GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2025

MARKING GUIDELINES

AGRICULTURAL SCIENCES

(PAPER 1)

11 pages

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	D ✓✓		
	1.1.3	C ✓✓		
	1.1.4	A ✓✓		
	1.1.5	C ✓✓		
	1.1.6	B ✓✓		
	1.1.7	D ✓✓		
	1.1.8	C ✓✓		
	1.1.9	A ✓✓		
	1.1.10	B ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	A only ✓✓		
	1.2.3	Both A and B ✓✓		
	1.2.4	B only ✓✓		
	1.2.5	None ✓✓	(5 x 2)	(10)
1.3	1.3.1	Peristalsis ✓✓		
	1.3.2	Fodder/Feed flow ✓✓		
	1.3.3	Bunching ✓✓		
	1.3.4	Cryptorchidism ✓✓		
	1.3.5	Hydrocephalus ✓✓	(5 x 2)	(10)

1.4 1.4.1 Amylase/Ptyalin ✓

1.4.2 Cafeteria style/Free choice/Ad lib✓

1.4.3 Foot and Mouth Disease/FMD ✓

1.4.4 Mummification ✓

1.4.5 Colostrum/Beestings ✓ (5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 **The digestive system of a ruminant**

2.1.1 **The name of the animal**

Cattle/sheep/goat ✓ (1)

2.1.2 **Processes illustrated by arrows**

A – Swallowing/peristalsis/ingestion/intake of food ✓
B – Regurgitation/retro-peristalsis ✓
C – Re-swallowing/peristalsis ✓ (3)

2.1.3 **TWO advantages of regurgitation/retro-peristalsis**

- Breaks down food into finer particles ✓
- Increases surface area ✓
- Stimulates secretion of saliva ✓
- Maintains rumen pH level ✓
- Improves the mixing of food ✓
- Helps with the forming of bolus ✓ (Any 2) (2)

2.2 **The schematic representation of the components of feed:**

2.2.1 **Identification of substances**

A – Dry matter ✓
B – Inorganic matter/minerals/elements ✓
C – Vitamins ✓ (3)

2.2.2 **Difference between oil and fat**

Oil – unsaturated/liquid at room temperature/plant origin/ Double bonds ✓
Fat – saturated/ solid at room temperature/animal origin/ Single bonds ✓ (2)

2.2.3 **The end-products of digestion in pigs**

(a) **Carbohydrates** – Glucose/energy ✓ (1)

(b) **Protein** – Amino acids ✓ (1)

2.2.4 **Two functions of water in digestion**

- Acts as a solvent/assists in the absorption of nutrients ✓
- Moisturises the swallowed food ✓
- Provides a suitable environment for micro-organisms ✓
- Helps with the breaking down of food ✓
- Prevents constipation ✓
- Transports nutrients ✓
- Facilitates the excretion of waste products ✓ (Any 2) (2)

2.3 **Minerals, vitamins and their deficiency symptoms**

2.3.1 **Missing information in A, B and C**

A – Zinc/Zn ✓
B – Metritis/inflammation of the udder ✓
C – Stiff lamb/muscle dystrophy/white muscle ✓ (3)

2.3.2 **Methods used to supplement the following**

(a) **Vitamin A** – Injections/supplementary rations ✓ (1)

(b) **Soluble minerals** – Dissolve minerals in drinking water/dosing ✓ (1)

2.4 **Calculation of digestibility co-efficient**

2.4.1 DM of hay = $\frac{8 \times 30}{100}$

= 2,4 kg
30 – 2,4

= 27,6 kg ✓

DC = $\frac{\text{Dry matter intake (kg) – Dry mass manure (kg)}}{\text{Dry matter intake (kg)}} \times \frac{100}{1}$ ✓

= $\frac{27,6 \text{ kg} – 12 \text{ kg} \times 100}{27,6 \text{ kg}}$ ✓

= 56,52 ✓ % ✓ or 57 ✓% ✓ (5)

2.4.2 56,52% ✓ of feed has been digested and absorbed ✓
OR
43,48% ✓ was excreted and not digested and absorbed ✓ (Any 1) (2)

2.5 **Nutritive ratio**

2.5.1 **The percentage of digestible non-nitrogenous substances**

75% – 20% ✓ = 55% ✓ (2)

2.5.2 **Calculation of the nutritive ratio**

NR = 1: $\frac{\text{\% Digestible non-nitrogen substances}}{\text{\% Digestible protein}}$ ✓
or
NR = $\frac{\text{1: \% TDN – \% DP}}{\text{\% DP}}$

= 1 : $\frac{75\% – 20\%}{20\%}$ ✓
or
$\frac{55\%}{20\%}$

= 1 : 2,75 ✓ OR 1:3 ✓ (3)

2.6 **Fodder flow plan**

Calculation of feed required for a year

15 x 30 animals x 30 days x 6 months ✓
= 81 000 kg ✓

81 000 kg + 108 000 kg
= 189 000 kg ✓ (3)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Farming systems

