



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P1

SEPTEMBER 2026

MARKING GUIDELINES

Marks: 150

This memorandum consists of 12 pages.

Copyright reserved

Please turn over

SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|-----------------------------|----------|------|
| 1.1 | 1.1.1 | C ✓✓ | | |
| | 1.1.2 | B ✓✓ | | |
| | 1.1.3 | A ✓✓ | | |
| | 1.1.4 | C ✓✓ | | |
| | 1.1.5 | A ✓✓ | | |
| | 1.1.6 | C ✓✓ | | |
| | 1.1.7 | D ✓✓ | | |
| | 1.1.8 | D ✓✓ | | |
| | 1.1.9 | B ✓✓ | | |
| | 1.1.10 | B ✓✓ | | |
| | | | (10 x 2) | (20) |
| 1.2 | 1.2.1 | A only ✓✓ | | |
| | 1.2.2 | Both A and B ✓✓ | | |
| | 1.2.3 | B only ✓✓ | | |
| | 1.2.4 | None ✓✓ | | |
| | 1.2.5 | Both A and B ✓✓ | | |
| | | | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Bile ✓✓ | | |
| | 1.3.2 | Quarantine/isolation ✓✓ | | |
| | 1.3.3 | Cryptorchidism ✓✓ | | |
| | 1.3.4 | Repeat breeders ✓✓ | | |
| | 1.3.5 | Oogenesis/ovigenesis ✓✓ | | |
| | | | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Vitamin A/retinol ✓ | | |
| | 1.4.2 | Bont ✓ | | |
| | 1.4.3 | Scrotum ✓ | | |
| | 1.4.4 | Dystocia ✓ | | |
| | 1.4.5 | Prolapsed vagina/prolapse ✓ | | |
| | | | (5 x 1) | (5) |

TOTAL SECTION A:45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canal of farm animal****2.1.1 Identification of parts**

- A** Ventriculus/gizzard/muscular stomach ✓
D Cloaca/vent✓
F Crop✓ (3)

2.1.2 Importance of part

- B** Stores/releases bile✓
E Releases digestive juices/enzymes for digestion✓ (2)

2.1.3 Definition of chemical digestion

- Process where complex food particles are broken down to simpler substances✓
- through the series of chemicals/enzymes/juices✓ (2)

2.2 Components of feed**2.2.1 TWO roles of water/moisture in digestion**

- Acts as a solvent for dissolving substances in the body ✓
- Softens/moistens food ✓
- Facilitating enzymatic digestion ✓
- Medium through which waste products are excreted ✓
- Transports nutrients through the digestive tract ✓ (Any 2) (2)

2.2.2 Identification of the component

- (a) Zinc✓ (1)
(b) Vitamin K✓ (1)
(c) Phosphorus✓ (1)

2.2.3 Indication of the component that is

- (a) Fat soluble - Vitamin K ✓ (1)
(b) Water soluble - Vitamin B1✓ (1)

2.3 Coefficient of digestibility

Calculation of digestibility co-efficiency

$$\text{DM manure} = \frac{81}{100} \times 7 \text{ kg} = 5,67 \text{ kg} \checkmark$$

$$\text{DC} = \frac{\text{Dry matter intake (kg)} - \text{Dry mass of manure (kg)}}{\text{Dry matter intake (kg)}} \times 100 \checkmark$$

$$= \frac{24 \text{ kg} - 5,67 \text{ kg}}{24 \text{ kg}} \times 100 \checkmark$$

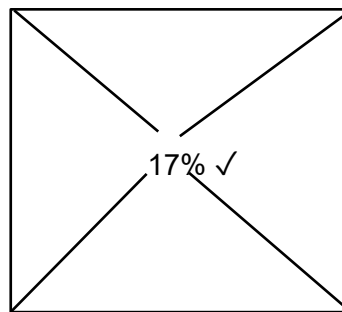
$$= 76,38 \checkmark \% \checkmark$$

(5)

2.4 Pearson square

2.4.1 **Calculation:** Maize 9%

27 parts ✓



Peanut oilcake 44%

8 parts ✓

(3)

