

G12 ECZ AGRICULTURAL SCIENCE 2014 PAPER 1 SOLUTIONS

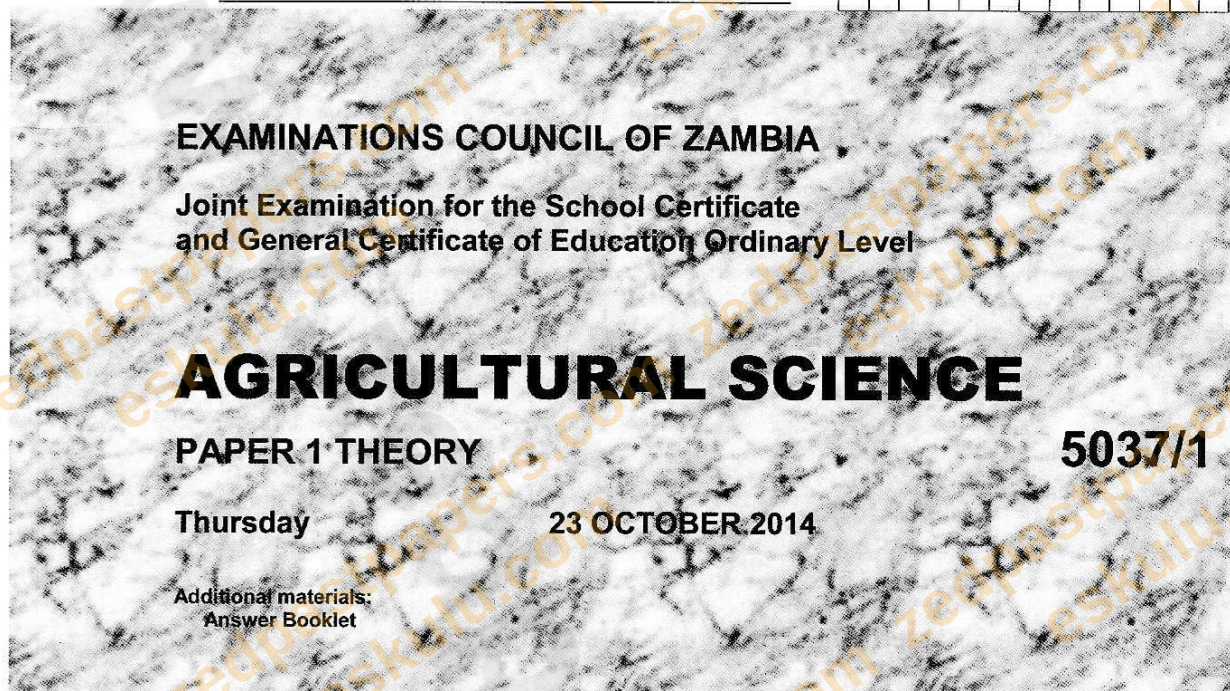
Grade 12 ECZ Agricultural Science 2014 Paper 1 (5037/1) — Theory

Thursday 23 October 2014 | 2 hours | Section A (Q1–5, answer all) + Section B (Q6–10, answer any three)

The full question paper appears first — worked answers follow.

Candidate Name: _____

Centre Number.				Candidate Number			



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.

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.

FOR EXAMINER'S USE	
Section A	
Section B	
Total	

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Section A

Answer **all** questions in this section.

- 1 **Figure 1A** and **1B** show a farm task carried out on young bulls.

