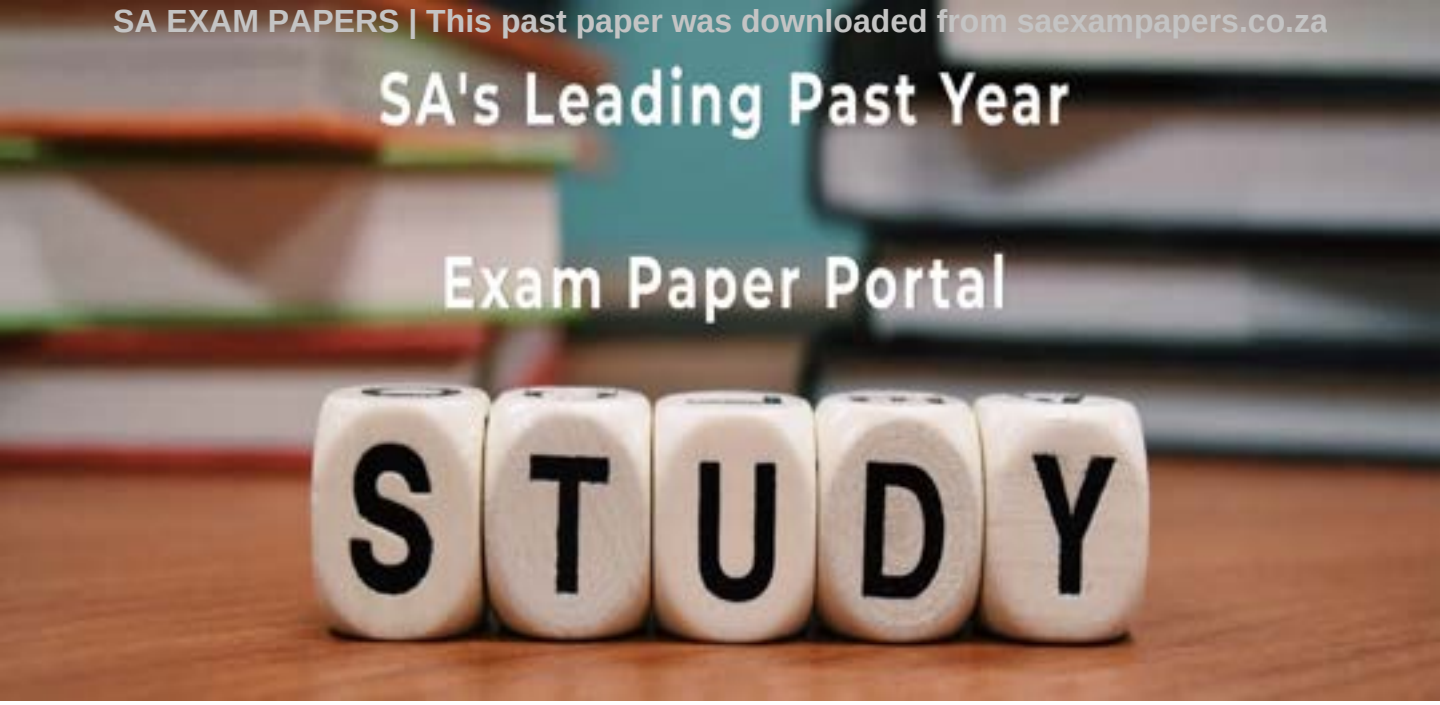


basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

# NATIONAL SENIOR CERTIFICATE

## GRADE 12

## AGRICULTURAL SCIENCES P1

## NOVEMBER 2023

## MARKING GUIDELINES

**MARKS: 150**

**These marking guidelines consist of 11 pages.**

## SECTION A

## QUESTION 1

| | | | | |
|---|---|---|---|---|
| 1.1 | 1.1.1 | C ✓✓ | | |
| | 1.1.2 | D ✓✓ | | |
| | 1.1.3 | C ✓✓ | | |
| | 1.1.4 | D ✓✓ | | |
| | 1.1.5 | A ✓✓ | | |
| | 1.1.6 | A ✓✓ | | |
| | 1.1.7 | B ✓✓ | | |
| | 1.1.8 | C ✓✓ | | |
| | 1.1.9 | D ✓✓ | | |
| | 1.1.10 | B ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | A only ✓✓ | | |
| | 1.2.2 | B only ✓✓ | | |
| | 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 | Amylase/ptyalin ✓✓ | | |
| | 1.3.2 | Feedlot ✓✓ | | |
| | 1.3.3 | Artificial insemination/AI ✓✓ | | |
| | 1.3.4 | Repeat breeders ✓✓ | | |
| | 1.3.5 | Impotence ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Net/NE ✓ | | |
| | 1.4.2 | Biological ✓ | | |
| | 1.4.3 | Acrosome ✓ | | |
| | 1.4.4 | Anoestrus ✓ | | |
| | 1.4.5 | Dry/rest ✓ | (5 x 1) | (5) |
| | | | **TOTAL SECTION A:** | **45** |

## SECTION B

## QUESTION 2: ANIMAL NUTRITION

### 2.1 The compound stomach of a sheep

2.1.1 **The letter of the part where**

**(a) Microbial fermentation -** B/C ✓ (1)

**(b) Mechanical digestion -** A/F ✓ (1)

**(c) Chemical digestion -** E/D ✓ (1)

2.1.2 **ONE function of small intestines**

- Absorption of the digested food/nutrients ✓
- Secretion of digestive juices to break down larger molecules ✓
- Assist in mixing food with digestive juices ✓
- Undigested/unabsorbed contents pass through to the large intestine ✓ (Any 1) (1)