3.1.1 Identification of production system

Semi intensive system /Backyard/free-range ✓ (1)

3.1.2 Two advantages of the production system

- Less expensive/cheaper ✓
- Easy to manage ✓
- No special equipment needed ✓
- No specialised/expert knowledge needed ✓
- More environmentally friendly ✓/ Improved Animal welfare (Any 2) (2)

3.1.3 Two problems associated with the production system

- Easy to contract diseases ✓
- Poor feeding/feeding on less nutritious food ✓
- High risk for predators ✓
- More feed energy is utilised for non-production purpose/low production output/slow growth rate ✓
- High risk towards theft of animals ✓
- Exposed to extreme environmental conditions ✓ (Any 2) (2)

3.2 Equipment used in handling farm animals

3.2.1 B/E ✓ (1)

3.2.2 B/C ✓ (1)

3.2.3 B/D ✓ (1)

3.2.4 A ✓ (1)

3.3 **Identification of the handling equipment**

3.3.1 **Diagram A**
Rope ✓

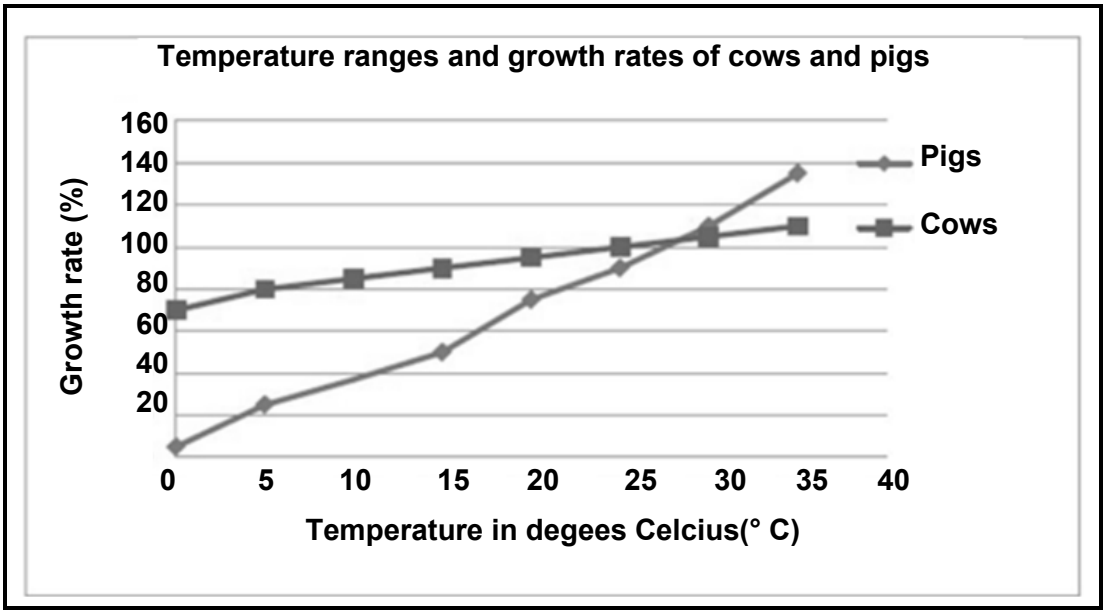
Diagram B
Nose holder✓ (2)

3.3.2 **One of the purposes of the equipment in Diagram A**
Handled to make it to lie down/bring the animal down ✓ (1)

3.3.3 **Part of the head that is used to grip the animal**
- Nostril ✓
- Ear ✓ (Any 1) (1)

3.4 **The temperature ranges in farm animals and their expected growth rates, expressed as averages for their population.**

3.4.1 **Graph on Temperature range and growth rates of cows and pigs**



Rubric for marking of the graph

Criteria	Yes: (1 mark)	No: (0 marks)
1 Line graph	1 ✓	
2 X-axis correctly labelled	1 ✓	
3 Y-axis correctly labelled	1 ✓	
4 Plotting growth rate for pigs	1 ✓	
5 Plotting growth rate for cows	1 ✓	
6 Correct heading	1 ✓	

(6)

3.4.2 **Farm animals that require more environmental control**
Pigs ✓
Justification
They are most affected by lower temperatures (lower growth rate at lower temperatures) ✓ (2)

3.5 **Diseases affecting farm animals**

A – Bacteria ✓
B – Blisters on the tongue, nose, lips, in the mouth and between the toes ✓
C – Protozoan ✓
D – Bont tick ✓
E – Ringworm ✓ (5)

3.6 **The diagram indicating various stages of the life cycle of a parasite**

3.6.1 **Name of parasite**
Bont tick ✓
Type of parasite
External parasite/ecto-parasite ✓ (2)

