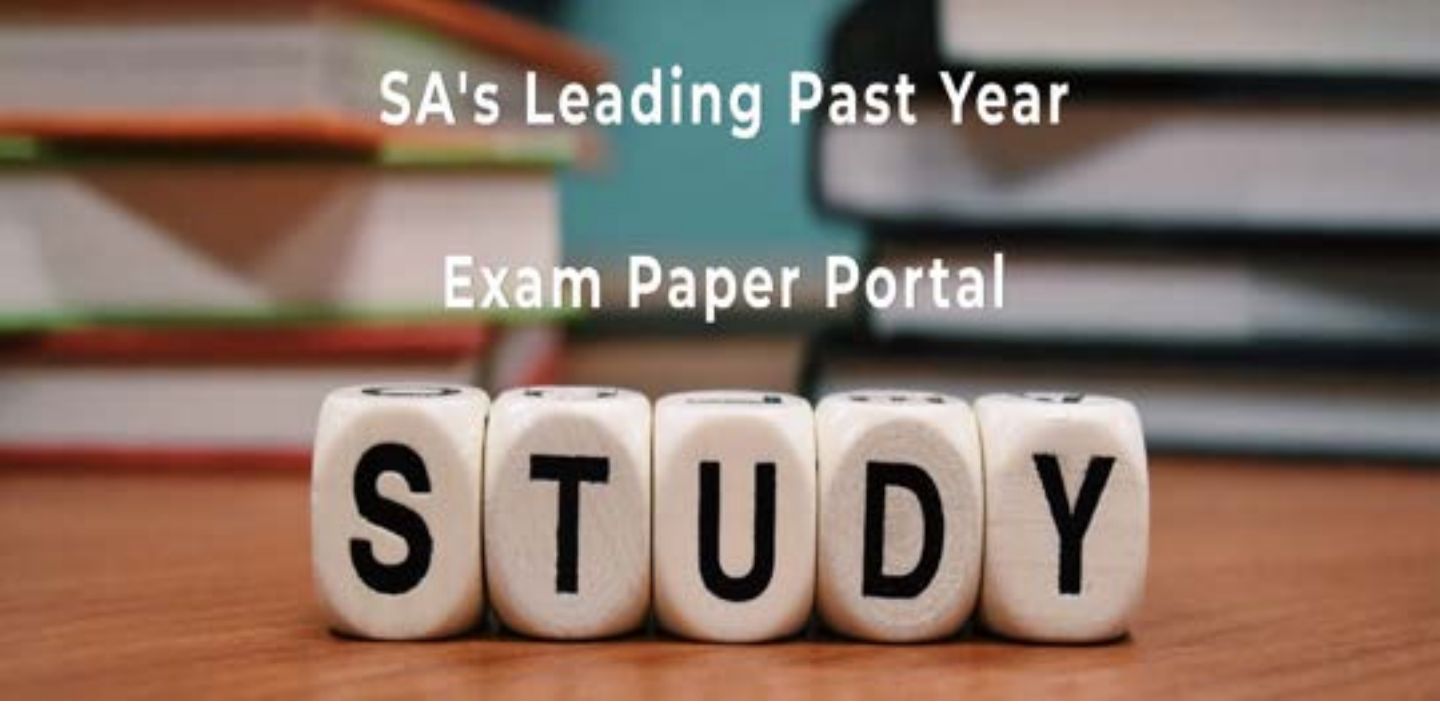

Province of the
EASTERN CAPE
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 12

JUNE 2021

AGRICULTURAL SCIENCES MARKING GUIDELINE (EXEMPLAR)

MARKS: 150

This marking guideline consists of 11 pages.

SECTION A

QUESTION 1

1.1	1.1.1	D ✓✓		
	1.1.2	A ✓✓		
	1.1.3	B ✓✓		
	1.1.4	A ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	D ✓✓		
	1.1.9	C ✓✓		
	1.1.10	A ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	Both A and B ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	B only ✓✓		
	1.2.5	None ✓✓	(5 x 2)	(10)
1.3	1.3.1	Anaemia ✓✓		
	1.3.2	Antibodies ✓✓		
	1.3.3	Ectoparasites/External parasites ✓✓		
	1.3.4	Impotence ✓✓		
	1.3.5	Therapeutic ✓✓		
			(5 x 2)	(10)
1.4	1.4.1	Pearson ✓		
	1.4.2	Creep ✓		
	1.4.3	Sterility ✓		
	1.4.4	Dystocia ✓		
	1.4.5	Foley catheter ✓	(5 x 1)	(5)
			TOTAL SECTION A:	**45**

