



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2025

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 13 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	C ✓✓	(10 x 2)	(20)
	1.1.2	B ✓✓		
	1.1.3	B ✓✓		
	1.1.4	A ✓✓		
	1.1.5	B ✓✓		
	1.1.6	D ✓✓		
	1.1.7	A ✓✓		
	1.1.8	C ✓✓		
	1.1.9	D ✓✓		
	1.1.10	C ✓✓		
1.2	1.2.1	None ✓✓	(5 x 2)	(10)
	1.2.2	Both A and B ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	B only ✓✓		
1.3	1.3.1	Ideal/complete protein ✓✓	(5 x 2)	(10)
	1.3.2	Battery system ✓✓		
	1.3.3	Congenital/genetic ✓✓		
	1.3.4	Milk ejection/milk let down ✓✓		
	1.3.5	Preparatory ✓✓		
1.4	1.4.1	Cellulase ✓	(5 x 1)	(5)
	1.4.2	Urea ✓		
	1.4.3	Hydrocephalus ✓		
	1.4.4	Dismounting ✓		
	1.4.5	Corpus luteum ✓		

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Feed intake, digestion and the flow of feed****2.1.1 Name of the farm animal**

Pig ✓

(1)

2.1.2 Reason

- Presence of salivary amylase in the mouth ✓
- Both physical and chemical digestion in the mouth ✓
- Flow of feed shows the route within a simple stomach ✓ (Any 1) (1)

2.1.3 ONE part assisting in ingestion of food

- Snout/lips/teeth ✓
- Tongue ✓ (Any 1) (1)

2.1.4 Name of the part A

Oesophagus/gullet ✓

(1)

2.1.5 ONE function of hydrochloric acid

- Antiseptic and therefore it destroys bacteria/prevents bacterial growth/prevents the stomach content from rotting ✓
- Neutralizes the alkaline reaction of the saliva ✓
- Changes the pH of the stomach into acid medium ✓
- Changes disaccharides (sucrose) into monosaccharides (glucose and fructose) ✓
- Activates pepsinogen to pepsin ✓ (Any 1) (1)

2.2 Accessory glands**2.2.1 Identification of part labelled B**

Pancreas ✓

(1)

2.2.2 ONE enzyme found in pancreas

- Amylase ✓
- Lipase ✓
- Proteolytic enzymes (Peptidase/Trypsin/chymotrypsin/protease/erepsin) ✓ (Any 1) (1)

2.2.3 ONE function of part A/liver

- Secretes bile ✓
- Stores glycogen/convert glucose to glycogen ✓
- Synthesizing all glucose needed by the animal ✓
- Stores water/thereby regulates the fluid balance in the blood ✓
- Produces red blood cells and destroys old red blood cells ✓
- Stores the fat-soluble vitamins A, D, K and E ✓
- Secretes heparin which prevent blood clotting ✓
- Converts toxic ammonia produced by bacteria in large intestines into urea ✓
- Detoxifies poisonous substances ✓

(Any 1) (1)

2.2.4 Importance of emulsification

To increase the surface area ✓ for the action of lipase ✓

(2)

2.3 Components of a feed**2.3.1 Identification of the mineral**

Sodium ✓

(1)

2.3.2 TWO importance of protein in the feed

- Main component of muscle tissue ✓
- Needed to build new cells/growth ✓
- Repairs damaged tissue ✓
- For the production of eggs and milk ✓
- Needed for the production of enzymes, internal secretions and hormones/antibodies ✓
- Play a role in reproduction and regulation of metabolism/biochemical reactions ✓
- Provide support for hair/skin/tendons/ligaments ✓

(Any 2) (2)

2.3.3 ONE other organic component of the feed

- Fats/oils/lipids ✓
- Vitamins ✓

(Any 1) (1)

2.3.4 Justification of the suitability of the feed

Has a high calcium content ✓ which is needed for stronger bones ✓

(2)

2.4 Digestibility of feed**2.4.1 Calculation of the dry matter absorbed in the feed**

$$\text{DM excreted} = \frac{40}{100} \times 3,5 \text{ kg} = 1,4 \text{ kg} \quad (3,5 \text{ kg} - 1,4 \text{ kg} = 2,1 \text{ kg}) \quad \checkmark$$