2.1.3 **Comparing the oesophagus of sheep to that of a fowl**

- In sheep the oesophagus has no enlargement/crop ✓ but in fowls the oesophagus has an enlargement/crop ✓
- In sheep the oesophagus is wide/long ✓ in fowls the oesophagus is narrow/short ✓ (Any 1) (2)

### 2.2 The biological value of feeds

2.2.1 **Collective name of the amino acids**

Essential amino acids ✓ (1)

2.2.2 **Explanation why protein quality is less important for ruminants**

Micro-organisms are able to utilize amino acids ✓ to synthesize microbial protein that has a higher biological value ✓ (2)

### 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 Components of feed

### 2.4.1 Labelling of

**A -** Inorganic components ✓ (1)
**C -** Carbohydrates ✓ (1)

### 2.4.2 TWO functions of water

- An important solvent ✓
- Helps during mechanical digestion/moistens food ✓
- Prevents constipation ✓
- Transportation of nutrients ✓
- Eliminates waste products ✓
- Part of biochemical reactions/homeostasis ✓
- Acts as lubricant ✓
- Regulates body temperature/cooling system ✓
- Supplies turgor pressure in cells/provides tensile strength/form/ shape to cells ✓
- Major component of cells/blood/body tissue ✓
- Protects sensitive tissues in the body/shock absorbing fluid ✓
- For efficient milk production ✓ (Any 2) (2)

### 2.4.3 Letter representing protein

B ✓ (1)

## 2.5 Pearson square

### 2.5.1 Parts representing

**(a) Soya bean oilcake meal -** 6 ✓ (1)
**(b) Oat meal -** 29 ✓ (1)

### 2.5.2 Calculation of the percentage oat meal in the mixture

- 29+6 = 35 parts ✓
- $\frac{29}{35} \times \frac{100}{1}$ ✓
- = 82,86% ✓ (3)