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 **The representation of the alimentary canal of a farm animal**

2.1.1 **Identification of letters B, C and G**
- **B**: Reticulum ✓
- **C**: Omasum ✓
- **G**: Ventriculus / Gizzard ✓ (3)

2.1.2 **Classification of alimentary canals**
- Non-ruminant ✓ (1)

2.1.3 **Justification**
- Simple stomach / Single stomach ✓
- Presence of pro-ventriculus ✓
- Presence of ventriculus / gizzard ✓
- Presence of crop ✓
- Presence of caeca / 2 caecum ✓ (Any 1) (1)

2.1.4 **Identification of a letter**
- F ✓ (1)

2.1.5 **Identification of the letter that represents the part**
(a) H ✓ (1)

(b) D / B ✓ (1)

2.2 **The vitamins and deficiency diseases**

2.2.1 Vitamin D ✓ (1)

2.2.2 Vitamin B_2/Riboflavin ✓ (1)

2.3 **Identification of the feed**

2.3.1 Fishmeal / Feed **D** ✓ (1)

2.3.2 Lick / Feed **C** ✓ (1)

2.3.3 Maize / Feed **B** ✓ (1)

2.3.4 Hay / Feed **A** ✓ (1)

2.4 **Compounding a ration for farm animals**

2.4.1 **Identification of a suitable example**
(a) **Concentrate:** Sunflower oilcake meal / Maize ✓ (1)
(b) **Roughage:** Silage ✓ (1)

2.4.2 **Calculation of digestibility co-efficient of silage**

Dry matter of silage = 80% of 25 kg = 20 kg ✓

OR

Dry matter of silage = 20% moisture of 25 kg = 5 kg, then
25 kg – 5 kg = 20 kg ✓

$$DC = \frac{\text{Dry material intake (kg)} - \text{Dry mass of manure (kg)}}{\text{Dry material intake (kg)}} \times \frac{100}{1} \checkmark$$

$$= \frac{20\text{ kg} - 8\text{ kg}}{20\text{ kg}} \times \frac{100}{1} \checkmark$$

OR

$$= \frac{12\text{ kg}}{20} \times \frac{100}{1} \checkmark$$

= 60% ✓ (5)

2.4.3 **Calculation of the nutritive ratio (NR) of sunflower oilcake meal**

- $NR = 1 : \frac{TDN - DP}{DP}$ ✓

  $NR = 1 : \frac{85 - 17}{17}$ ✓

  NR = 1 : 4 ✓

OR

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

  $= 1 : \frac{68}{17}$ ✓

  = 1 : 4 ✓ (3)

2.4.4 **Categorising the NR value:**

- **Sunflower oilcake meal:** Narrow ✓
- **Maize meal:** Wide ✓ (2)

2.4.5 **Justification for the suitability of sunflower oilcake meal for fattening of matured animals**

- Sunflower oilcake meal is NOT suitable for fattening ✓
- **Reason:** Very high in protein / Narrow nutritive ratio ✓ (2)

2.5 **Fodder-flow programme**

2.5.1 **Identification of the month during which the farmer only used natural pasture to feed farm animals**

- January ✓
- December ✓ (Any 1) (1)

2.5.2 **Justification for the answer in QUESTION 2.5.1.**

- No supplementation during both months ✓ (1)

2.5.3 **Calculations**

(a) Determination of the amount of natural pasture needed in December

45 sheep x 2,5 kg per day x 31 days ✓ = 3 487,5 kg ✓ (2)

(b) Indication of shortage or surplus

4,3 tons x 1 000 = 4 300 kg ✓
4 300 kg (feed available) – 3 487,5 kg (feed required) ✓
= 812,5 kg ✓ (3)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Animal production systems

3.1.1 Identification production systems A and B

- **PICTURE A:** Extensive production system ✓
- **PICTURE B:** Intensive production system ✓ (2)

3.1.2 Justification for QUESTION 3.1.1

- **Sustainable use of natural resources:**

  In the **extensive system** good sustainable use of resources / less use of energy / less waste production / less pollution ✓ (Any 1) (1)

  In the **intensive system** poor sustainable use of resources / high use of energy / more production of animal waste / more pollution ✓ (Any 1) (1)

- **Capital investment:**

  In the **extensive system** less capital investment / less production inputs ✓ (Any 1) (1)

  In the i**ntensive system** more capital investment / more production inputs ✓ (Any 1) (1)

3.1.3 Indication of the farming system associated with each of the animal production systems identified in QUESTION 3.1.1

- **A/Extensive production system:** Subsistence farming system ✓
- **B/Intensive production system:** Commercial farming system ✓ (2)