OR

$$\text{DM excreted} = \frac{60}{100} \times 3,5 \text{ kg} = 2,1 \text{ kg} \quad \checkmark$$

$$\text{DM absorbed} = 12,5 \text{ kg} - 2,1 \text{ kg} \quad \checkmark$$

$$= 10,4 \text{ kg} \quad \checkmark$$

(3)**2.4.2 ONE animal factor that influenced the digestibility of the feed**

- Age/body mass of animal \checkmark
- Type of animal/digestive system \checkmark
- Individuality \checkmark
- Stage of production of the animal \checkmark
- Animal breed \checkmark
- Animal health \checkmark

(Any 1) (1)**2.5 Nutritive ratio/NR****2.5.1 Calculation of the nutritive ratio**

$$\begin{aligned} \text{\% digestible non-nitrogen substances (DNNS)} &= \text{\%TDN} - \text{\%DP} \\ &= 89\% - 15\% \\ &= 74\% \quad \checkmark \end{aligned}$$

$$\text{Nutritive Ratio} = 1 : \frac{\text{\% digestible non-nitrogen substances (DNNS)}}{\text{\% digestible protein (DP)}}$$

$$= 1 : \frac{74\%}{15\%} \quad \checkmark$$

$$= 1 : 4,9 / 1 : 5 \quad \checkmark$$

(3)**2.5.2 ONE purpose of the feed**

- Production \checkmark
- Reproduction \checkmark
- Growth \checkmark

(Any 1) (1)**2.5.3 Justification**

It has a high protein content/narrow NR/less than 1:6 \checkmark

(1)

2.6 The types of feeds**2.6.1 Identification of**

- A** Roughages ✓ (1)
C Dry ✓ (1)

2.6.2 The importance of A in young ruminant

Stimulate the development of the fore stomach in young ruminants ✓ (1)

2.6.3 ONE example of

- (a) **B** Maize meal/oatmeal/barley meal/rye meal/sorghum meal/
wheat meal ✓ (1)
 (b) **D** Lucerne hay/legume hays ✓ (1)

2.7 Energy value of feeds**2.7.1 Calculation of energy value of feeds**

$$\text{Energy lost through faeces} = \frac{35}{100} \times 21 \text{ MJ/kg} = 7,35 \text{ MJ/kg} \checkmark$$

$$\text{Digestible Energy/DE} = \text{Gross Energy/GE} - \text{Energy loss in faeces} \checkmark$$

$$= 21 \text{ MJ/kg} - 7,35 \text{ MJ/kg} = 13,65 \text{ MJ/kg} \checkmark$$

$$= 13,65 \text{ MJ/kg} \times 30 \text{ kg} = 409,5 \text{ MJ} \checkmark$$

OR

$$\text{GE} = 30 \times 21 \text{ MJ} = 630 \text{ MJ} \checkmark$$

$$\text{DE} = \text{GE} - \text{Faeces} \checkmark$$

$$\text{DE} = 630 \text{ MJ} - \left(630 \text{ MJ} \times \frac{35}{100} \right)$$

$$\text{DE} = 630 \text{ MJ} - 220,5 \text{ MJ} \checkmark$$

$$\text{DE} = 409,5 \text{ MJ} \checkmark$$

(4)

2.7.2 Energy remaining for maintenance and production

$$\text{Net Energy/NE} \checkmark$$

(1)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Farming systems****3.1.1 Identification of the farming systems**

- (a) **PICTURE B** - Commercial ✓ (1)
(b) **PICTURE A** - Subsistence ✓ (1)

3.1.2 Reason

- (a) **PICTURE B** Production of the large herd of beef cattle to sell and make profit ✓ (1)
(b) **PICTURE A** Fewer animals used for ploughing the field to sustain the family ✓ (1)

3.2 Animal production**3.2.1 Identification of the factors to increase animal production**

- PICTURE A** - Nutrition/feeding ✓ (1)
PICTURE B - Breeding/reproduction ✓ (1)