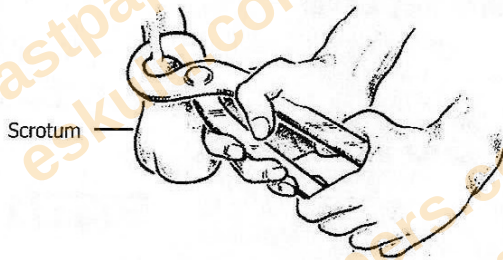


Figure 1A

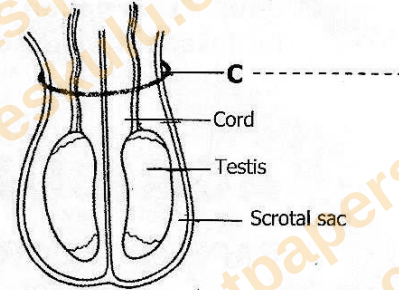


Figure 1B

- (a) Identify the task represented by **Figure 1A** and **Figure 1B**.

[1]

- (b) Name the method used to carry out the task in:

(i) **Figure 1A** [1]

(ii) **Figure 1B** [1]

- (c) On **figure 1B**, label part **C** [1]

- (d) Name the instrument used to

(i) place part **C** in position in **Figure 1B**.

[1]

(ii) carry out the task in **Figure 1A**.

[1]

- (e) Give **two** reasons for carrying out the task represented by **Figure 1A** and **Figure 1B**.

(i)

(ii)

[2]

[Total 8]

2 **Figure 2** shows an experiment on soil structure.



Figure 2

(a) Identify the soil structures **A**, **B** and **C**.

- A**
- B**
- C** [3]

(b) State **two** ways in which soil structure can be damaged.

- (i)
- (ii) [2]

(c) Outline **three** ways in which a farmer can use a cropping policy to improve soil structure.

- (i)
- (ii)
- (iii) [3]

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[Total 8]

3 **Figure 3** shows a farming implement.

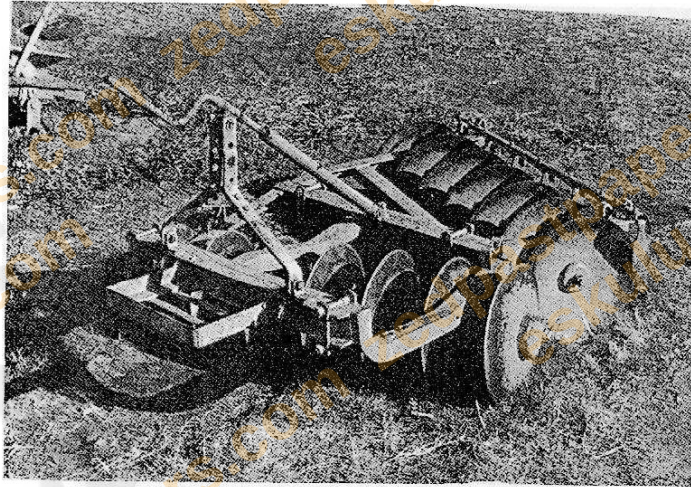


Figure 3

(a) Name the farming implement in **Figure 3**.

[1]

(b) State the maintenance practices for the farming implement named in (a) above.

(i)

(ii)

[2]

(c) Give **five** reasons for using the farm implement in **Figure 3**.

(i)

(ii)

(iii)

(iv)

(v)

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[5]

[Total 8]

- 4 **Figure 4** shows a method of sowing seeds.

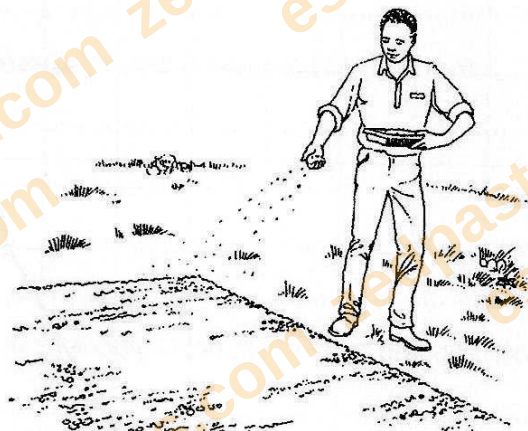


Figure 4

- (a) Identify the sowing method represented in **Figure 4**.

