates are ready for the job market and for survival.

Assessment Objectives

Candidates will be assessed against the following aspects:

Knowledge with Understanding

1. agricultural science symbols, quantities and units of measurement
2. agricultural science terms, facts, concepts and principles.

Problems Solving

1. organise and present information from a variety of sources (words, symbols, graphs, numbers, etc.)
2. translate information given in one form to another. (e.g. numerical data to graphical data)
3. use information to observe trends and draw conclusions
4. present explanations for observed facts and relate them to each other
5. make predictions based on observations
6. use knowledge to solve problems.

Practical Activities

Competences and Techniques

1. follow instructions
2. choose suitable techniques, equipment and materials
3. use equipment and materials safely and correctly
4. make and record observations, measurements and estimates

Investigations

- identify problems and plan investigations
- organise and carry out investigations in a systematic way
- interpret and evaluate observations and experimental data
- evaluate methods and suggest improvements

Skills and Techniques in Livestock Production

- handle single or groups of farm animals in a safe and correct manner

- maintain the health of a farm animal

- calculate maintenance and production rations of farm animals
- plan, manage and implement a feeding programme for different stages of the life cycle of a farm animal
- identify types and breeds of animals
- market farm animals and their products
- maintain accurate physical and financial records of a livestock enterprise

Skills and Techniques in Crop Production and Entrepreneurship
- identify cultivars and varieties of crops
- calculate fertiliser/manure requirements of a crop and estimate crop yield
- plan, implement and manage a cropping programme
- harvest and market a crop
- maintain accurate physical and financial records of a crop enterprise

Test Design

The examination will comprise three papers

Paper 1 (2 hours) will consist of two sections, A and B. Section A will comprise five compulsory semi-structured questions carrying 8 marks each. Section B will consist of five essay questions each carrying 20 marks. Candidates will be required to attempt three questions from section B.

Paper 2 is a school-based project carrying 20 marks. Candidates are expected to carry out a project in either crop or livestock production. The project should start when candidates are in the third term of grade 11 and should be completed in the second term of grade 12. Candidates will each maintain and submit for the purpose of the final examination a project report.
Paper 3 (1 hour 30 minutes) is a practical test comprising four compulsory questions carrying 10 marks each. This is designed to test appropriate skills in all assessment objectives. Each question will consist of sub-components requiring candidates to read instructions carefully, carry out experiments, make observations, draw diagrams, measure, record data and make conclusions.

Paper Name and Code	**Paper and Duration**	**Marks**	**Number of Questions**	**Overall Weight of Paper**
Agricultural Science paper 1	2 hours	100	Section A: 5 Section B: 5	63%
Agricultural Science paper 2	2 hours	20		12%
Agricultural Science paper 3	1 hour 30 minutes	40	4	25%
Total				**100%**

Candidate Name_____

Centre Number				Candidate Number								

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

Agricultural Science 5037/1

Paper 1 Theory

Additional Materials:

Answer Booklet

Time: 2 hours

Instructions to candidates

Write your name, centre number and candidate number in the spaces at the top of this page and on the Answer Booklet.

There are **Ten** questions in this paper.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer any **three** questions.

Write your answers in the Answer Booklet provided.

At the end of the examination:

1 fasten the Answer Booklet securely to the question paper.

2 enter the numbers of the **Section B** questions you have answered in the grid for Examiner's use.

FOR EXAMINER'S USE	
Section A	
Section B	
Total	

Information for candidates

The number of marks is given in brackets [ ] at the end of each question or part question.

You are advised to spend no longer than 40 minutes on **Section A**.

Cell phones are not allowed in the examination room.

This question paper consists of 8 printed pages

Section A

Answer all questions in this section

1 ***Figure 1*** shows the root system of a groundnut crop and the root system of a maize crop.

