



# 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 ✓✓	(10 x 2)	(20)
	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 ✓✓		
1.2	1.2.1	A only ✓✓	(5 x 2)	(10)
	1.2.2	B only ✓✓		
	1.2.3	B only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	Both A and B ✓✓		
1.3	1.3.1	Amylase/ptyalin ✓✓	(5 x 2)	(10)
	1.3.2	Feedlot ✓✓		
	1.3.3	Artificial insemination/AI ✓✓		
	1.3.4	Repeat breeders ✓✓		
	1.3.5	Impotence ✓✓		
1.4	1.4.1	Net/NE ✓	(5 x 1)	(5)
	1.4.2	Biological ✓		
	1.4.3	Acrosome ✓		
	1.4.4	Anoestrus ✓		
	1.4.5	Dry/rest ✓		

**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**

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

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

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

$$= 76,38 \checkmark \% \checkmark \quad (5)$$

**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)**

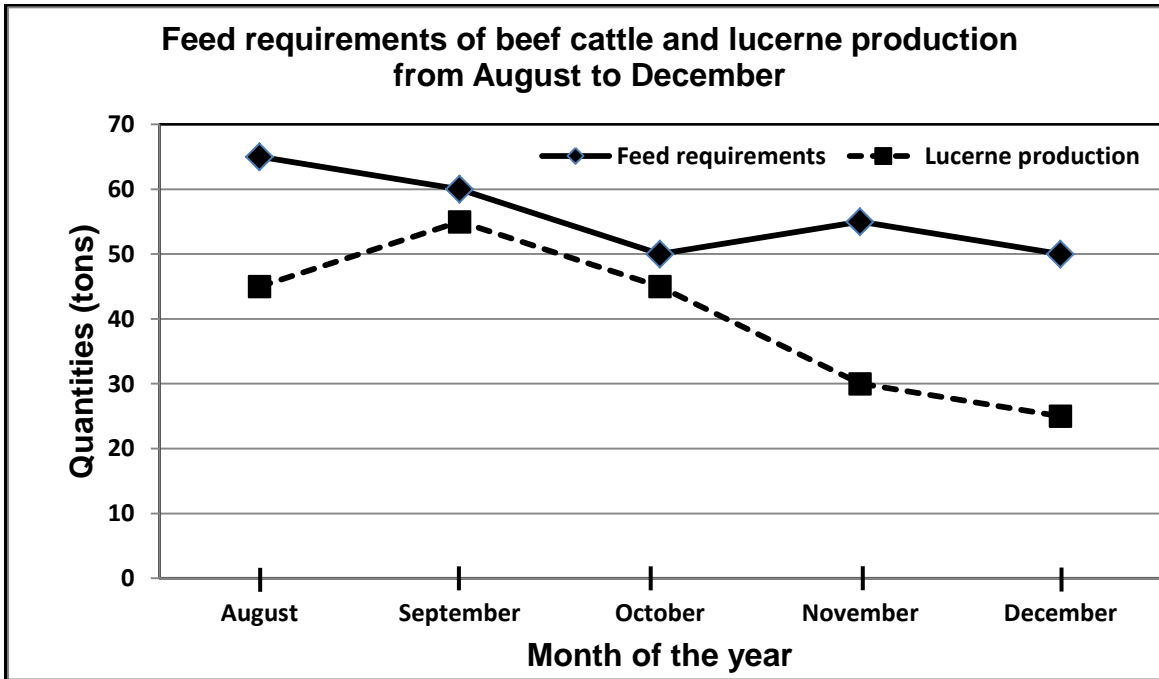
- $50+50+50+50+55+60 = 315$  tons ✓
- $315 \times 1\ 000$  ✓
- $= 315\ 000$  kg ✓

**(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/ovogenesis ✓ (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**