2.4.2 **Maize percentage to be included in the ration**

$$\begin{aligned} &27 \div 35 \times 100 \checkmark \\ &= 77,14/77\% \checkmark \end{aligned}$$

(2)

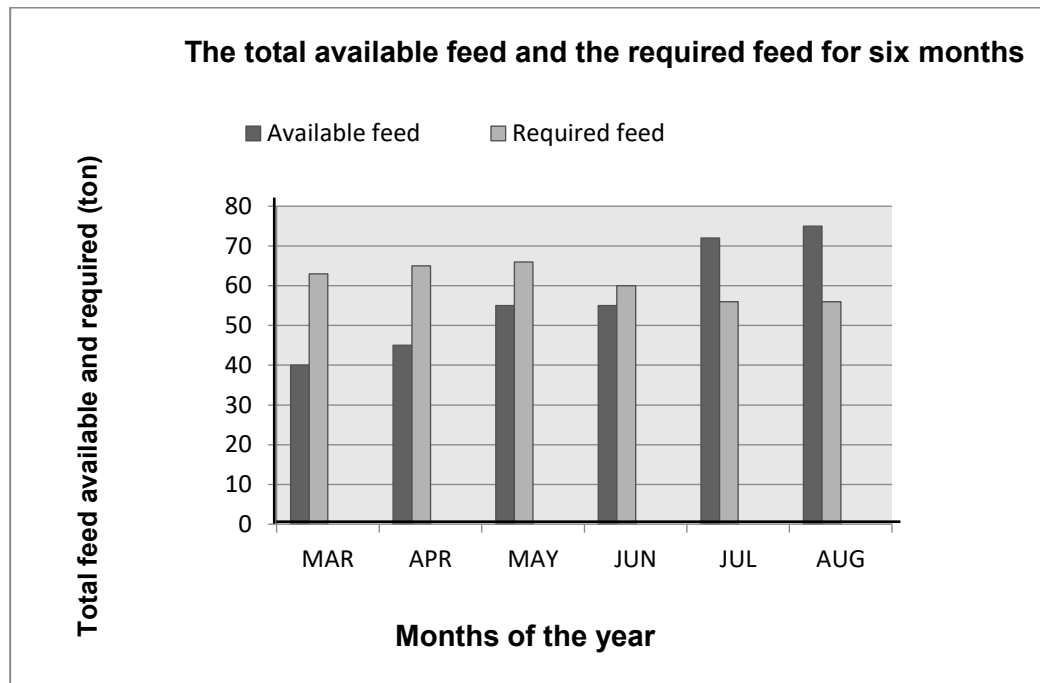
2.5 Feed flow programme

2.5.1 Calculation of deficit for May

$$\begin{aligned} &(66 - 55) \text{ tons} \checkmark \\ &= 11 \text{ tons} \checkmark \end{aligned}$$

(2)

2.5.2 Bar graph of the available feed and requirement of animals from March to August.



CRITERIA/RUBRIC/MARKING GUIDELINES

- Correct heading ✓
- X axis: Correctly calibrated with label (Months of the year) ✓
- Y axis: Correctly calibrated with label (Total feed available and required) ✓
- Correct units (ton) ✓
- Bar graph ✓
- Accuracy ✓

(6)

2.6 Nutritive ratio

2.6.1 Recommendation of the feed

- | | | |
|-----|----------|-----|
| (a) | Feed B ✓ | (1) |
| (b) | Feed A ✓ | (1) |
| (c) | Feed C ✓ | (1) |

(35)

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Production systems****3.1.1 Identification of the TWO production systems represented by A and****A** - Intensive production system✓ (1)**B** - Extensive production system✓ (1)**3.1.2 Comparison of the TWO production systems****(a) Method of feeding**

- **Intensive production system** - feed is provided to animals ✓
- **Extensive production system** - animals graze/look for food ✓ (2)

(b) Space per production output

- **Intensive production system** - more production per area✓
- **Extensive production system** - less production per area✓ (2)

3.2 Farm animals loosing heat**3.2.1 Ways in which animals lose heat****A** - Radiation/evaporation/perspiration ✓**B** - Conduction ✓**C** - Excretion/defecation ✓ (3)**3.2.2 Other ways of heat loss**

