basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

MAY/JUNE 2026

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.

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SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓		
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	C ✓✓		
	1.1.5	D ✓✓		
	1.1.6	A ✓✓		
	1.1.7	C ✓✓		
	1.1.8	D ✓✓		
	1.1.9	B ✓✓		
	1.1.10	A ✓✓	(10 x 2)	(20)
1.2	1.2.1	A only ✓✓		
	1.2.2	None ✓✓		
	1.2.3	B only ✓✓		
	1.2.4	Both A and B ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Chyme ✓✓		
	1.3.2	Metabolic diseases ✓✓		
	1.3.3	Preparatory ✓✓		
	1.3.4	Buffer/pH regulator ✓✓		
	1.3.5	Congenital ✓✓	(5 x 2)	(10)
1.4	1.4.1	Gross energy/GE ✓		
	1.4.2	Crutching ✓		
	1.4.3	Placenta ✓		
	1.4.4	Seminiferous tubules ✓		
	1.4.5	Freemartin ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 **The alimentary canals of two farm animals**

2.1.1 **Farm animal represented in DIAGRAM B**
Fowl/chicken/poultry ✓ (1)

2.1.2 **Justification of the answer**
- Presence of a crop ✓
- Presence of proventriculus ✓
- Presence of ventriculus/gizzard ✓
- Presence of two caeca ✓ (Any 1) (1)

2.1.3 **Description of protein digestion from part C/abomasum to part D/small intestine**
- Protein is converted by enzyme pepsin into peptides in part **C** ✓ (1)
- The enzyme erepsin changes peptides to amino acids in part **D** ✓ (1)

2.1.4 **ONE way in which micro-organisms in part B benefit animals**
- Breakdown roughages/cellulose to produce volatile fatty acids/ fermentation ✓
- Supply of water-soluble vitamins and vitamin K ✓
- They benefit from amino acids synthesized through hydrolysis of protein and non-protein nitrogenous compounds ✓ (Any 1) (1)

2.1.5 **Comparing the oesophagus and the crop in terms of functions**
Part A/oesophagus - Transports food from the mouth to the stomach and vice versa ✓ (1)
Part E/crop - Stores/moistens/softens food ✓ (1)

2.2 **Feed component**

2.2.1 **Identification of the component of feed**
Vitamins ✓ (1)

2.2.2 **The category of vitamins**
Water/fat soluble vitamins ✓ (1)

2.2.3 **Indication of the letter of the component**
(a) Preventing nervous symptoms in animals - C/D ✓ (1)
(b) Its deficiency causes polyneuritis - C ✓ (1)

2.2.4 **Name of feed component labelled F**
Vitamin A/retinol ✓ (1)

2.3 Digestibility of feeds

2.3.1 Explanation of what would have influenced the digestibility of maize stalk

The high fibre content in maize stalk was poorly digested (only 5kg) was absorbed ✓ 8kg was excreted by the young growing animal ✓ due to the underdevelopment of the rumen and insufficient rumen micro-organisms for fibre digestion ✓

OR

The animal was a non-ruminant ✓ and was less able to digest feeds high in crude fibre content ✓ due to a lack of rumen micro-organisms ✓ (3)

2.3.2 TWO methods that could be used to improve the digestibility

- Grinding ✓
- Pelleting ✓
- Spraying with water/NPN/molasses mixture ✓
- Supplementation with molasses/NPN ✓ (Any 2) (2)

2.4 Types of feeds

2.4.1 Classification of feeds

(a) **PICTURE A -** Roughage ✓ (1)
(b) **PICTURE F -** Roughage ✓ (1)

2.4.2 Identification of feeds

(a) **A succulent roughage -** F (Silage)/A (Green Lucerne) ✓ (1)
(b) **A protein-rich concentrate of plant origin**
E (Soya bean meal) ✓ (1)

2.4.3 Explanation for feeding roughage to 8 week old calves

Roughages stimulate the development of the fore-stomach ✓ which promotes proper digestion of feed high in crude fibre and overall well-being of rumen ✓ (2)