## 2.6 Fodder flow programme

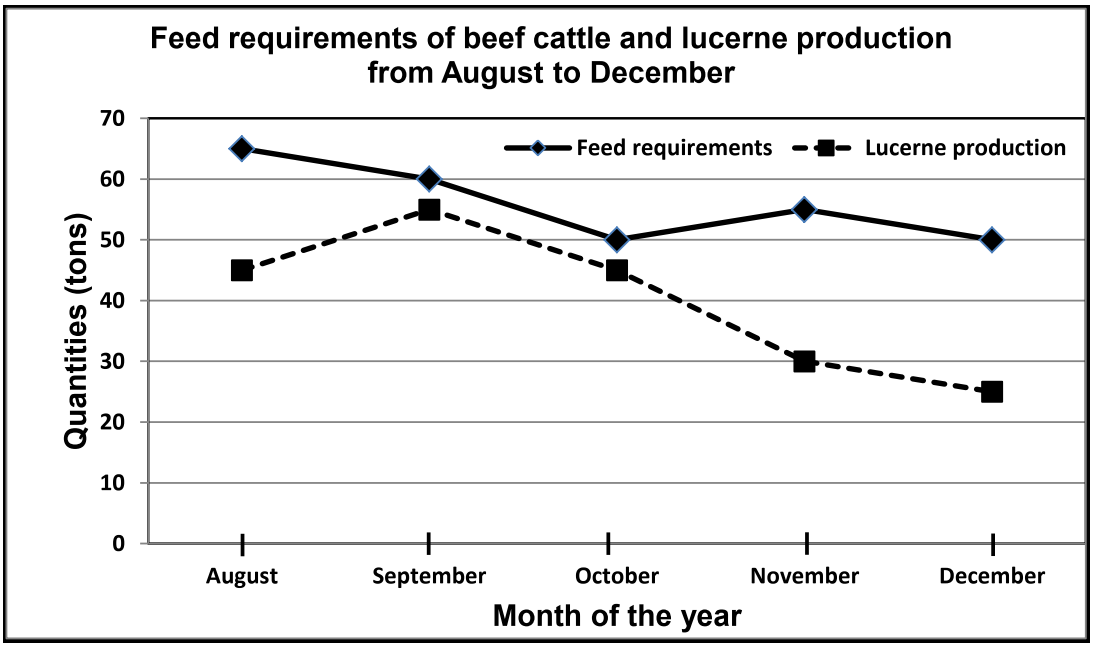
### 2.6.1 Calculation of the quantity of feed required for the first six months of the year (in kg)

- 50+50+50+50+55+60 = 315 tons ✓
- 315 x 1 000 ✓
- = 315 000 kg ✓ (3)

### 2.6.2 TWO importance of fodder flow planning

- Safe use of resources ✓
- To meet the animals feed requirements/standards ✓
- Effective management of the fodder flow programme ✓
- To ensure a positive margin over feed costs ✓ (Any 2) (2)

2.6.3 **Line graph**




**CRITERIA/RUBRIC/MARKING GUIDELINES**

- Correct heading ✓
- X-axis: correct calibrations and labelled (Month of the year) ✓
- Y-axis: correct calibrations and labelled (Quantities) ✓
- Correct unit (tons) ✓
- Line graph ✓
- Accuracy (80% + correctly plotted) ✓ (6)

**[35]**

## QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL

### 3.1 Production systems in pigs

3.1.1 **Identification of**
**(a)** Intensive production system ✓ (1)
**(b)** Free range system ✓ (1)

3.1.2 **The facility visible in picture A**
Farrowing pen/crate ✓ (1)

3.1.3 **ONE reason for housing pigs in a farrowing pen**
- Separates sows and piglets/prevents cannibalism ✓
- Prevents sows from rolling over/lying down on piglets ✓
- Easy management/handling of animals ✓ (Any 1) (1)

3.1.4 **TWO factors to increase animal production in a farrowing pen**
- Environment/housing/sheltering ✓
- Nutrition/feeding ✓
- Management ✓
- Breeding/reproduction ✓ (Any 2) (2)