[1]

- (b) Give **two** advantages of using the sowing method in **Figure 4**.

(i)

(ii)

[2]

- (c) (i) What is inter-cropping?

[2]

- (ii) Give **three** reasons why a farmer may practise inter-cropping.

1.

2.

3.

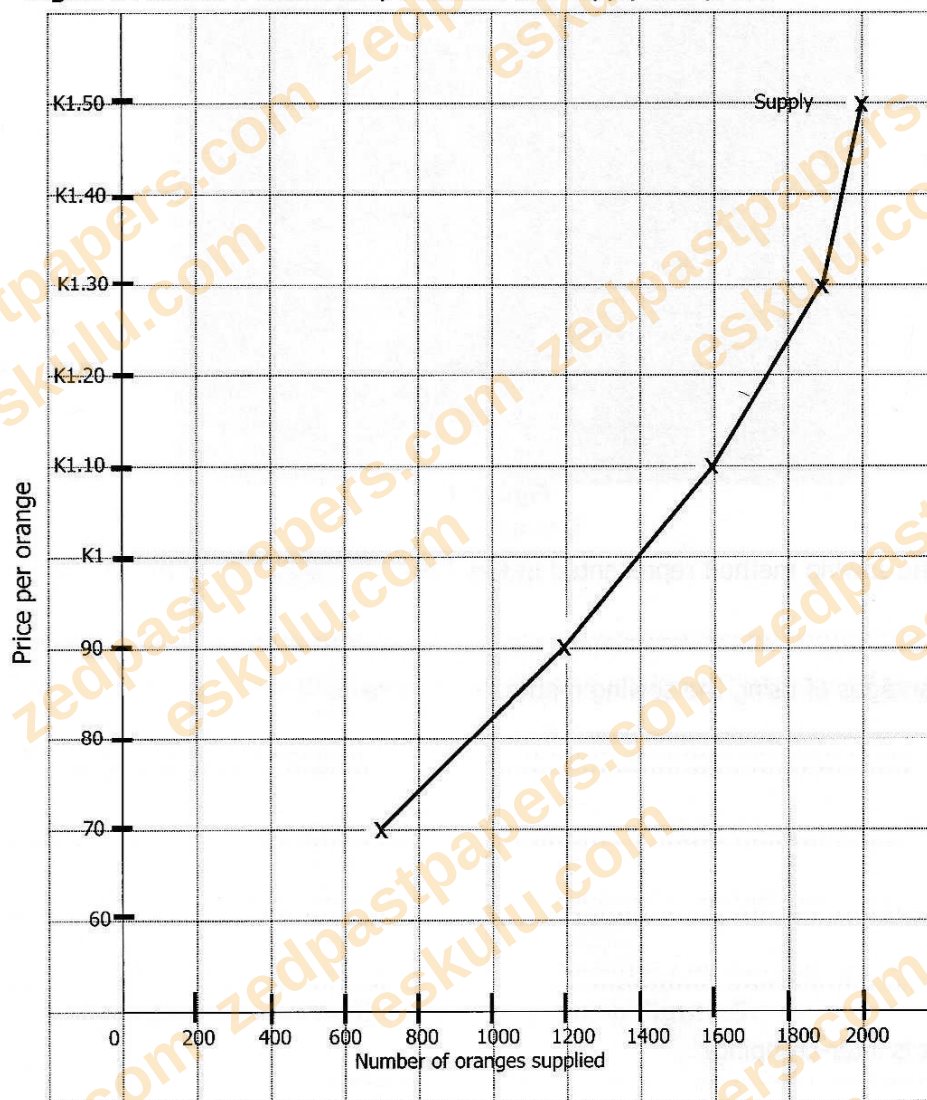
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[3]

[Total 8]

[Turn over]

5

Figure 5 shows a relationship between the supply and price.**Figure 5****(a)** What is the supply of oranges when the price is:**(i)** 70N per orange? [1]**(ii)** K1.50N per orange? [1]**(b)** At what price will 1,900 oranges be supplied by farmers?