2.4.4 Calculation of the nutritive ratio of the feed

$$NR = 1: \frac{\%TDN - \%DP}{\%DP} \checkmark$$

$$NR = 1: \frac{85\% - 34\%}{34\%} \checkmark$$

NR = 1:1,5/1:2 ✓

OR

$$NR = 1: \frac{\%DNNS}{\%DP} \checkmark$$

$$NR = 1: \frac{51\%}{34\%} \checkmark$$

NR = 1:1,5/1:2 ✓ (3)

2.5 **Pearson square method**

2.5.1 **Name of the method**
Pearson square ✓ (1)

2.5.2 **Identification of the ratio**
Maize meal **:** Peanut oilcake meal
27 **:** 8 ✓ (1)

2.5.3 **Deduction of the amount of digestible protein for the mixture**
17% ✓ (1)

2.6 **Formulation of ration**

2.6.1 **Description of fodder flow programme**
A management strategy by farmers to ensure that livestock have sufficient feed ✓ throughout the year ✓ (2)

2.6.2 **Type of the ration**
Maintenance ration ✓ (1)

2.6.3 **Calculation of the total monthly DM needed**
- Per day:25 cows x 10 kg DM/cow = 250 kg DM ✓
- 250 kg/day x 30 days ✓
- = 7 500 kg DM/month ✓ (3)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 **Production systems and farming systems**

Identification of a farm
(a) FARM D ✓ (1)
(b) FARM B ✓ (1)
(c) FARM A ✓ (1)
(d) FARM C ✓ (1)

3.2 **Animal production**

3.2.1 **Identification of the factors to increase animal production**
(a) **PICTURE A -** Breeding/reproduction ✓ (1)
(b) **PICTURE B -** Nutrition/feeding ✓ (1)

3.2.2 **Description of how nutrition can increase broiler production**
Proper nutrition gives farm animals vigour to grow/develop/strong immunity to fight off infections ✓ leading to more profitable and sustainable agriculture ✓ (2)

3.3 **Effects of incorrect handling of farm animals**

3.3.1 A ✓ (1)

3.3.2 C ✓ (1)

3.3.3 B ✓ (1)

3.4 **TWO basic guidelines to be considered before loading animals**

- Familiarise animals with loading area ✓
- Group animals before loading them so that they establish social groups ✓
- Ensure that the truck/loading zone is suitable for the type of animal ✓
- Keep animals calm in preparation for the trip ✓
- Do not feed animals two hours before they are loaded ✓
- Separate animals according to type, sex and age ✓
- Separate sick/pregnant animals ✓
- Floors should not be slippery ✓
- Disinfect the truck prior to loading animals ✓
- Proper documentation must be available ✓ (Any 2) (2)

3.5 **Housing facility**

3.5.1 **Purpose of a broiler housing facility**

- To create a suitable environment for maximum growth and production ✓
- Protection against predators ✓ (Any 1) (1)

3.5.2 **ONE basic requirement of the housing facility**

- House is oriented lengthwise in a north-south direction and short sides facing east -west ✓
- Proper lighting ✓
- Side walls built in such a way to allow for air movement ✓
- Corrugated iron increases temperature during winter months ✓
- House have the foldable curtains to regulate temperature ✓
- Roof has an A-frame to improve air circulation ✓ (Any 1) (1)