3.6.2 **Classification of parasites**
Three-host tick ✓ (1)

3.6.3 **Two economic implications**
- Banning of exports/decrease in trade ✓
- High treatment/medication costs to control/prevent diseases ✓
- Decreased production ✓
- Loss of income/profit ✓
- Loss of livestock/death ✓ (Any 2) (2)

3.7 **Salt poisoning**

3.7.1 **Two symptoms of salt poisoning**
- Excessive salivation ✓
- Increased thirst ✓
- Vomiting and regurgitation ✓
- Constipation ✓
- Aggressiveness ✓
- Hypersensitivity ✓
- Red and dry mucous membranes of mouth ✓
- Increased urination and defecation ✓
- Abnormal pain and diarrhoea ✓ (Any 2) (2)

3.7.2 **Two measures to treat animals with salt poisoning**
- Provision of fresh, clean water in small amounts ✓
- Provision of isotonic saline solution/hypertonic dextrose ✓
- Remove source of salt poisoning ✓ (Any 2) (2)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 Female reproductive organs

4.1.1 Identification of the parts of the reproductive system

A – uterine horn ✓
C – fallopian tube/oviduct ✓
E – cervix ✓
F – vagina ✓ (4)

4.1.2 Parts linking with the following functions:

(a) Serves as the birth canal – F ✓ (1)
(b) Site of fertilisation – C ✓ (1)
(c) Organ not directly involved in reproduction – I ✓ (1)
(d) Deposition of semen during artificial insemination – J ✓ (1)

4.2 Infertility and sterility in bulls

4.2.1 Differentiation between infertility and sterility

- **Sterility** is the total loss of fertility ✓
- **Infertility** is the temporary loss of fertility ✓ (2)

4.2.2 TWO congenital defects that lead to sterility

- Hypoplasia ✓
- Cryptorchidism ✓
- Hermaphroditism ✓
- Sperm defects ✓ (Any 2) (2)

4.2.3 TWO conditions that may cause a bull to be unable to copulate

- Injuries to the penis ✓
- Defective penis/corkscrew/too short ✓
- Poorly developed hind legs ✓
- Diseases causing inflammation of the joints ✓ (Any 2) (2)

4.3 **The diagram that illustrates a technique used in animal reproduction**

4.3.1 **Process illustrated by the diagram**
Nuclear transfer/cloning ✓ (1)

4.3.2 **Identification of cells**
A – Recipient cell with nucleus/egg cell/ovum ✓
B – The nucleus of the donor cell ✓
D – The fused cell ✓ (3)

4.3.3 **Two types of the process**
- Reproductive cloning ✓
- Therapeutic cloning ✓ (2)

4.4 **Difficulty in giving birth**

4.4.1 **Scientific term for difficult births**
Dystocia ✓ (1)

4.4.2 **Three reasons for difficult births in heifers**
- Heifers are physically smaller ✓ and less developed (younger)/age ✓
- Incorrect presentation/position/posture/ Posterior presentation ✓
- Too large foetus/hydrocephalus ✓
- Deformities of the foetus ✓
- Torsion/twisting of the foetus ✓
- Prolapsed uterus ✓
- Multiple births/twins ✓
- Size of pelvic area ✓
- Weak/ ineffective labour ✓
- Cervix failing to dilate ✓
- Prolonged gestation/pregnancy period ✓
- Malnutrition ✓
- Diseases ✓ (Any 3) (3)

4.4.3 **TWO managerial measures to reduce difficult births**
- Use bulls renowned for small calves/low birth weight ✓
- Mate heifers at the ideal age/mass/not too early ✓
- Use a controlled/well-planned breeding season ✓
- Well planned feeding programme/avoid overfeeding ✓
- Planned health programme ✓ (Any 2) (2)

4.4.4 **Definition of placenta retention**
- The failure to expel the placenta/membranes ✓
- within 12 hours after parturition/birth ✓
- with negative effects/complications ✓ (Any 2) (2)

4.5 **Normal lactation**

4.5.1 **Identification of the week when the cow reached her maximum production**
Week 8 ✓ (1)

4.5.2 **TWO benefits of the milk produced within the first 3 days of parturition for the calf**
- It provides antibodies to increase the calf's resistance to diseases ✓
- Supplies nutrients to the calf ✓
- Necessary for the normal growth, functioning and maturation of the alimentary canal ✓
- Higher butterfat content ✓ (Any 2) (2)

4.5.3 **Explanation of the relationship between the percentage of butter fat content and the quantity of milk produced**
When milk production reached its maximum during week 8 and decreased until week 42 ✓ butterfat content decreased at week 8 and increased until week 42 ✓ (2)

4.5.4 **Period in lactating cow after 42 weeks**
Dry period ✓ (1)

4.5.5 **Importance of dry period**
It gives the glandular tissue of the udder time to recover ✓ (1)
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TOTAL SECTION B: 105

TOTAL: 150