GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2026

MARKING GUIDELINES

AGRICULTURAL SCIENCES

(PAPER 1)

11 pages

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	B ✓✓		
	1.1.3	C ✓✓		
	1.1.4	A ✓✓		
	1.1.5	C ✓✓		
	1.1.6	C ✓✓		
	1.1.7	D ✓✓		
	1.1.8	B ✓✓		
	1.1.9	A ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	A only ✓✓		
	1.2.2	A only ✓✓		
	1.2.3	None ✓✓		
	1.2.4	Both A and B ✓✓		
	1.2.5	B only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Salivary gland / Pancreas✓✓		
	1.3.2	Biuret ✓✓		
	1.3.3	Notifiable disease ✓✓		
	1.3.4	Synchronisation of oestrus ✓✓		
	1.3.5	Anterior ✓✓	(5 x 2)	(10)

1.4 1.4.1 Lipase ✓

1.4.2 Papillae ✓

1.4.3 Tranquilisers ✓

1.4.4 Pheromones ✓

1.4.5 Progesterone ✓ (5 x 1) (5)

TOTAL SECTION B: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 **The digestive system of a farm animal**

2.1.1 **The type of farm animal that has the stomach in the diagram**
Ruminant. ✓ (1)

2.1.2 **Justification to the answer to QUESTION 2.1.1.**
- Complex stomach/four compartment stomach/ Polygastric ✓
- Large fermentation vessel/rumen ✓
- The animal regurgitates ✓ (Any 2) (2)

2.1.3 **TWO fluids that are secreted into the small intestines.**
- Bile
- Pancreatic juice
- Succus entericus/ Intestinal/ Duodenal juice (Any 2) (2)

2.2 **The absorption of substances**

2.2.1 **Indication of the process**
Active absorption ✓ (1)

2.2.2 **Description of the process/active absorption**

Absorption of nutrients from a low to high concentration/against concentration gradient ✓ with the aid of ATP as a source of energy ✓ (2)

2.3 An experimental trial with sheep to determine digestibility

2.3.1 Classification of lucerne hay as a feed

Protein-rich roughage ✓ (1)

2.3.2 Calculation of the co-efficient of digestibility

$\text{Manure} = \frac{4}{100} \times \frac{2}{1} = 0{,}08$ $\qquad$ $\text{Lucerne} = \frac{8}{100} \times \frac{7}{1} = 0{,}56$

2 – 0,08 = 1,92 kg $\qquad$ 7 – 0,56 = 6,44 kg ✓

$$DC = \frac{\text{Dry Matter Intake (kg)} - \text{Dry mass manure (kg)}}{\text{Dry Matter Intake (kg)}} \times \frac{100}{1} \checkmark$$

$$= \frac{6.44\ kg - 1{,}92\ kg}{6{,}44\ kg} \times \frac{100}{1} \checkmark$$

= 70,18 ✓ % ✓ **OR** 70,2 ✓ % ✓ (5)

2.3.3 Explanation of the difference in protein requirement between an older sheep and a lamb

Lambs/younger sheep need proteins mainly for growth. ✓
Older sheep need proteins for production and reproduction. ✓ (2)

2.3.4 THREE methods that can improve the digestibility of feeds

- Grinding/milling ✓
- Dry rolling/crackling ✓
- Popping/micronising ✓
- Roasting ✓
- Pelleting ✓
- Soaking ✓

(Any 3) (3)

2.4 The table that indicates the nutritional information of selected feeds

2.4.1 Calculation of the Nutritive Ratio

NR = 1 : $\frac{\%\ DNNS}{\%\ DP}$ ✓ $\qquad$ **OR NR =** 1 : $\frac{\%\ TDN - DP\ \%}{\%\ DP}$

= $\frac{1 : 37\%}{25\%}$ ✓ $\qquad$ 1 : $\frac{62\% - 25\%}{25\ \%}$ ✓

= 1 :1,48 /1 : 1,5 ✓ $\qquad$ 1 : 1,48 /1 :5 ✓ (3)