3.2 Pictures showing housing facilities for farm animals

3.2.1 Identification of facilities 1 and 2

- **Facility 1:** Broiler house ✓
- **Facility 2:** Farrowing crate/ Farrowing pen ✓ (2)

3.2.2 Indication of the main purpose for part A and B

- **Part A of FACILITY 1**: Insulation / Ventilation ✓ (Any 1) (1)

- **Part B of FACILITY 2**: Separate the sow from its litter / prevents the sow from laying over its litter ✓ (Any 1) (1)

3.2.3 **ONE equipment found in FACILITY 1**

- Foot baths ✓
- Feeders ✓
- Water trays ✓
- Weighing scale ✓
- Lighting facilities ✓
- Thermometer ✓
- Fans / air conditioners ✓
- Heaters / infrared lights ✓ (Any 1) (1)

3.2.4 **Indication of TWO ways in which animals lose body heat**

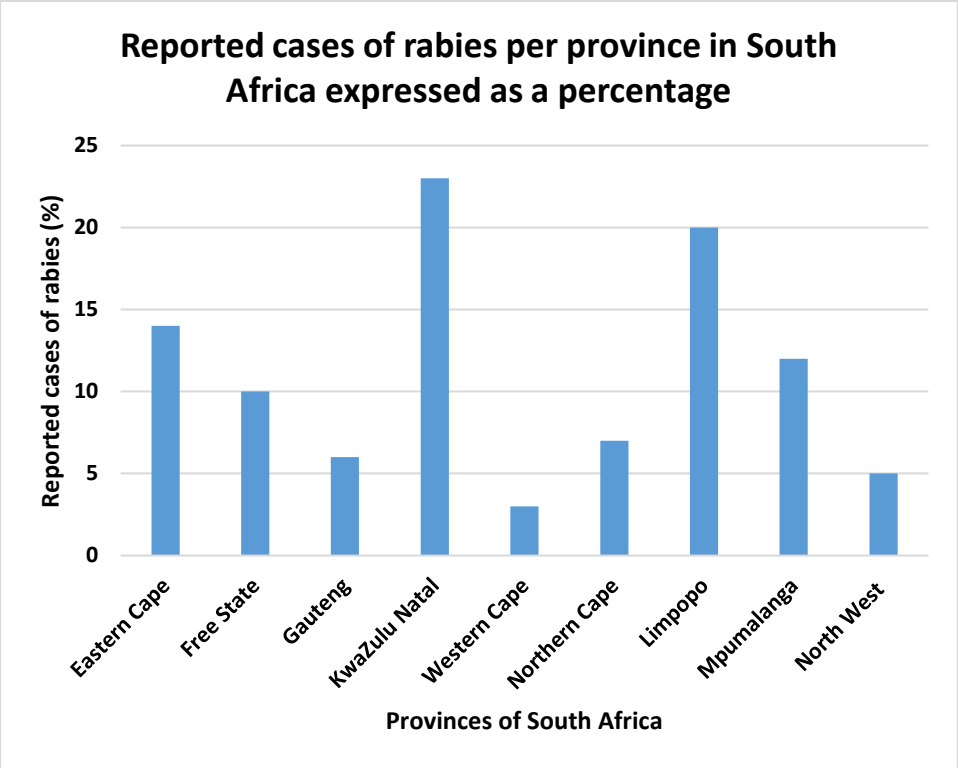
- Heat radiation ✓
- Sweating ✓
- Evaporation ✓
- Conduction ✓
- Convection ✓ (Any 2) (2)

3.3 3.3.1 **Provision of labels for letters A–F**

- **A:** African Swine Fever ✓
- **B:** Bacteria ✓
- **C:** Quarantine infected animals/Burn and bury carcasses / Dispose manure and bedding of infected areas/vaccination ✓
- **D:** Protozoan ✓
- **E:** Ringworm ✓
- **F:** Fungi ✓ (6)

3.4 **Graph on reported cases of rabies outbreak in South Africa**

3.4.1 **Graph**



Criteria for marking

- Type of graph (bar) ✓
- Correct heading ✓
- Correct units (%)✓
- Correct labelling and calibration on y-axis (Reported cases of rabies) ✓
- Correct labelling and calibration on x-axis (Provinces of South Africa) ✓ (5)

3.4.2 **The trend for rabies reported cases from the table**

- Reported cases of rabies were high in 2017 ✓ and dropped in 2018 ✓ (2)

3.4.3 **Indication of possible reason for the trend**

- Public awareness ✓
- Vaccination programme ✓ (Any 1) (1)

