



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2019

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	A ✓✓	(10 x 2)	(20)
	1.1.2	B ✓✓		
	1.1.3	C ✓✓		
	1.1.4	D ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	A ✓✓		
	1.1.9	C ✓✓		
	1.1.10	D ✓✓		
1.2	1.2.1	B only ✓✓	(5 x 2)	(10)
	1.2.2	A only ✓✓		
	1.2.3	Both A and B ✓✓		
	1.2.4	None ✓✓		
	1.2.5	A only ✓✓		
1.3	1.3.1	Feed/fodder flow ✓✓	(5 x 2)	(10)
	1.3.2	Lighting/bulb/lamp ✓✓		
	1.3.3	Internal/endo ✓✓		
	1.3.4	Hydrops/hydro/dropsy foetus/hydramnios ✓✓		
	1.3.5	Oogenesis/ovigenesis ✓✓		
1.4	1.4.1	Cafeteria style/free choice ✓	(5 x 1)	(5)
	1.4.2	Insulation ✓		
	1.4.3	Progesterone ✓		
	1.4.4	Abortion ✓		
	1.4.5	Acrosome ✓		
TOTAL SECTION A:			45	

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canals of farm animals****2.1.1 Classification of animals****DIAGRAM A** - Ruminant/polygastric ✓**DIAGRAM B** - Non-ruminant/monogastric ✓

(2)

2.1.2 TWO adaptation features of animal in DIAGRAM A

- Complex/compound/polygastric/fore stomach/reticulo-rumen ✓
- Large fermentation vessel/rumen ✓
- Presence of rumen micro-flora/organisms ✓ (Any 2)

(2)

2.1.3 Reason for not feeding animal in DIAGRAM B with a ration high in crude fibre content

- It has a monogastric/simple stomach/no fore stomach ✓
- Absence of micro-flora/cannot digest crude fibre ✓ (Any 1)

(1)

2.1.4 Explanation on how animal in DIAGRAM A benefits from non-protein nitrogenous substance

Secretion of urease that changes urea into ammonia ✓ which is used to synthesise microbial protein that is later broken into amino acids ✓

(2)

2.2 Composition of ration**2.2.1 Identification of the feed****(a) Carbohydrate-rich roughage:** Oats hay ✓

(1)

(b) Protein-rich concentrate: Sunflower oil cake meal ✓

(1)

2.2.2 Explanation for not recommending the ration as the only source of food for lambs

- Rumen of the lamb is still underdeveloped/abomasum is the only functioning compartment that cannot digest crude fibre ✓
- Cannot digest feed with a high crude fibre content/roughage is too high/70% ✓

(2)

2.2.3 Importance of grass hay in rations for mature ewes

- Grass hay is cheap and available ✓
- To improve functioning of the digestive system ✓
- Prevents bloating ✓
- Supply the necessary bulkiness to the ration/main source of the ration ✓
- Source of energy ✓ (Any 1)

(1)

2.3 Pearson square**2.3.1 Parts of the ration representing maize meal and sunflower oil cake meal**• **Maize meal** - 20 parts ✓

(1)

• **Sunflower oil cake** - 8 parts ✓

(1)

2.3.2 Calculation of the percentage of feed B in the mixture

- $20 + 8 = 28$ ✓
- Feed B = $\frac{20}{28} \times 100$ ✓
- = 71,43% ✓ (3)

2.3.3 Calculation of the quantities of maize in a 250 kg mixture

- $\frac{20}{28} \times 250\text{kg}$ ✓
- = 178,6Kg ✓

OR

- $\frac{71,43 \times 250\text{kg}}{100}$ ✓
- = 178,6kg ✓ (2)

2.4 Nutritive Ratio

2.4.1 Calculation of the Nutritive ratio of FEED B with a formula

- $\text{NR} = 1: \frac{\% \text{TDN} - \% \text{DP}}{\% \text{DP}}$ ✓
- $1: \frac{80\% - 7\%}{7\%}$ ✓
- $\text{NR} = 1 : 10,4/10$ ✓

OR

- $\text{NR} = 1: \frac{\% \text{DNNN/DNNS}}{\% \text{DP}}$ ✓
- $1: \frac{73}{7}$ ✓
- $\text{NR} = 1: 10,4/10$ ✓ (3)

2.4.2 Justification of the suitability of FEED A and FEED B for growth

- **FEED A:** Suitable because it has a narrow nutritive ratio/more proteins/less carbohydrates ✓ (1)
- **FEED B:** Not suitable because it has a wide nutritive ratio/less proteins/more carbohydrates ✓ (1)