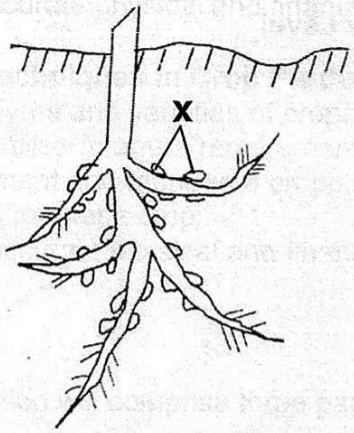


Figure 1A

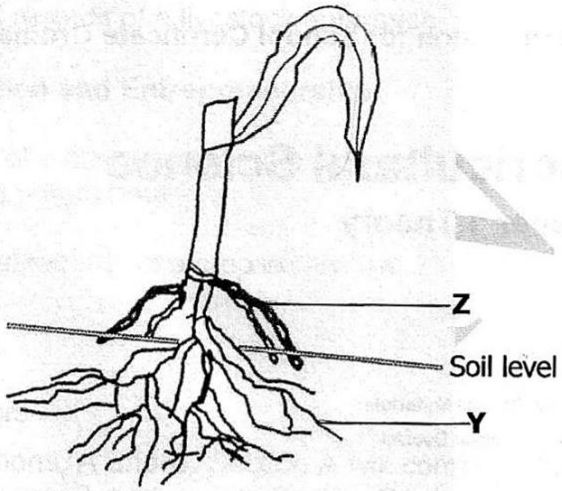


Figure 1B

(a) Identify the type of root system in:

Figure 1 A .....

Figure 1 B ..... [2]

(b) Name the structures labelled **X**, **Y** and **Z**.

X .....

Y .....

Z ..... [3]

(c) State the importance of the structure labelled **X** in soil fertility.

.....

.....

..... [3]

[8 marks]

2 *Figure 2* shows types of moisture movements.

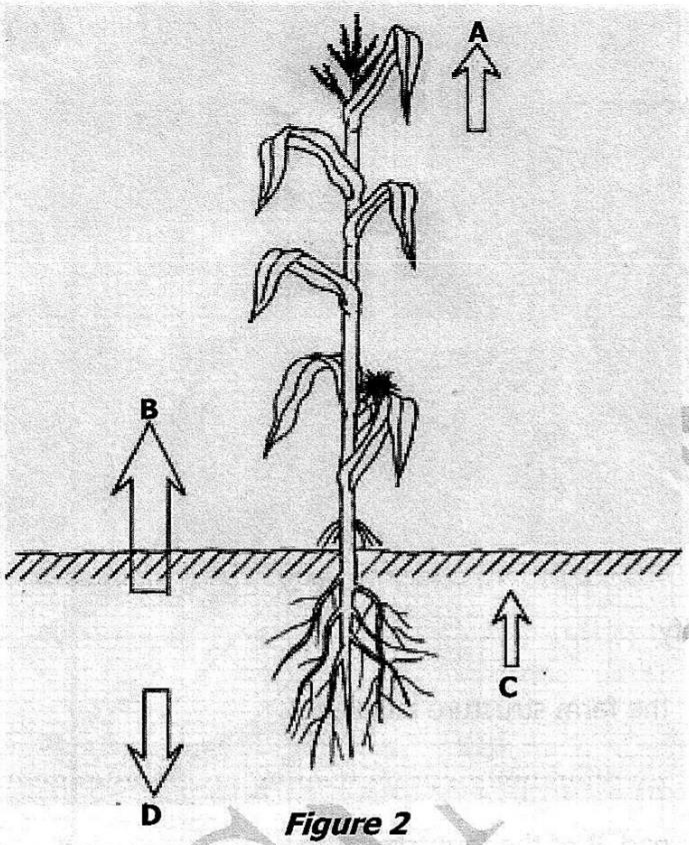


Figure 2

(a) Identify the movements of moisture at **A**, **B**, **C** and **D**.

A .....

B .....

C .....

D ..... [4]

(b) Name the types of soil moisture at **C** and **D**.

C .....

D ..... [2]

(c) State **two** uses of soil moisture in crop production.

(i) .....

.....

(ii) .....

..... [2]

[8 marks]

[Turnover

3 ***Figure 3*** shows a farm structure for water supply.