2.4.2 Justification of suitability of lucerne hay for fattening

- Not suitable for fattening. ✓
- It has more proteins. ✓
- A narrow ratio suited for growth/production/reproduction. ✓

(Any 2) (2)

2.5 **The schematic representation indicating energy loss**

2.5.1 **Labels for A and C**
A – Digestible Energy/DE ✓
C – Energy lost in heat ✓ (2)

2.5.2 **Importance of net energy**
- Growth ✓
- Production ✓
- Reproduction ✓
- Maintenance ✓
- Work ✓

(Any 3) (3)

2.6 **Different animal feeds**

2.6.1 **Finishing cattle for the abattoir** – B ✓ (1)

2.6.2 **To correct mineral deficiencies** – D ✓ (1)

2.6.3 **To improve fertility in male animals** – A ✓ (1)

2.6.4 **To supply bulkiness in rations of ruminant animals** – C ✓ (1)

2.7 **Feed Flow Programme** (1)

2.7.1 **Description of the term**
Feed/ fodder flow programme ✓ (1)

2.7.2 **Principles of Feed Flow Programme**
- Meet animal requirements ✓
- Safe use of resource ✓
- The margin over all feed costs should be positive ✓
- Management should be flexible. ✓

(Any 1) (1)
[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 **Farming system.**

3.1.1 **Identification of the farming system**
Subsistence farming system ✓ (1)

3.1.2 **Justification of the answer providing TWO reasons**
- Fewer animals are used for ploughing ✓
- Produce to meet the needs for the family ✓
- No use of technology / use of traditional methods ✓ (Any 2) (2)

3.1.3 **THREE factors that would increase animal production**
- Nutrition/feeding ✓
- Environment ✓
- Breeding/reproduction ✓
- General management practices ✓ (Any 3) (3)

3.2 **Two types of farmers**

3.2.1 **Identification of a farmer that operates on a small scale**
Farmer A ✓ (1)

3.2.2 **A reason that supports the answer in QUESTION 3.2.1**
The enterprise is operated with 30 cows ✓ (1)

3.2.3 **The production system practiced by Farmer B**
Intensive farming system ✓ (1)

3.2.4 **TWO reasons to justify question 3.2.3**
- Cows are milked in a milking parlour ✓
- Presence of a housing facility ✓
- Use the latest technology✓ (Any 2) (2)

3.2.5 **Predict the effect of extreme temperatures (too high temperatures and too low temperatures) on feed intake**
- Low temperatures will increase feed intake for animals to maintain constant body temperature (heat) ✓
- High temperature leads to lower feed intake/animal is uncomfortable and eats less ✓ (2)

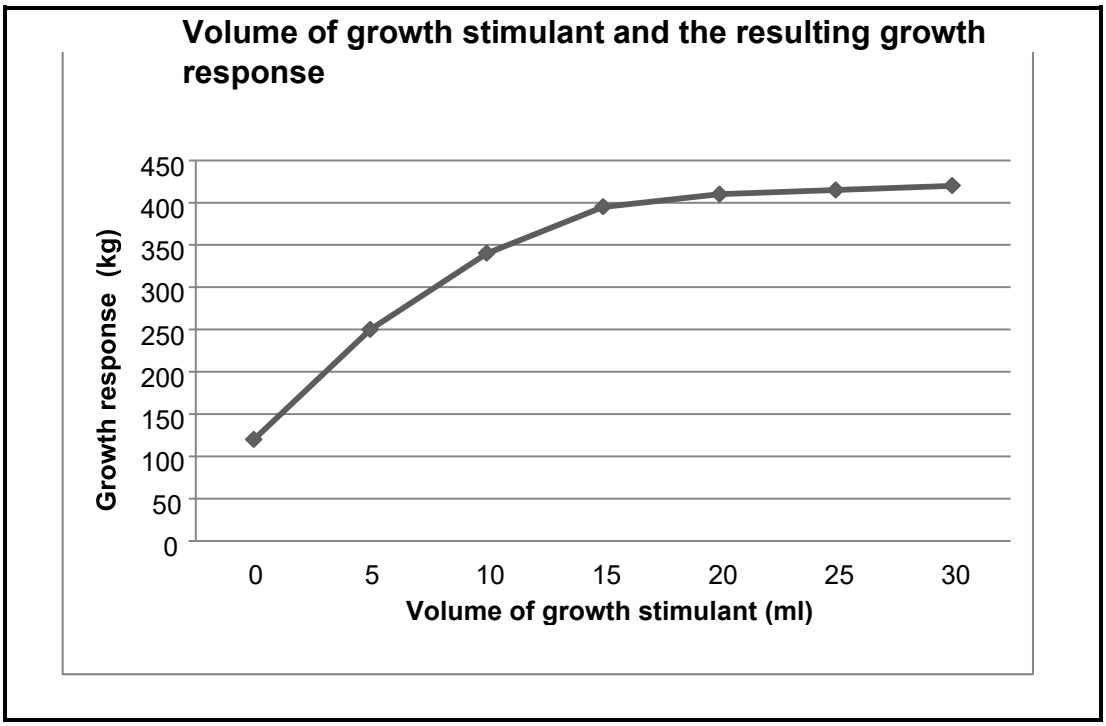
3.2.6 **TWO possible measures that are taken by Farmer B to control high temperatures in this dairy production unit**
- Shelter/housing ✓
- Ventilation ✓ (2)