3.2.2 TWO other factors that would adversely affect the young calf

- Harsh environmental conditions ✓
 - Poor general enterprise management ✓
 - More prone to predators ✓
- (Any 2) (2)

3.3 Housing facilities**3.3.1 Identification of the facility**

- (a) **PICTURE A** - Holding pen ✓ (1)
(b) **PICTURE B** - Farrowing pen/crate ✓ (1)

3.3.2 Indication of the use of bedding in PICTURE B

- To insulate cold cement floors/maintains heat ✓
 - Protects piglets against abrasive/rough cement/concrete floors ✓
 - Absorption of moisture ✓
- (Any 1) (1)

3.3.3 Differentiation between facility in PICTURE C and PICTURE D

- Facility in PICTURE C** - Used to feed animals ✓ (1)
Facility in PICTURE D - Used to store animal feed ✓ (1)

3.4 Tools and equipment to handle farm animal

- 3.4.1 Plastic shaker ✓ (1)
3.4.2 Halter ✓ (1)
3.4.3 Prodder ✓ (1)
3.4.4 Casting harness ✓ (1)

3.5 ONE basic guideline for handling sheep

- Approach them calmly and slowly ✓
- Do not catch or hold sheep by their wool ✓
- Use a herding dog to move them ✓
- Handle them as a flock ✓
- They can be trained to act on a vocal command ✓
- Catch them from behind/grabbing as high as possible on the hind leg ✓
- Sit the sheep on its rump, squat down and take a firm hold of its back legs keeping its head up ✓
- Pull the animal firmly against your body ✓
- When lifting it over a fence, do not attempt to drag but work from the same side as the animal ✓
- Avoid blind spot ✓
- No sudden movements ✓
- Do not make loud noises/avoid noise ✓
- Use the correct handling facilities/methods ✓
- Do not beat/throw objects to sheep ✓

(Any 1) (1)

3.6 Parasites**3.6.1 Identification of the parasite in DIAGRAM A**

Tapeworm ✓

(1)

3.6.2 Classification of the parasite in DIAGRAM B

External/ecto parasite ✓

(1)

3.6.3 Differentiation of parasites based on their life cycles

- Parasite in **DIAGRAM A** is two host/needs two hosts to complete its cycle/has a 3 stage life cycle ✓
- Parasite in **DIAGRAM B** is one host/needs one hosts to complete its cycle/has a 4 stage life cycle ✓

(1)

(1)

3.6.4 TWO economic implications of internal parasites

- High feeding costs ✓
- High treatment costs ✓
- Poor production/degrading of carcasses ✓
- Loss of income/profit ✓

(Any 2) (2)

3.7 Plant poisoning**3.7.1 TWO measures to treat plant poisoning**

- Keep affected animals away from drinking water ✓
- Allow small quantities of water after two days ✓
- Administer remedies that will neutralize the plant poison/strong tea/activated charcoal/laxatives ✓
- Provide large doses of purgatives to cause expulsion of poison ✓
- Dose with sugar/glucose ✓
- Keep animals calm/in shade ✓

(Any 2) (2)

3.7.2 TWO roles played by the state

- Awareness campaigns ✓
- Legislation/registration of medication ✓
- Research ✓
- Training/education ✓
- Quarantine services ✓
- Import/export bans ✓
- Importation/production of vaccines ✓
- Movement control/permits ✓
- Veterinarian services ✓

(Any 2) (2)

3.8 Animals diseases

- 3.8.1 Foot and mouth disease/FMD ✓ (1)
- 3.8.2 Red water ✓ (1)
- 3.8.3 Lumpy wool ✓ (1)
- 3.8.4 Heart water ✓ (1)
- 3.8.5 Mastitis ✓ (1)

3.9 TWO methods of administering medication

- Injection ✓
- Oral administration ✓
- Topical application ✓
- Vaginal administration ✓
- Dipping/foot bathing ✓
- Intra nasal application ✓
- Rectal application ✓
- Eye drop application ✓

(Any 2) (2)
[35]

QUESTION 4: ANIMAL REPRODUCTION**4.1 Male reproductive system****4.1.1 Identification of part D**

Epididymis ✓

(1)