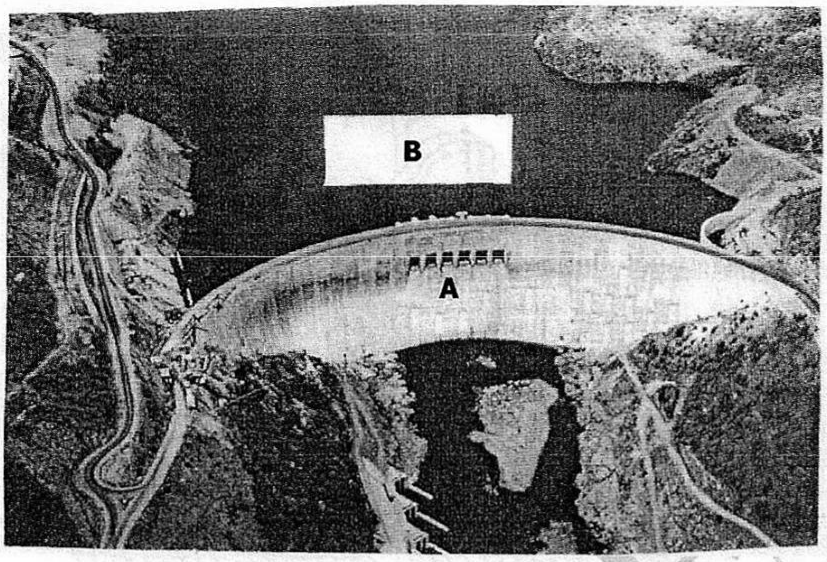


Figure 3

(a) Identify:

(i) the farm structure labelled **A**.

..... [1]

(ii) part **B** of the farm structure.

..... [1]

(b) State a local material used to construct the farm structure.

..... [1]

(c) Name any **two** other farm structures for water supply.

(i) .....

(ii) ..... [2]

(d) **(i)** What is water pollution?

..... [1]

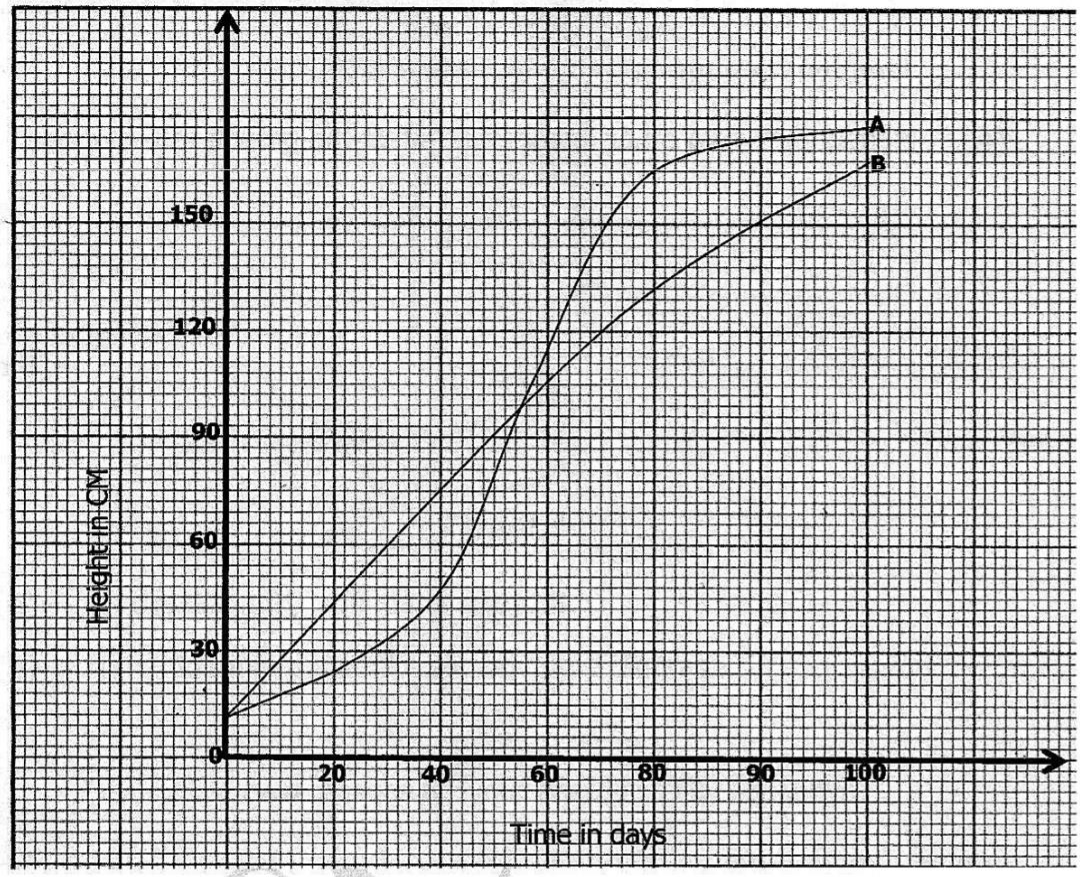
(ii) Describe **two** ways in which water supplies on the farm may be polluted.