3.5.3 **TWO equipment to reduce heat stress in summer**

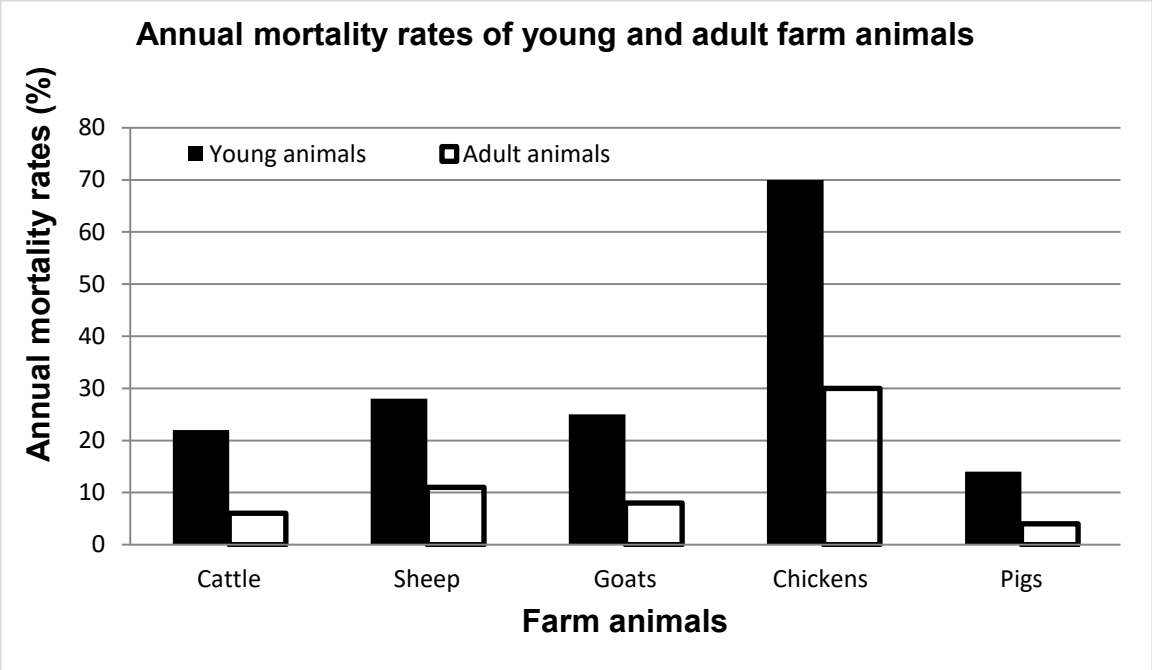
- Air conditioner/evaporative cooling pads ✓
- Foggers/mist sprays ✓
- Fans ✓
- Foldable curtains/ventilators ✓ (Any 2) (2)

3.6 Health and mortality rates in farm animals

3.6.1 ONE general sign of ill-health in pigs

- Loss of appetite ✓
- Isolation from the group ✓
- Listlessness ✓
- Swollen navel, udder or joints ✓
- Rapid, irregular breathing ✓
- Shivering ✓
- Coughing ✓
- Discoloured skin/blisters ✓
- Loss/lack of condition/weight ✓
- Lameness/lethargy ✓
- Diarrhoea/constipation ✓
- Vomiting ✓ (Any 1) (1)

3.6.2 Combined bar graph



Criteria/rubric/marking guidelines

- Correct heading (with both variables) ✓
- X-axis: Correctly calibrated with label (Farm animal) ✓
- Y-axis: Correctly calibrated with label (Annual mortality rates) ✓
- Correct units (%) ✓
- Combined bar graph ✓
- Accuracy (80% + correctly plotted) ✓ (6)

3.7 Transmission and prevention of animal diseases

3.7.1 Mode of transmission

(a) Anthrax - Inhalation/direct contact/ingestion ✓ (1)
(b) Rift Valley Fever - Vectors ✓ (1)

3.7.2 TWO ways to prevent further spread of diseases once detected

- Vaccination ✓
- Isolation/quarantine ✓
- Controlling vectors ✓
- Proper disposal of carcasses and bedding material ✓
- Notifying the relevant authorities ✓
- Disinfection/sanitation ✓ (Any 2) (2)

3.8 Parasites

3.8.1 Collective term of the organisms

Parasites ✓ (1)

3.8.2 Identification of the parasites

(a) Needs a snail to complete its life cycle - PICTURE A ✓ (1)
(b) A vector - PICTURE C ✓ (1)

3.8.3 Differentiation of organisms

- **PICTURE A**: Found inside the body of the host/internally ✓ (1)
- **PICTURE C:** Found outside the body of the host/externally ✓ (1)

3.9 Salt poisoning

3.9.1 ONE measure to treat salt poisoning

- Internal provision of fresh water in small quantities through stomach tube □
- Treat animals with a hypertonic dextrose or isotonic saline solution □
- Immediate removal of the source of salt poisoning □ (Any 1) (1)