3.3 **Common practice in a livestock production enterprise**

THREE requirements for the movement or transport of animals on public roads

- Big and strong vehicles/adapted vehicles for transportation/strong sides ✓
- Enough space for animals ✓
- Correct documentation for the transport of livestock ✓
- Animals should be marked as prescribed by regulations ✓
- Animals of same sex and age transported together ✓
- Sufficient protection ✓
- Provision of drinking water/a calm area prior to departure ✓
- Use a red flag when moving animals on foot ✓ (Any 3) (3)

3.4 **A line graph**



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- Correct heading ✓
- Y-axis – correct labelling (growth response) ✓
- X-axis – correct labelling (volume of growth stimulants) ✓
- Correct units (kg & ml) ✓
- 80% correct plotting ✓
- Correct type of graph ✓ (6)

3.5 **Life cycle of a blowfly**

3.5.1 **Identify the parasite in the diagram of a life cycle**
Blowfly ✓ (1)

3.5.2 **The most harmful stage in the life cycle of this parasite**
Larva stage ✓ (1)

3.5.3 **The condition caused by the stage in QUESTION 3.5.2 that occurs in the wounds of wounds of the farm animal**
Blowfly strike/attacks ✓ (1)

3.5.4 **The term used for the removal of the wool around the tail and near the leg areas**
Crutching ✓ (1)

3.5.5 **THREE non-chemical management practices used to control infestation by this parasite**
- Correct timing of shearing/crutching ✓
- Clipping and cleaning wool ✓
- Tail docking ✓
- Lambing time after shearing ✓
- Breeding/selection of resistant animals ✓ (Any 3) (3)

3.6 **A toxic plant that can affect the animals in different ways**

3.6.1 **Identification of the plant shown in the picture**
Thorn apple/ Devil's apple ✓ (1)

3.6.2 **TWO measures the farmer can implement to treat animals suffering from plant poisoning**
- Keep affected animals away from drinking water ✓
- Allow small quantities of water after two days ✓
- Administer remedies that neutralise the plant poison/strong tea/activated charcoal/laxatives ✓
- Provide large doses of purgatives to cause expulsion of the poison ✓
- Dose with sugar/glucose ✓
- Keep the animal calm in the shade ✓ (Any 2) (2)

3.6.3 **ONE role that the state fulfils in animal health**
- Awareness campaigns ✓
- Legislation/registration of medication ✓
- Research ✓
- Training/education ✓
- Quarantine services ✓
- Veterinarian services ✓
- Import and export bans ✓
- Importation/production of vaccines ✓
- Movement control/permits ✓ (Any 1) (1)

[35]