1 .....

2 ..... [2]

[8 marks]

4 **Graph 1** shows average growth of crop **A** and crop **B**. Organic fertilizer was applied to crop **A** while inorganic fertilizer was applied to crop **B**.



Graph 1

(a) What was the average height of crop **A** and **B** on the 20th day of growth?

A .....

B ..... [2]

(b) Explain why crop **A** had a slower growth rate than crop **B** between 10 days and 40 days.

.....

.....

..... [2]

[Turnover

(c) Explain why crops **B** started growing slowly after 60 days.

.....

.....

..... [2]

(d) Mention any **two** other factors that affect the growth rate of crops.

(i) .....

(ii) ..... [2]

[8 marks]

5 ***Figure 4*** shows part of the diesel engine.

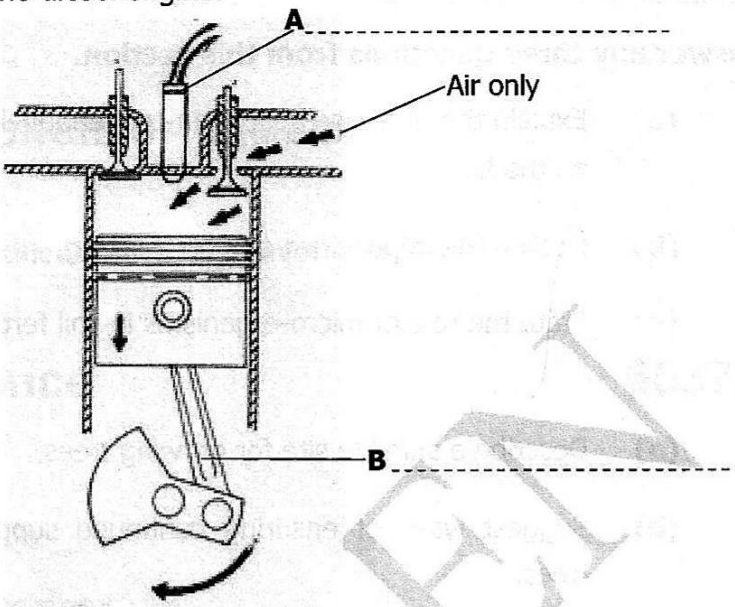


Figure 4

(a) On the diagram, label parts **A** and **B**. [2]

(b) **(i)** Identify the stroke shown in the diagram.

..... [1]

(ii) Give **two** reasons for your answer in **(b) (i)** above.

1 .....

.....

2 .....

..... [2]

(c) What would you expect to happen when the following parts are not functional in a petrol engine?

(i) Radiator .....

..... [1]

(ii) Carburettor .....

..... [1]

(iii) Spark plug .....

..... [1]

[8 marks]

Section B

Answer any three questions from this section.

6 **(a)** Explain the difference between conventional and conservation farming methods. [10]

(b) Outline the importance of intercropping. [5]

(c) State the role of micro-organisms in soil fertility. [5]

[Total: 20]

7 **(a)** Describe a suitable site for growing trees. [5]

(b) Suggest ways of ensuring continued supply of poles and handles from trees. [6]

(c) Outline how trees reduce soil erosion. [9]

[Total: 20]

8 **(a)** State the economic importance of cattle. [11]

(b) Outline the advantages of a mixture of grasses and legumes on a pasture. [9]

[Total: 20]

9 **(a)** With the aid of a diagram, describe the induction stroke of a petrol engine. [12]

(b) State the differences between petrol and diesel engines. [8]

[Total: 20]

10 **(a)** Suggest ways of increasing sales of agricultural products in the local area. [10]

(b) Distinguish between gross-margin of an enterprise and depreciation of farm machinery. [7]

(c) State **three** methods used to calculate depreciation of farm machinery. [3]

[Total: 20]