2.5 Energy value of the feeds

2.5.1 Calculation of the energy value represented by A

ME = GE – Energy lost through faeces – Energy lost through urine and gases

$$\text{ME} = 19\text{J} - 7\text{J} - 4\text{J} \quad \text{OR} \quad 19 - (7+4) \quad 11\text{J} \quad \checkmark$$

$$\text{ME} = 8\text{J} \quad \checkmark \quad (2)$$

2.5.2 Identification of the energy loss in B

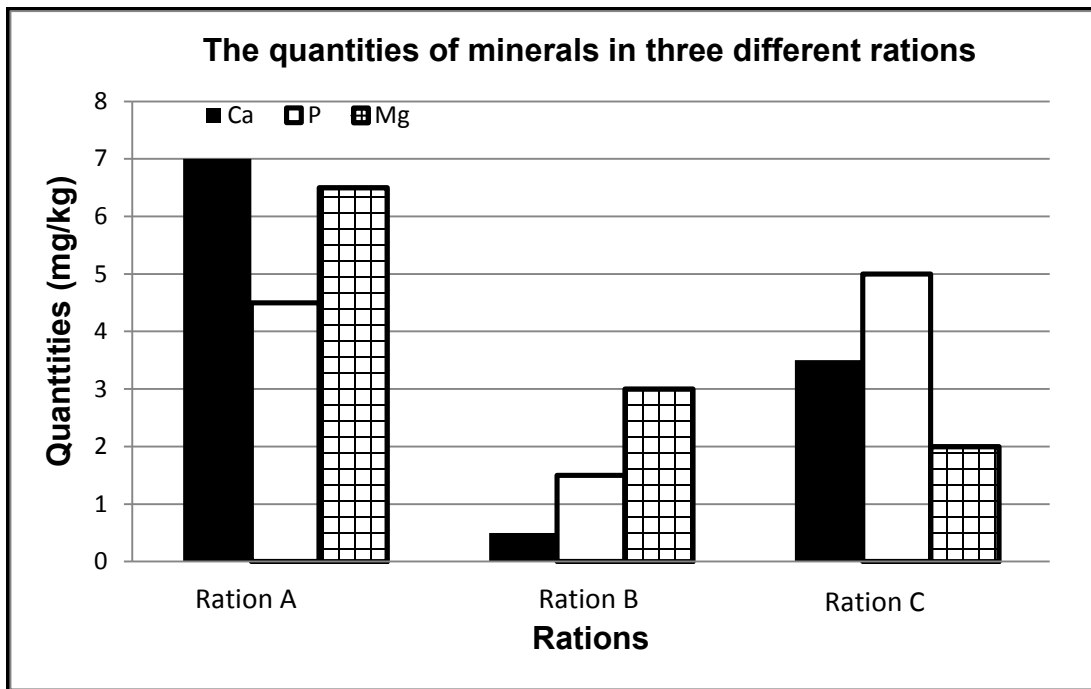
Energy lost through heat ✓ (1)

2.5.3 TWO importance of energy in C for animals

- For maintenance ✓
- For production ✓
- For reproduction ✓
- Physical work done ✓
- Growth ✓

(Any 2) (2)

2.6 Bar graph of the different quantities of minerals in rations



CRITERIA/RUBRIC/MARKING GUIDELINES

- Correct heading ✓
- X axis: Correctly calibrated with label (Rations) ✓
- Y axis: Correctly calibrated with label (Quantities) ✓
- Correct units (mg/kg) ✓
- Bar graph ✓
- Accuracy ✓

(6)
[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 The lowest critical temperature and heat production of different farm animals

3.1.1 Identification of TWO animals that need to be kept under intensive production system

- Piglets ✓
- Day old chickens ✓

(2)

3.1.2 Reason

The lowest critical temperature is the highest/lowest heat produced ✓

(1)

3.1.3 Animal that would be most economical to keep without facilities

Dairy cattle ✓

(1)