QUESTION 4: ANIMAL REPRODUCTION

4.1 The reproductive system of a farm animal

4.1.1 **Identify the letter**
(a) **Transportation of sperm cells to the urethra** – D ✓
(b) **Secretion of a sticky liquid that provides energy for the sperm cell** – E ✓ (2)

4.1.2 **The role played by part C**
It deposits semen into the vagina during mating ✓ (1)

4.1.3 **TWO congenital defects of part B that may cause a complete loss of fertility in bulls**
- Cryptorchidism ✓
- Hypoplasia ✓
- Sperm defect / Azoospermia ✓ (Any 2) (2)

4.2 The development of twins in a cow

4.2.1 **TWO types of multiple births illustrated in**
DIAGRAM A – Monozygotic twins/identical twins ✓
DIAGRAM B – Dizygotic twins/non-identical twins ✓ (2)

4.2.2 **Motivate the answer to QUESTION 4.2.1**
A one egg fertilised to produce two similar offspring ✓
B two eggs fertilised to produce two different offspring ✓ (2)

4.2.3 **TWO characteristics of the twins illustrated in DIAGRAM A with regards to:**
(a) **Physical appearance** – they are identical ✓ (1)

(b) **Gender** – they are of the same sex ✓ (1)

4.3 Parturition stage

4.3.1 **Identification of parturition stage**
Preparatory stage ✓ (1)

4.3.2 **The correct scientific name**
Dystocia ✓ (1)

4.3.3 **TWO actions that a farmer can take to save both the calf and the cow**
- Call a veterinarian for a caesarean section ✓
- Redirect the calf into an anterior position ✓ (2)

4.4 **Oestrus cycles**

4.4.1 **The average number of days for the oestrus cycle in a cow**
21 days ✓ (1)

4.4.2 **TWO devices a farmer may use to detect oestrus in a cow**
- Pedometer ✓
- Chin-ball marker ✓
- Tail-chalking ✓
- Kamar heat mount detector ✓ (Any 2) (2)

4.4.3 **Give FOUR reproductive hormones, in sequential order:**
- Follicle Stimulating Hormone (FSH) ✓
- Oestrogen ✓
- Luteinising Hormone (LH) ✓
- Progesterone ✓ (4)

4.4.4 **The importance of the relationship between the timing of insemination and ovulation**
- AI should be performed approximately 6 – 14 hours before ovulation ✓
- That gives time for semen to move to the fallopian tube ✓
- So that the ovum does not wait too long before fertilisation ✓ (3)

4.5 **A technique used by farmers to improve their cattle herds.**

4.5.1 **The technique in the diagram**
Artificial Insemination/AI ✓ (1)

4.5.2 **Name of the apparatus**
Pistolette/insemination gun ✓ (1)

4.5.3 **TWO characteristics of high-quality semen**
- Colour – whitish to yellowish/milky/opaque/ Sticky ✓
- Less than 15 % dead sperm cells/less mortality rate ✓
- 80% of sperm cells showing forward movement/mobility/motility/ viability ✓
- Less than 20 % deformation/normal morphology ✓
- Characteristic odour ✓
- Healthy/disease free semen ✓
- pH - 6,4 to 6,9/slightly acidic ✓
- Concentration – 1,1 to 4,5 billion sperm cells per ml ✓
- Volume – 4 to 8 ml ✓ (Any 2) (2)

4.5.4 **The best time of the day for inseminating a cow that shows the first signs of oestrus in the morning**
In the afternoon ✓ (1)

4.5.5 **ONE negative effect**
- Injury of the reproductive tract of the cow ✓
- Unexpected low pregnancy result ✓ (Any 1) (1)

4.6 **Lactation**

4.6.1 **Definition of the term**
Lactation is the period ✓ during which a female mammal produces milk. ✓ (2)

4.6.2 **TWO stimuli initiated by the milker during the milking process**
- Washing of the udder ✓
- Massage of the udder ✓
- Appearance and sound of the milker ✓
- Milking action ✓ (Any 2) (2)

[35]

TOTAL SECTION B: 105

TOTAL: 150