3.9.2 ONE role of the state in animal protection

- Public awareness campaigns ✓
- Provision of vaccines ✓
- Provision of veterinary services ✓
- Provision of quarantine services ✓
- Conducts research on animal diseases/pests ✓
- Provides advice, monitoring and control ✓
- Formulates, approves and monitors the implementation of legislation ✓
- Regulates imports/exports ✓ (Any 1) (1)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 Female reproductive system

4.1.1 The process represented by A
Ovulation ✓ (1)

4.1.2 Justify the answer
The egg cell is released from the Graafian follicle/ovary ✓ (1)

4.1.3 Description of the process in B/fertilisation
- Process when a haploid male gamete/sperm cell and a haploid female gamete/ovum fuse ✓ to form a diploid zygote ✓
- Fusion of male and female gametes ✓ to form diploid zygote ✓ (Any 1) (2)

4.1.4 Type of cell division by which the zygote divides multiple times
Mitosis ✓ (1)

4.1.5 ONE function of the uterus
- Provides a suitable environment for development of the foetus ✓
- Helps with the transportation of sperm cells ✓
- Helps with the expulsion of the calf ✓
- Provides uterine milk as nutrition to the developing embryo ✓
- Contains nodules where foetal membranes are attached to ✓
- Sperm capacitation ✓ (Any 1) (1)

4.2 Re-arrangement of the mating stages in sequential order

B ✓ (1)

C ✓ (1)

A ✓ (1)

4.3 Hormone concentration during the reproductive cycle in cows

4.3.1 Identification of the progesterone concentration on day 12
30 mg/ml ✓ (1)

4.3.2 Hormones responsible
(a) Oestrogen/progesterone ✓ (1)
(b) Luteinising hormone/LH ✓ (1)

4.3.3 Description of the change in the progesterone concentration
Progesterone concentration increase/will become higher ✓ (1)

4.3.4 **Identification of the oestrus cycle stage**
Di-oestrus ✓ (1)

4.3.5 **The impact of progesterone during di-oestrus**
- Progesterone suppresses the secretion of follicle stimulating hormone (FSH) ✓ to prevent the development of follicles/onset of oestrus ✓
- Maintains the endometrium ✓ in preparation for implantation ✓

(Any 1) (2)

4.4 **Morphological abnormalities in sperm cells**

4.4.1 **The morphological abnormalities in sperm cells**
B/C ✓ (1)

4.4.2 **Identification of the number of the part responsible for**
(a) Mobility - 3 ✓ (1)
(b) Carrier of the genetic information - 1 □ (1)

4.4.3 **Structure releasing the enzyme responsible for sperm penetration**
Acrosome □ (1)

4.4.4 **The process whereby sperm cells are formed**
Spermatogenesis □ (1)

4.5 **Reproductive techniques in farm animals**

4.5.1 **Identification of the reproductive technique**
Embryo transfer/transplant/ET ✓ (1)

4.5.2 **Importance of the recipient cow**
Implantation of the embryos/acts as a surrogate ✓ (1)

4.5.3 **Definition of cloning**
Process of generating genetically identical copy of cell/organism ✓✓ (2)

4.5.4 **Identification of the sheep**
Nucleus donor sheep ✓ (1)

4.5.5 **Justification of the answer**
Genetical material is from somatic cells of the nucleus donor sheep ✓ (1)

4.6 **Pregnancy**

4.6.1 **Deduction the cow's stage of pregnancy**
Foetal stage ✓ (1)

4.6.2 **Description of embryonic stage of pregnancy**
It is the stage after the ovum stage ✓ during which organs, tissues and systems develop ✓ (2)

4.6.3 **TWO calf-related possible causes of birth difficulty**

- Abnormal large size foetus/hydropsy ✓
- Multiple births/twins ✓
- Incorrect/posterior presentation of the foetus/deviation of the head/flexion of the elbow ✓
- Hydrocephalus ✓ (Any 2) (2)

4.7 **Lactation**

4.7.1 **The period of lactation during which milk production declines**
After week 8 to week 9 ✓ (1)

4.7.2 **Explanation of the relationship**
Milk production declines while butterfat content increases/ vice versa ✓✓ (2)
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TOTAL SECTION B: 105
GRAND TOTAL: 150

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