- Convection ✓
- Movement/work ✓
- Production level ✓
- Urination ✓
- Breathing ✓ (Any 2) (2)

3.2.3 Signs of heat stress in animals

- Excessive salivation/drooling ✓
- Drop/decrease in production ✓
- Excessive panting/high respiratory rate/sweating ✓
- Open mouth breathing with tongue hanging out ✓
- Loss of appetite ✓
- Cattle move away from each other ✓
- Restlessness ✓ (Any 2) (2)

3.2.4 Management practice to reduce heat in A

- Provision of shelter/shade/cool area ✓
- Breeding of heat adapting animals ✓
- Use of mechanical cooling systems ✓
- Work calmly with animals ✓
- Access to drinking water ✓

(Any 2)

(2)

3.3 Medication of farm animals**3.3.1 Method to administer medication**

Intramuscular injection ✓

(1)

3.3.2 Identification of the role of the state

Registration of the medication/Reg. No. F 2144/ACT 36/1947 ✓

(1)

3.3.3 Justification

The medication is retained in the body for four weeks ✓

(1)

3.3.4 TWO other methods to administer medication through injection

- Intravenous injection ✓
- Subcutaneous/hypodermic injection ✓
- Intradermal injection ✓
- Intraperitoneal injection ✓
- Intraruminal injection ✓
- Intramammary injection ✓

(Any 2)

(2)

3.4 FMD in farm animals**3.4.1 The pathogen causing FMD**

- Virus ✓

(1)

3.4.2 TWO main symptoms of FMD in farm animals

- Blister-like lesions ✓
- Painful ulcers ✓
- Sticky, foamy salivation ✓
- Severe lameness /unable to walk/limping ✓
- Nasal discharge ✓

(Any 2)

(2)

3.4.3 TWO roles of state in controlling animal diseases

- Public awareness/report the outbreak of FMD ✓
- Quarantine services/separation/isolation of infected animals ✓
- Veterinarian services ✓

- Banning of exports ✓ (Any 2) (2)

3.4.4 TWO economic impact of FMD

- International trade decreases/export bans ✓
- Reduce food security ✓
- Decreased production ✓
- Loss of income/profit/jobs ✓
- Costs to control, prevent and treat animals are high ✓
- Death of an animal/stock losses ✓ (Any 2) (2)

3.5 Various stages of the life cycle of a parasite

3.5.1 Identification of the type of parasite

External/ecto-parasite ✓ (1)

3.5.2 Classification of the type of parasite according to the life cycle

Three-host parasite ✓ (1)

3.5.3 Letters representing the stages in the life cycle of the parasite

- (a) B ✓ (1)
- (b) D ✓ (1)
- (c) E ✓ (1)

3.6 Salt poisoning in livestock

3.6.1 Two symptoms of salt poisoning

- Increased thirst ✓
- Dry/red mucous membranes of the mouth ✓
- Hypersensitivity ✓
- Irritability ✓
- Excessive salivation ✓
- Increased urination/defecations ✓
- Constipation ✓
- Vomiting and regurgitation ✓
- Inflammation of the stomach ✓
- Abdominal pain and diarrhoea ✓
- Wobbling/staggering/circling/blindness/seizures/paralysis ✓
- Dragging the hind legs/knuckling of the fetlock ✓
- Aggressiveness ✓ (Any 2) (2)

3.6.2 One way of treating animals with salt poisoning

- Immediate removal of the source ✓

- Treatment with hypertonic dextrose/isotonic saline solution ✓
 - Provision of fresh/clean water ✓ (Any 1) (1)
- (35)**

QUESTION 4: ANIMAL REPRODUCTION

4.1 Female reproductive system

4.1.1 Identification of the TWO secondary sex organs

- B ✓
- C ✓
- D ✓
- E ✓ (Any 2) (2)

4.1.2 Providing the letter

- (a) The site of fertilisation - B ✓ (1)
- (b) Glands secreting nutrients – C ✓ (1)