3.5 **Parasites**

3.5.1 **Example of categories of ticks**

(a) **Single-host ticks**: Blue tick ✓

(b) **Three-host ticks**: Bont tick ✓ (2)

3.5.2 **TWO application methods used to control ectoparasites chemically**

- Plunge dip ✓
- Spray races ✓
- Pour-ons ✓
- Injectable drugs ✓
- Hand spraying ✓ (Any 2) (2)

3.6 **TWO services rendered by the state to protect animals from infection by diseases**

- Quarantine services ✓
- Enforce legislation ✓
- Movement permits ✓
- Import bans ✓
- Government animal health schemes √
- Veterinary services ✓
- Importation of vaccines ✓
- Research ✓
- Public awareness ✓ (Any 2) (2)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 **The reproductive system of a bull**

4.1.1 **Identification of parts**

- **B**: Seminal vesicles ✓
- **C**: Urethra ✓
- **E**: Glans penis ✓ (3)

4.1.2 **Indication of the process taking place in part F**

- Spermatogenesis ✓ (1)

4.1.3 **TWO functions of the hormone secreted in part F**

- Development of secondary sexual characteristics ✓
- Stimulates normal mating behaviour ✓
- Necessary for the functioning of accessory glands ✓
- Assists in the production of spermatozoa ✓
- Maintenance of the male reproductive system ✓ (Any 2) (2)

4.1.4 **Matching functions with the letter**

(a) G ✓
(b) A / I ✓
(c) B ✓ (3)

4.1.5 **Explanation for the importance of part H in the control of temperature for effective functioning of F and G**

- During cold weather scrotum muscles draw the testes closer to the body to heat up ✓
- During hot weather scrotum muscles move the testis downwards away from the body to cool off ✓ (2)

4.2 **Reproductive process in farm animals**

4.2.1 **Identification of the reproductive process illustrated in the diagram**

- Oogenesis / Ovigenesis ✓ (1)

4.2.2 **Indication of the name of an organ where the reproductive process identified in QUESTION 4.2.1 occurs**

- Ovaries ✓ (1)

4.2.3 **Division process taking place at A and B in the diagram above**

A: Mitosis ✓ (1)
B: Meiosis ✓ (1)

4.3 **Oestrus process**

4.3.1 **Oestrus**

- It is a period when non pregnant female animals are receptive ✓
- to male animals/allow mating ✓ (2)

4.3.2 **TWO visible signs of oestrus**

- Vulva is swollen / reddish ✓
- Mucous discharge ✓
- Cow is restless ✓
- Mounting other cows ✓
- Cow sniffs genitalia of other cows ✓
- Isolation ✓
- Decrease in food intake/loss of appetite ✓
- Legs and flanks are muddy ✓
- Allows mating ✓
- Hair on the tail head and rump is fluffed up ✓ (Any 2) (2)

4.3.3 **TWO practical methods to identify cows on heat**

- Observation of animal behaviour ✓
- Place a bull in pen near the cows ✓
- Bulls marked with a chin ball marker ✓
- Use of pedometer ✓
- Tail paint on tail head/tail paint markers / tail-chalking ✓
- Heat mount detectors ✓ (Any 2) (2)

4.4 **Re-arranging the stages of nuclear transfer process presented in the list to its chronological order**

- Enucleation of an unfertilised egg ✓
- Nucleus containing DNA from donor is transferred into cytoplasm of the enucleated egg ✓
- Egg is treated and cultured in the laboratory for fusion to take place ✓
- Manipulated cell is artificially activated to start dividing until it is a blastocyst ✓
- Transferred into the uterus of recipient cows to grow until adulthood ✓ (5)

4.5 **Name of an organ where each of the following female hormones are produced**

4.5.1 **Oestrogen**: Graafian follicle / ovary ✓ (1)
4.5.2 **Gonadotrophic releasing hormone (GnRH):** Hypothalamus ✓ (1)
4.5.3 **Progesterone:** Corpus luteum / ovary ✓ (1)
4.5.4 **Follicle-stimulating hormone (FSH):** Anterior pituitary gland ✓ (1)
4.5.5 **Oxytocin:** Hypophysis ✓ (1)

4.6 **Multiple births**

4.6.1 **Identification of the type of multiple births represented by DIAGRAM A and B**

A: Monozygotic / Identical twins ✓

B: Dizygotic / Fraternal twins ✓ (2)

4.6.2 **Justification for the answer to QUESTION 4.6.1**

- **A**: Developed from one single ovum fertilised by one sperm cell ✓
- **B**: Developed from two different ova fertilised by different sperm cells ✓ (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150