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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 B₂/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

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

$$= 60\% \checkmark$$

(5)

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

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

$$NR = 1 : \frac{85 - 17}{17} \checkmark$$

$$NR = 1 : 4 \checkmark$$

OR

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

$$= 1 : \frac{68}{17} \checkmark$$

$$= 1 : 4 \checkmark$$

(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**

$$45 \text{ sheep} \times 2,5 \text{ kg per day} \times 31 \text{ days} \checkmark = 3\,487,5 \text{ kg} \checkmark \quad (2)$$

(b) Indication of shortage or surplus

$$4,3 \text{ tons} \times 1\,000 = 4\,300 \text{ kg} \checkmark$$

$$4\,300 \text{ kg (feed available)} - 3\,487,5 \text{ kg (feed required)} \checkmark$$

$$= 812,5 \text{ kg} \checkmark$$

(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 **intensive 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

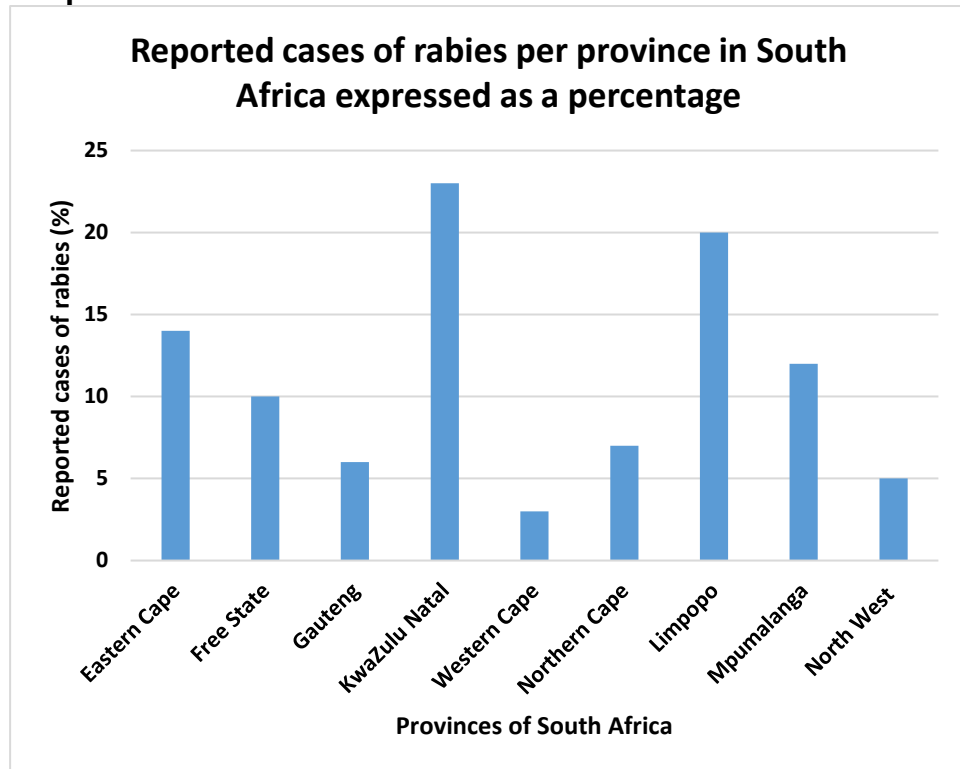
- Heat radiation ✓
 - Sweating ✓
 - Evaporation ✓
 - Conduction ✓
 - Convection ✓
- (Any 2) (2)

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)
- [35]**

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 / Ovogenesis ✓
- (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