4.1.3 TWO functions of the cervix (Part D)

- (a) Opens to allow semen passage to the uterus ✓ (1)
- (b) Closes the uterus through the thick mucus secretion/mucus plug to prevent microbial infection of the uterus ✓ (1)

4.2 Semen collection, dilution and preservation

4.2.1 TWO methods of collecting semen

- Artificial vagina ✓
- Electrical stimulation/electro-ejaculator ✓ (2)

4.2.2 TWO requirements for semen collection

- All equipment that will be used should be readily available ✓
- Equipment must be hygienic/clean/sterilized ✓
- Floor area must not be slippery ✓
- Personnel must be trained/skilled with experience/expertise ✓
- Vial must be kept warm before and after collection ✓
- Enough handlers should be available ✓
- Teaser cow should be available ✓
- Semen must not be exposed to direct sunlight ✓ (Any 2) (2)

4.2.3 TWO functions of semen dilutants

- Provide nutrients/energy to the sperm cells ✓
- Prevent contamination by micro-organisms ✓
- Protect sperm cells against pH changes ✓
- Protect sperm cells during freezing and thawing ✓
- Increase the volume of semen ✓
- Maintain proper osmotic/electrolyte pressure ✓
- Increase the viability of the sperm cells ✓ (Any 2) (2)

4.2.4 Temperature requirement for semen storage

- -196°C ✓ (1)

4.3 Parturition**4.3.1 The stage of parturition in the diagram**

- Expulsion/ejection of the foetus/delivery ✓ (1)

4.3.2 Two problems with the calf

- Calves with high birth weights/large calves ✓
- Bull calves normally have higher birth weights ✓
- Malformed calves/congenital defects/hydrocephalus ✓
- Multiple births/twins ✓
- Incorrect position of the calf/posterior presentation ✓ (Any 2) (2)

4.3.3 Letters of the steps when the cow is giving birth

- D ✓ (1)
- B ✓ (1)
- C ✓ (1)
- A ✓ (1)

4.4 The reproduction cycle of a dairy cow**4.4.1 A month in which artificial insemination should take place**

- May ✓ (1)

4.4.2 TWO possible causes for the cow not conceiving

- Improper handling of semen/poor quality semen ✓ (1)
- Use of inexperienced technician ✓
- Diseases/infections ✓
- Malnutrition ✓
- Congenital factors ✓
- Incorrect timing ✓ (Any 2) (2)

4.4.3 THREE causes of abortion in dairy cows

- Infections/diseases ✓
- Malnutrition ✓
- Injuries ✓
- Maltreatment/stress ✓
- Environmental factors ✓
- Genetic/congenital factors ✓
- Strong laxatives ✓
- Toxic elements in feed ✓
- Vaccination/immunisation ✓
- Twinning ✓ (Any 3) (3)

4.4.4 The last process coming just before the start of milk production

Calving/parturition/giving birth ✓ (1)

4.5 THREE causes for lack of libido

- Immaturity ✓
- Inexperience ✓
- Diseases ✓
- Underfeeding/overfeeding/malnutrition ✓
- Old age/senility ✓
- Overwork/exhaustion/over exertion ✓
- Improper handling/stress ✓
- Lack of testosterone ✓
- Temperament ✓
- Environment ✓ (Any 3) (3)

4.6 Embryo transplantation**4.6.1 Identification of the process**

Embryo transplantation/transfer/ET ✓ (1)

4.6.2 TWO advantages of ET to farmers

- Fast/cost effective way to increase genetic improvement ✓
- Extend the reproductive life of older/unproductive cows ✓
- Offspring from superior animals are multiplied/higher calving percentage ✓
- Genetic material in the herd is conserved ✓
- Genetic material can be transported internationally ✓
- Can improve the medical properties of products ✓
- Produce animals with improved resistance towards diseases ✓
- Prevent the extinction of valuable and endangered animals ✓
- Profits from increased sales of quality genes/products ✓
- A planned breeding programme can be implemented ✓ (Any 2) (2)

4.6.3 The term referring to the cow that is

(a) Donor cow ✓ (1)

(b) Recipient/surrogate cow ✓ (1)

(35)

**TOTAL SECTION B:105
GRAND TOTAL:150**