..... [1]

(c) (i) What happens to the supply when the price of oranges falls from K1.00 to 70N.

..... [1]

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

1.

.....

2.

..... [2]

(d) (i) What happens to supply when the price of oranges rises from K1.10 to K1.50?

..... [1]

(ii) Give **one** reason for your answer in (d) (i) above.

.....

..... [1]

[Total 8]

SECTION B

Answer any **three** questions from this section.

- 6** (a) Distinguish clearly between small scale farming and commercial farming. [12]
 (b) Discuss the effects of small scale farming and commercial farming on the environment. [8]
[Total 20]
- 7** Outline the importance of trees on the following:
 (a) soil conservation; [6]
 (b) soil fertility; [8]
 (c) rainfall and, [3]
 (d) environmental temperature; [3]
[Total 20]
- 8** (a) Discuss the economic importance of cattle. [15]
 (b) Explain the energy release and utilization in the body of an animal. [5]
[Total 20]
- 9** (a) Outline how you would prepare the soil for sowing groundnuts. [7]
 (b) Describe the production of groundnuts under the following:
 (i) sowing [7]
 (ii) preventing rosette disease and, [2]
 (iii) harvesting [4]
[Total 20]
- 10** (a) List the types of structures for cattle on the farm. [4]
 (b) State the materials used to construct buildings on the farm. [7]
 (c) Explain the importance of maintaining farm structures on the farm. [9]
[Total 20]



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Question 1. Figures 1A and 1B show a farm task carried out on young bulls (1A: a Burdizzo squeezing the scrotum; 1B: a diagram of the scrotum showing the cord, testis and scrotal sac with part C at the top).

Answer: (a) Task represented: CASTRATION of the young bulls.

Answer: (b)(i) Figure 1A method: the BLOODLESS (crushing) method — the spermatic cord is crushed without cutting the skin.

Answer: (b)(ii) Figure 1B method: the RUBBER RING (elastration) method — a tight rubber ring cuts off blood supply to the scrotum/testes.

Answer: (c) Part C on Figure 1B: the RUBBER RING.

Answer: (d)(i) Instrument used to place part C (Figure 1B): the ELASTRATOR.

Answer: (d)(ii) Instrument used to carry out the task in Figure 1A: the BURDIZZO.

Answer: (e) Two reasons for castration: (i) to CONTROL/PREVENT indiscriminate breeding (only selected bulls are kept for breeding); (ii) to make the animals DOCILE and easier to handle, and to improve the quality of beef.

Question 2. Figure 2 shows an experiment in which water is dropped onto three soil samples A, B and C (A collapses/spreads flat, B partly holds together, C remains a firm rounded ball).

The experiment tests the WATER-STABILITY of soil aggregates — how well the soil holds together when wetted, which depends on its structure.

Answer: (a) Soil structures: A = a POORLY-STRUCTURED / weak (single-grained, structureless) soil — it slakes and collapses when wetted. B = a MODERATELY-STRUCTURED soil — partly stable. C = a WELL-STRUCTURED, water-stable CRUMB (granular) soil — it keeps its shape (rich in organic matter).

Answer: (b) Two ways soil structure can be damaged: (i) excessive cultivation/tillage, especially when the soil is too wet; (ii) compaction by heavy machinery or trampling by livestock. (Also: raindrop impact on bare soil and loss of organic matter through burning.)

Answer: (c) Three ways a cropping policy can improve soil structure: (i) practise CROP ROTATION (including deep- and shallow-rooted crops); (ii) grow LEGUMES / cover crops (green manure) and include grass leys whose roots bind the soil; (iii) RETURN crop residues and apply organic manure to raise organic-matter content.

Question 3. Figure 3 shows a farming implement (a disc harrow — a frame carrying gangs of concave steel discs).

