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# 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 ✓
- Type of animal/digestive system ✓
- Individuality ✓
- Stage of production of the animal ✓
- Animal breed ✓
- Animal health ✓

(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 ✓
- Reproduction ✓
- Growth ✓

(Any 1) (1)

### 2.5.3 Justification

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

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

Digestible Energy/DE = Gross Energy/GE – Energy loss in faeces ✓

 $= 21\text{MJ/kg} - 7,35\text{MJ/kg} = 13,65\text{MJ/kg}$  ✓ $= 13,65\text{MJ/kg} \times 30\text{kg} = 409,5\text{MJ}$  ✓**OR**GE =  $30 \times 21\text{MJ} = 630\text{MJ}$  ✓

DE = GE – Faeces ✓

DE =  $630\text{MJ} - (630\text{MJ} \times \frac{35}{100})$ DE =  $630\text{MJ} - 220,5\text{MJ}$  ✓DE =  $409,5\text{MJ}$  ✓ (4)**2.7.2 Energy remaining for maintenance and production**

Net Energy/NE ✓ (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**

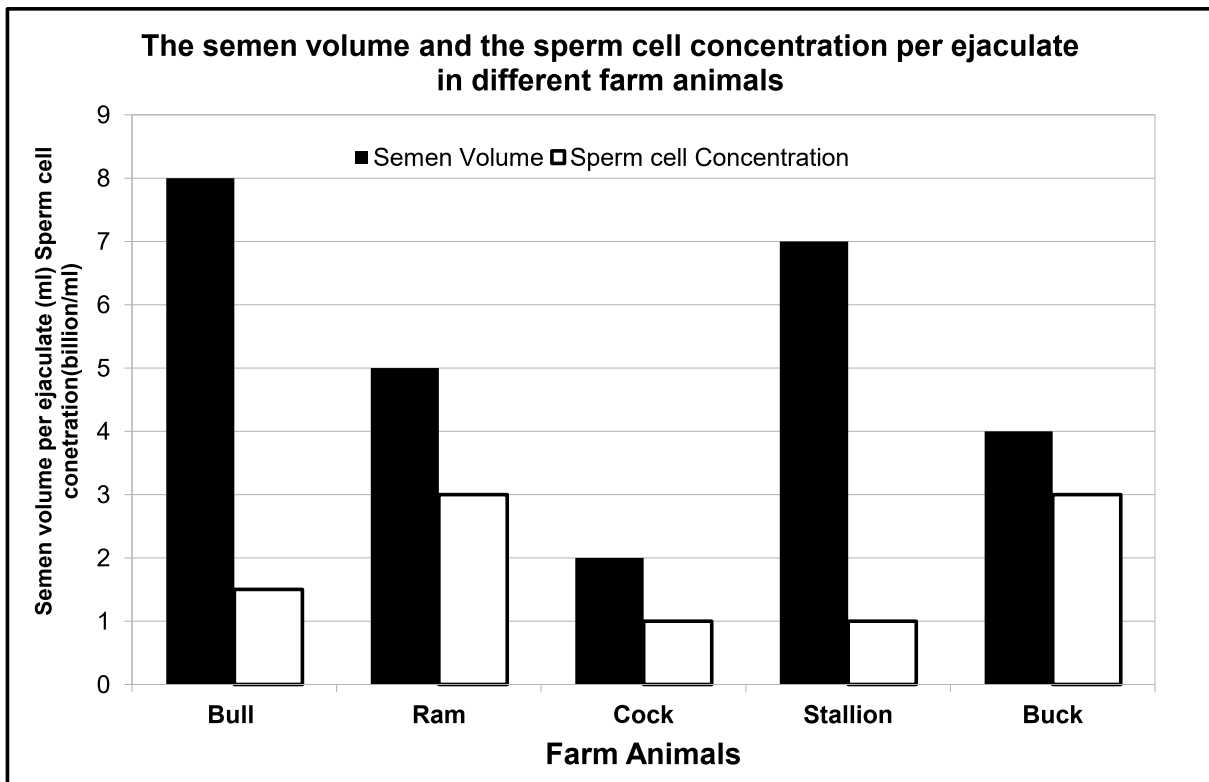
The corpus luteum will degenerate/disappear/disintegrate/luteolysis has taken place ✓

(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 a 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 ✓ (Any 1)
- (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**