4.1.2 ONE function of**(a) Seminal fluid**

- Provides nutrients for sperm cells ✓
- Lubricates/cleanses the urethra ✓
- Improves the motility/mobility of sperm cells ✓
- pH buffer ✓
- Increases the volume of the semen ✓

(Any 1) (1)

(b) Vas deferens

- Transportation of the sperm cells ✓
- Plays a role during ejaculation ✓

(Any 1) (1)

4.1.3 Congenital defects

- Cryptorchidism ✓
- Hypoplasia ✓

(Any 1) (1)

4.2 Sperm cell**4.2.1 Name of the process whereby sperm cell is formed**

Spermatogenesis ✓

(1)

4.2.2 Letter of the part

C ✓

(1)

4.2.3 The type of cell division**(a)** Meiosis 1 ✓

(1)

(b) Mitosis ✓

(1)

4.3 Hormonal levels in cattle during the reproduction cycle**4.3.1 Identification of the time (in days)**

Day 2 ✓

(1)

4.3.2 Evidence that the cow was not pregnant after day 1

- Declining levels of progesterone ✓ and increased levels of oestrogen ✓
- The cow was able to go to a second oestrus cycle ✓✓ (Any 1) (2)

4.3.3 Description of what could have happened to the corpus luteum after day 15

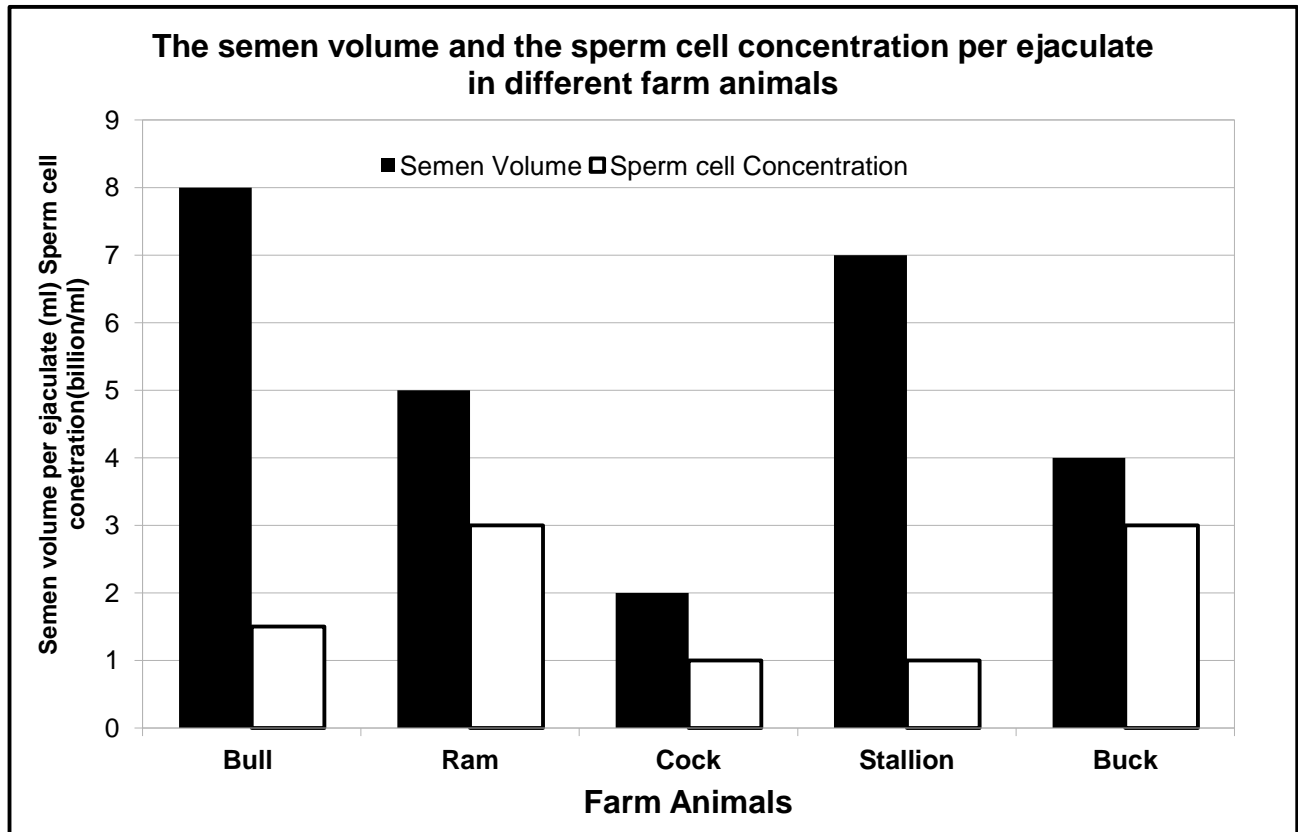
The corpus luteum will degenerate/disappear/disintegrate/luteolysis has taken place ✓