- 3.1.4 **TWO reasons from the graph**
- Their lowest critical temperature is the lowest ✓
 - They can generate more heat to keep warm ✓
- (2)
- 3.1.5 **The impact of decrease in temperature below 25°C on feed intake**
Piglets will eat more ✓
- (1)
- 3.2 **Production system**
- 3.2.1 **Identification of the production system in picture C**
Backyard system/free range/semi-intensive ✓
- (1)
- 3.2.2 **Reason**
- Chickens move freely around the house during the day ✓
 - Are kept inside the shelter ✓
 - Feed is provided ✓
- (Any 2) (2)
- 3.2.3 **Indication of the letter of the picture**
- (a) Picture B ✓ (1)
- (b) Picture A ✓ (1)
- 3.2.4 **Differentiation between facility in terms of their purpose**
- **Facility in A** - Animals are kept for handling/management practices/auction/temporarily ✓ (1)
 - **Facility in D** - Animals are kept for housing/feeding/growing/permanently ✓ (1)
- 3.2.5 **Role of equipment labelled E in picture D**
For automatic dispensing of animal feed ✓
- (1)
- 3.3 **TWO basic guidelines for handling large farm animals**
- Announce your approach through touch from the front/side ✓
 - Avoid the blind spot ✓
 - Avoid the kicking region when approaching animals ✓
 - Use proper handling facilities/special facilities for male animals ✓
 - Always leave yourself an escape way ✓
 - Avoid entering small area enclosed with large animals ✓
 - Never poke/prod/throw objects to animals ✓
 - Give animals time to adjust before working with them ✓
 - Take special care when working with cows that have calves ✓
 - Avoid children/visitors/non-workers approaching animals ✓
 - Limit/reduce noise levels ✓
 - Handle animals in a group/herd ✓
- (Any 2) (2)
- 3.4 **Parasites**
- 3.4.1 **Classification of PARASITE A according to its life cycle**
One/single-host tick ✓
- (1)
- 3.4.2 **Protozoan disease transmitted by the parasite**
- Red water ✓
 - Anaplasmosis/gall sickness ✓
- (Any 1) (1)

- 3.4.3 **Indication of the letter of the parasite**
- (a) Parasite C ✓ (1)
- (b) Parasite B ✓ (1)
- 3.4.4 **TWO requirements of the use of medication**
- Medicine must be safe for the specific animal ✓
 - Check expiry date ✓
 - Correct dosage according to weight and age ✓
 - Correct method of administering the medicine ✓
 - Correct period of application/
correct intervals between administering medication ✓
 - Proper storage according to instructions ✓
 - Use registered medicine ✓
 - Use sterilized equipment ✓ (Any 2) (2)
- 3.5 **Animal diseases**
- 3.5.1 **Disease affecting**
- **Animal 1** - Anthrax ✓ (1)
 - **Animal 2** - Lumpy wool ✓ (1)
 - **Animal 3** - Rabies ✓ (1)
- 3.5.2 **Indication of the animal suffering from a deadly bacterial disease**
Animal 1 ✓ (1)
- 3.5.3 **Pathogen causing disease in ANIMAL 2**
Fungus ✓ (1)
- 3.5.4 **ONE precautionary measure to prevent the spread of disease in ANIMAL 3**
- Vaccination/inoculation/immunisation ✓
 - Awareness/education/notify authorities ✓
 - Isolation ✓ (Any 1) (1)
- 3.5.5 **TWO roles of the state in controlling the spread of the disease in ANIMAL 1**
- Establish quarantine zone ✓
 - Restricted movement from/to infected areas/import/export bans ✓
 - Destroying/correct disposal of infested carcasses/materials ✓
 - Inoculation/vaccination/immunisation of healthy stock/veterinarian services ✓
 - Public awareness ✓ (Any 2) (2)

3.6 Salt poisoning**3.6.1 TWO symptoms of salt poisoning in animals**

- Excessive salivation ✓
- Increased thirst ✓
- Vomiting ✓
- Constipation ✓
- Wobbling/circling/seizures/blindness/partial paralysis ✓
- Dragging of the hind legs/knuckling of the fetlock ✓
- Mucous membranes of the mouth are red and dry ✓
- Hypersensitivity to touch ✓
- Frequent urination ✓
- Inflammation of the stomach and intestines ✓
- Aggressiveness ✓
- Diarrhoea ✓

(Any 2) (2)

3.6.2 TWO measures to treat an animal with salt poisoning

- Provision of fresh water in small amounts at short intervals ✓
- Small animals can be given a hypertonic dextrose/isotonic saline solution ✓
- Removal of the source ✓

(Any 2) (2)

[35]**QUESTION 4: ANIMAL REPRODUCTION****4.1 Reproductive cycle in farm animals****4.1.1 Hormones initiating mating in ANIMAL A and ANIMAL B**

- **ANIMAL A** - Oestrogen ✓ (1)
- **ANIMAL B** - Testosterone ✓ (1)

4.1.2 Function for each hormone

- **Oestrogen** - Makes cow to come into oestrus/allow mating ✓ (1)
- **Testosterone** - Stimulates mating behaviour in the bull ✓ (1)

4.1.3 Identification of the reproductive processes

- (a) Fertilization/pregnancy/gestation ✓ (1)
- (b) Parturition/birth giving/calving ✓ (1)

4.1.4 Hormone initiating milk let-down

Oxytocin ✓ (1)

4.1.5 The function of oxytocin in milk let-down

It causes contraction of the myoepithelial cells surrounding the alveoli to release the milk ✓ (1)