Answer: (a) Implement: a DISC HARROW.

Answer: (b) Maintenance practices: (i) clean off soil and trash and grease/oil the bearings after use; (ii) sharpen or replace worn/blunt discs, tighten loose bolts, and store under shelter to prevent rusting.

(c) Five reasons for using the disc harrow (secondary tillage):

Answer: (i) To break down clods after ploughing into a fine tilth/seedbed.

Answer: (ii) To level the soil surface.

Answer: (iii) To incorporate crop residues, manure or lime into the soil.

Answer: (iv) To destroy/control weeds and germinating seedlings.

Answer: (v) To cover broadcast seed and conserve soil moisture.

Question 4. Figure 4 shows a method of sowing seeds (a person scattering seed by hand).

Answer: (a) Sowing method: **BROADCASTING**.

Answer: (b) Two advantages of broadcasting: (i) it is **FAST** and covers a large area quickly; (ii) it is **CHEAP** and simple — it needs no special equipment or skill.

Answer: (c)(i) Inter-cropping: growing **TWO OR MORE** crops together on the same piece of land at the same time.

(c)(ii) Three reasons a farmer may practise inter-cropping:

Answer: 1. To make **MAXIMUM** use of the land and resources (light, water, nutrients).

Answer: 2. To reduce the **RISK** of total crop failure (if one crop fails, the other may succeed) and to spread income.

Answer: 3. A legume inter-crop **FIXES NITROGEN** for the companion crop, and the ground cover suppresses weeds and reduces soil erosion.

Question 5. Figure 5 is a supply curve showing the relationship between the price per orange and the number of oranges supplied.

Answer: (a)(i) Supply when the price is 70N per orange: about 800 oranges (read from the curve).

Answer: (a)(ii) Supply when the price is K1.50N per orange: about 2,000 oranges.

Answer: (b) At 1,900 oranges supplied, the price is about K1.45 (read from the supply curve).

Answer: (c)(i) When the price falls from K1.00 to 70N, the supply **DECREASES** (falls).

(c)(ii) Two reasons:

Answer: 1. A lower price means less profit, so farmers are less willing to supply/produce oranges.

Answer: 2. Some farmers withdraw from the market because production is no longer worthwhile.

Answer: (d)(i) When the price rises from K1.10 to K1.50, the supply **INCREASES**.

Answer: (d)(ii) Reason: the higher price gives more profit, so farmers are willing to supply more oranges (the law of supply).

Question 6. [SECTION B] (a) Distinguish clearly between small-scale farming and commercial farming. (b) Discuss the effects of small-scale and commercial farming on the environment.

(a) SMALL-SCALE vs COMMERCIAL FARMING:

Answer: Small-scale: small area of land; mainly for SUBSISTENCE (feeding the family) with little surplus; uses family labour; simple/traditional tools (e.g., hand hoe); low capital; little or no mechanisation; few improved inputs; low output; often mixed/diversified to spread risk; few or no records kept.

Answer: Commercial: large area of land; produces for SALE and PROFIT (market-oriented); uses hired/skilled labour and machinery (mechanised); high capital investment; uses improved seed, fertilizers and agro-chemicals; high output; usually specialised (often monoculture); proper business records and management.

(b) EFFECTS ON THE ENVIRONMENT:

Answer: Small-scale: shifting cultivation and slash-and-burn cause deforestation and loss of vegetation; overgrazing and bush burning degrade land and cause soil erosion; but generally little chemical pollution.

Answer: Commercial: heavy use of fertilizers and pesticides pollutes soil and water; monoculture reduces biodiversity and exhausts soil fertility; clearing large fields causes deforestation and large-scale soil erosion; irrigation can deplete water; machinery and burning add to air pollution.

Question 7. Outline the importance of trees on: (a) soil conservation; (b) soil fertility; (c) rainfall; (d) environmental temperature.