### 3.2 Farm animal behaviour

3.2.1 E ✓ (1)

3.2.2 C ✓ (1)

3.2.3 D ✓ (1)

3.2.4 A ✓ (1)

3.2.5 B ✓ (1)

### 3.3 Facilities used in animal production system

3.3.1 **Identification of the facilities**
**A -** Crush/chute ✓ (1)
**B -** Head gate/neck clamp ✓ (1)

3.3.2 **The purpose for using a herd gate**
Restraining farm animals ✓ (1)

3.3.3 **TWO reasons for handling farm animals**
- Management practices/ docking/castration/AI/identification/dehorning/branding ✓
- For diagnosis purposes ✓
- Application of medication/treatment of parasites ✓
- Transportation ✓
- Generation of data ✓
- Determining the age of the animal ✓
- For pregnancy testing ✓ (Any 2) (2)

3.4 **TWO basic requirements for transporting farm animals**

- Don't transport animals when the roads are busy ✓
- Transport animals of different ages/size/sex/species separately ✓
- Pregnant animals should not be transported ✓
- Floors should not be slippery ✓
- No sharp edges/angles on the truck ✓
- Facilities should be high and strong ✓
- Familiarize animals with the loading area ✓
- Don't feed animals less than 12 hours before loading/loading facilities ✓
- Red flag when transporting animals by road ✓
- Animals should not be rushed ✓
- Don't load animals too long before departure ✓
- Proper ventilation ✓
- Relevant legal documentation ✓ (Any 2) (2)

3.5 **Viral diseases**

3.5.1 **Name of the disease**
Rift Valley Fever (RVF) ✓ (1)

3.5.2 **Identification of examples**
**(a) Vector -** Mosquito ✓ (1)
**(b) Pathogen -** Virus ✓ (1)

3.5.3 **Justification**
The disease is highly transmittable/infectious/contagious ✓ (1)

3.5.4 **The term describing the sentence**
Zoonotic ✓ (1)

3.5.5 **TWO economic implications of animal diseases to the farmer**

- Banning of exports and imports/decrease in trade ✓
- High treatment/vaccination costs to control/prevent diseases ✓
- Decreased production ✓
- Loss of livestock/death ✓
- Loss of income/profit ✓ (Any 2) (2)

3.6 **Lifecycle of a parasite**

3.6.1 **Life cycle of a parasite**
Two-host ✓ (1)

3.6.2 **Reason**
It needs two hosts to complete its lifecycle ✓ (1)

3.6.3 **THREE stages in the life cycle of the parasite**

- Adult ✓
- Eggs ✓
- Larvae ✓
- Nymph ✓ (Any 3) (3)

3.7 **Linking statements to internal parasites**

**(a)** Liver fluke ✓ (1)

**(b)** Round worm ✓ (1)

**(c)** Tape worm ✓ (1)

3.8 **TWO basic principles of good health**

- Good sanitation/hygiene ✓
- Practice rotational grazing to control parasites at their breeding areas ✓
- Proper handling of manure ✓
- Isolation of sick animals from healthy ones ✓
- Vaccination ✓
- Veld burning ✓
- Proper feeding ✓

(Any 2) (2)

**[35]**

## QUESTION 4: ANIMAL REPRODUCTION

### 4.1 Male and female reproductive organs

#### 4.1.1 Labels

**B -** Vas deferens/sperm duct ✓ (1)
**C -** Epididymis ✓ (1)
**G -** Cervix ✓ (1)

#### 4.1.2 Letters

**(a)** D ✓ (1)
**(b)** E ✓ (1)
**(c)** I ✓ (1)
**(d)** A ✓ (1)

### 4.2 Reproductive process

#### 4.2.1 The reproductive process

Mating/copulation ✓ (1)

#### 4.2.2 Stage of the process

Mounting ✓ (1)