(1)

4.3.4 Stage of oestrus between day 5 and day 8

Met-oestrus ✓

(1)

4.4 Bar graph**4.4.1 Bar graph****Criteria/rubric/marketing guidelines**

- Correct heading (with both variables) ✓
- X-axis: Correctly calibrated with label (Farm animal) ✓
- Y-axis: Correctly calibrated with label (Semen volume per ejaculate and sperm cell concentration) ✓
- Correct units (Billion per ml and ml) ✓
- Combined bar graph ✓
- Accuracy (80% + correctly plotted) ✓

(6)

4.4.2 ONE requirement for the storage of semen

- Proper/correct equipment should be used ✓
- Presence of a dilutant ✓
- Store at 5°C if stored for shorter periods ✓
- Store at –196°C in a cannister/flask containing liquid nitrogen if stored for longer periods ✓
- Store in polyvinyl straws ✓
- End of the straws should be sealed to prevent liquid nitrogen to enter ✓
- Straws should be properly labelled ✓

(1)

(Any 1)

4.5 Explanation on how each of the following techniques work in detecting oestrus in cattle

4.5.1 Pedometer - Apparatus records the spike in movement and temperatures ✓ which indicates restlessness ✓ because of oestrus

(2)

4.5.2 Tail chalking - Marker/chalk will rub off from the cow in oestrus ✓ due to mounting by others ✓

(2)

4.6 The process of artificial insemination (AI)

Indication of the action the farmer would take if signs of heat were detected in the afternoon

The cow should be artificially inseminated early the next morning/12 hours after the signs of oestrus ✓

(1)

4.7 Multiple births

“

4.7.1 Explanation of multiple birth formation

Two different ova are fertilized ✓ by two different spermatozoa ✓

(2)

4.7.2 Naming of the reproductive process

Pregnancy/gestation ✓

(1)

4.8 Cloning**4.8.1 Deduction of the type of reproductive technique**

Reproductive cloning ✓

(1)

4.8.2 Justification for the calf being a Holstein

The nucleus/genetic material of the offspring was extracted from Holstein ✓ and inserted into a Nguni ✓

(2)

4.8.3 ONE disadvantage of cloning

- Conception rate is low ✓
- Expensive procedure ✓
- Very scientific/complex procedure ✓
- Clones are prone to diseases/lower immune system ✓
- Time consuming/labour intensive ✓
- Expert knowledge/skills required/veterinarian ✓
- Short life-span ✓
- Less genetic diversity ✓
- No guarantees for success ✓
- Dystocia problems can arise ✓
- Genetic defects may occur ✓
- It alters the normal reproductive process ✓

(Any 1) (1)

4.9 Pregnancy**4.9.1 Stage of pregnancy in cows**

Foetal stage ✓

(1)

4.9.2 TWO reasons for the termination of pregnancy/abortion

- Metabolic or hormonal disabilities ✓
- Nutritional deficiencies/malnutrition ✓
- Trauma/stress/injuries ✓
- Poisoning/toxins ✓
- Laxatives ✓
- Infections/diseases ✓
- Genetic or chromosomal defects of ova/sperm cells ✓
- Allergies ✓
- Twinning ✓
- Embryo abnormalities ✓
- Vaccination ✓
- Dropsy of the foetal membranes ✓

(Any 2) (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150