4.2 Sperm morphology**4.2.1 Process during which the sperm cells above are formed**

Spermatogenesis ✓ (1)

- 4.2.2 **Identification of the sperm cell that can constituting good quality semen**
Sperm cell A ✓ (1)
- 4.2.3 **Instrument to evaluate sperm cells**
Microscope ✓ (1)
- 4.2.4 **Explanation of how sperm cell in B and C affect the ability of the bull to fertilize**
SPERM CELL B - It cannot fuse with the egg cell because it does not have an acrosome/no head ✓ (1)
SPERM CELL C - It cannot move towards the point of fertilization since it does not have a tail ✓ (1)
- 4.3 **Correct technique for AI**
- 4.3.1 **Re-arranging the steps during AI**
- A cow is sheltered and kept calm ✓
 - Excess faecal matter is removed ✓
 - Inseminator checks abnormalities and whether the cow is not pregnant by inserting the hand through the rectum ✓
 - The pistolette is guided through the vulva, vagina to the cervix ✓ (4)
- 4.3.2 **TWO disadvantages of AI for the farmer**
- Disease transmission can affect large number of cows ✓
 - Infections can occur/venereal diseases can spread quickly ✓
 - Genetic abnormalities can occur ✓
 - Inexperienced operator can damage the reproductive organs ✓
 - Low success rate when using inexperienced technician ✓
 - Labour intensive ✓
 - Expensive ✓
 - More time consuming ✓
 - Not always successful ✓
 - Does not necessarily improve the genetics of the herd ✓
 - Genetic variability can decrease ✓
 - If records are not kept carefully, inbreeding can occur ✓
 - Undesirable traits can be transferred to more offspring ✓ (Any 2) (2)
- 4.4 **Foetal membranes**
- 4.4.1 **Stage of pregnancy**
Foetal stage ✓ (1)
- 4.4.2 **Indication of the letter of the membrane**
- (a) A ✓ (1)
 - (b) B ✓ (1)
 - (c) C ✓ (1)

4.5 Parturition**4.5.1 TWO behavioural signs of an animal that is about to give birth**

- Isolates herself from the herd ✓
- Loss of appetite ✓
- Show signs of distress and discomfort ✓
- Restlessness ✓
- Nesting behaviour/circles searching for a hiding place ✓
- Frequent urination ✓
- Bellowing noises ✓

(Any 2) (2)

4.5.2 TWO causes of problems during birth in heifers

- Large foetus/small sized heifer ✓
- Multiple births ✓
- Inexperience ✓
- Incorrect presentation ✓
- Malformed foetus/hydrocephalous ✓
- Size of the pelvic area ✓
- Incomplete/failure of the cervix to dilate ✓
- Prolonged parturition/ineffective/weak labour ✓
- Inertia of the uterus ✓
- Torsion of the uterus ✓
- Length of the gestation period ✓
- Poor body conformation ✓
- Malnutrition ✓
- Diseases ✓

(Any 2) (2)

4.6 The importance of the aspects of embryo transfer**4.6.1 Superovulation**

For the production of more genetically superior ova ✓

(1)

4.6.2 Embryo flushing

For the harvest of more embryos from superior/donor cows ✓

(1)

4.6.3 Donor cow

For the production of superior embryo's ✓

(1)

4.6.4 Recipient cow

For implantation of the harvested embryo's ✓

(1)

4.7 Nuclear transfer**4.7.1 Importance of nuclear transfer****(a) Farmer**

- Animals with desirable traits can be produced to meet the specific production needs ✓
- Preserve superior genes/animals ✓
- Farmers can produce high-quality safe and healthy food ✓
- Animals can be bred that is more resistant to diseases ✓
- Frozen cloned embryos can be transported worldwide ✓
- Many clones can be obtained from one female ✓ (Any 1)

(1)

(b) Veterinarian services

- Production of stem cells to find cures for diseases ✓
- Research ✓
- Valuable medicines can be produced in the milk of cows/sheep/goats ✓
- Animals with a slightly modified genetic make-up can be produced for transplantation into humans ✓
- Preserve rare/endangered species ✓ (Any 1) (1)

4.7.2 TWO disadvantages of a nuclear transfer

- Cloned animals have a shorter lifespan ✓
 - Genetic abnormalities of a cloned animal can be transmitted to the offspring ✓
 - It is expensive ✓
 - Cloned animals have a low immune system ✓
 - Offspring are large causing problems during parturition ✓
 - Genetic diversity deteriorates/reduces variation ✓
 - Premature aging of cloned animals resulting in early death ✓
 - Offspring of cloned animals encounter problems with vital organs such as lungs, heart and kidneys ✓
 - Requires specific skills ✓ (Any 2) (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150