#### 4.2.3 TWO sexual behavioural signs displayed by bulls before mating

- Follow/excited about the cow on oestrus closely ✓
- Smelling/licking external genitalia and urine of the cow ✓
- Extend their heads and curl upper lips/Flehmen response ✓
- Pawing on the ground and snorting ✓
- Resting the chin on the cow's rump ✓
- Bellowing and tongue lapping ✓
- Protect/guard the females on oestrus ✓ (Any 2) (2)

#### 4.2.4 TWO factors that regulate mating behaviour among bulls

- Genetics ✓
- Hormonal influences ✓
- Senses ✓
- Environmental factors ✓
- Psychological factors/temperament ✓
- Health status of the bull ✓
- Experience of the bull ✓
- The type of breed ✓
- Social ranking of the bull/over worked/exhausted ✓
- Newly introduced bulls in a herd attracts greater attention ✓
- Social and sexual interactions/over worked/exhaustion ✓
- Feeding ✓ (Any 2) (2)

4.3 **Cloning**

4.3.1 **Type of cloning**
**A -** Reproductive cloning ✓ (1)
**B -** Therapeutic cloning ✓ (1)

4.3.2 **Purpose of**
**A - Reproductive cloning -** To produce an offspring that is genetically identical to the donor ✓ (1)
**B - Therapeutic cloning -** To produce stem cells that can be used for health purposes/cell therapy ✓ (1)

4.3.3 **TWO disadvantages of cloning**
- It is expensive ✓
- Requires specific skills/expert knowledge ✓
- Cloned animals age prematurely/limited capacity to survive ✓
- There is an increased incidence of abnormalities ✓
- Dystocia problems due to large offspring ✓
- Genetic diversity deteriorates ✓ (Any 2) (2)

4.4 **Gametogenesis**

4.4.1 **The processes**
**DIAGRAM 1 -** Spermatogenesis ✓ (1)
**DIAGRAM 2 -** Oogenesis/ovigenesis ✓ (1)

4.4.2 **Labelling**
**A -** Secondary spermatocyte ✓ (1)
**B -** Sperm cells/spermatozoa ✓ (1)
**C -** Primary oocyte ✓ (1)

4.4.3 **The type of cell division**
Mitosis ✓ (1)

4.5 **Parturition**

4.5.1 **The term referring to birth difficulty in cows**
Dystocia ✓ (1)

4.5.2 **TWO problems associated with the foetus that interfere with normal parturition**
- High birth weight/large foetus/hydro foetus ✓
- Incorrect presentation ✓
- Flexion of the elbow ✓
- Deviation of the head ✓
- Retention of one or both legs ✓
- Hydrocephalus ✓
- Deformities/congenital defects ✓
- Multiple births/twinning ✓
- Dead foetus ✓ (Any 2) (2)

4.5.3 **TWO factors causing retention of the placenta**

- Deficiency of vitamin A ✓
- Infection/abortion ✓
- Mineral deficiency/lack of Se/Mg/Ca ✓
- Premature birth ✓
- Hereditary defects/breed type ✓
- Inertia of the uterus causing weak contractions to expel placenta ✓
- Over-conditioning of dry cows ✓
- Metabolic disorders/milk fever ✓
- Malnutrition ✓
- Old age ✓
- Prolonged labour ✓
- Vaginal prolapse ✓
- Diseases ✓
- Induced calving ✓
- Multiple births/twinning/abnormal births ✓ (Any 2) (2)

4.6 **The udder of a cow**

4.6.1 **Identification of the parts**

**A -** Alveoli/lobule ✓ (1)
**B -** Gland cavity ✓ (1)

4.6.2 **The letter of the part where milk is produced**

A ✓ (1)

4.6.3 **Hormone**

**(a) Synthesis of milk -** Prolactin/luteotropic hormone/LTH ✓ (1)
**(b) Milk let down process -** Oxytocin/ ✓ (1)
**[35]**

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