Answer: (a) SOIL CONSERVATION: tree roots bind the soil and reduce erosion; the canopy intercepts rain and lessens raindrop impact; leaf litter forms a protective mulch; trees act as windbreaks reducing wind erosion; they slow run-off and increase infiltration.

Answer: (b) SOIL FERTILITY: fallen leaves decompose to form humus/organic matter; leguminous trees fix nitrogen; deep roots recycle nutrients from the subsoil to the surface; trees improve soil structure and encourage soil organisms; mulch conserves moisture for nutrient release.

Answer: (c) RAINFALL: through transpiration trees release water vapour into the air, which helps form clouds and increases local rainfall; they raise humidity and moderate the local climate.

Answer: (d) ENVIRONMENTAL TEMPERATURE: shade and transpiration cool the surroundings; trees absorb carbon dioxide, reducing the greenhouse effect/global warming, helping to keep temperatures down.

Question 8. (a) Discuss the economic importance of cattle. (b) Explain the energy release and utilisation in the body of an animal.

(a) ECONOMIC IMPORTANCE OF CATTLE:

Answer: Meat (beef) for food and sale; milk and dairy products; hides and skins for leather; draught power for ploughing and transport; manure for fertilizer and for fuel/biogas; a source of income and savings/wealth; by-products such as blood, bones, horns and hooves; social and cultural value (dowry, status); and they create employment.

(b) ENERGY RELEASE AND UTILISATION:

Answer: Food is digested and absorbed (e.g., as glucose). In the cells, RESPIRATION oxidises glucose using oxygen, releasing ENERGY together with carbon dioxide and water (the energy is stored briefly as ATP).

Answer: The energy is then used for: maintaining body temperature (heat); movement and work; growth and repair of tissues; production (milk, meat, work); and reproduction.

Question 9. (a) Outline how you would prepare the soil for sowing groundnuts. (b) Describe the production of groundnuts under: (i) sowing; (ii) preventing rosette disease; (iii) harvesting.

Answer: (a) SOIL PREPARATION: clear the land of vegetation and stumps; plough to loosen the soil to a good depth; harrow to break the clods into a fine, loose tilth (groundnuts need a well-drained sandy-loam soil for easy pegging); level the seedbed; apply lime if the soil is acidic and work in organic matter.

Answer: (b)(i) SOWING: use certified, healthy seed shelled just before planting and dressed with a fungicide; sow at the onset of the rains about 5 cm deep at a spacing of roughly 45 cm between rows and 10–15 cm within the row, placing seeds singly, then cover lightly.

Answer: (b)(ii) PREVENTING ROSETTE DISEASE: rosette is a virus spread by aphids — control the aphid vector with insecticides, plant early and at close spacing, use resistant varieties, and rogue out (remove) infected plants.

Answer: (b)(iii) HARVESTING: harvest when the leaves turn yellow and the pods are mature (the inner shell shows dark veins and the seeds fill the pods); lift/pull the plants, dry them in windrows, strip the pods, dry to a safe moisture content and store properly.

Question 10. (a) List the types of structures for cattle on the farm. (b) State the materials used to construct buildings on the farm. (c) Explain the importance of maintaining farm structures.

Answer: (a) STRUCTURES FOR CATTLE: kraal/boma; cattle shed/barn; dip tank or spray race; crush/race; feed and water troughs; milking parlour; calf pens; and a hay/feed store.

Answer: (b) BUILDING MATERIALS: bricks or blocks, cement, sand, aggregate/stones, timber and poles, iron (roofing) sheets, nails and wire, thatch grass, concrete, and steel bars.

(c) IMPORTANCE OF MAINTAINING FARM STRUCTURES:

Answer: It prolongs the lifespan/durability of the structure and saves the cost of replacement; keeps it functional and efficient; ensures the safety of animals and workers and prevents accidents; maintains hygiene and helps prevent disease; preserves the value of the asset; and provides good, comfortable housing that supports higher animal production.

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