



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

JUNE 2019

**AGRICULTURAL SCIENCES
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 10 pages.

SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|------------------------------|----------|------|
| 1.1 | 1.1.1 | B ✓✓ | | |
| | 1.1.2 | C ✓✓ | | |
| | 1.1.3 | D ✓✓ | | |
| | 1.1.4 | A ✓✓ | | |
| | 1.1.5 | D ✓✓ | | |
| | 1.1.6 | C ✓✓ | | |
| | 1.1.7 | A ✓✓ | | |
| | 1.1.8 | D ✓✓ | | |
| | 1.1.9 | A ✓✓ | | |
| | 1.1.10 | B ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | None ✓✓ | | |
| | 1.2.2 | Both A and B ✓✓ | | |
| | 1.2.3 | None ✓✓ | | |
| | 1.2.4 | A only ✓✓ | | |
| | 1.2.5 | B only ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Bloating/Bloat ✓✓ | | |
| | 1.3.2 | Osteomalacia ✓✓ | | |
| | 1.3.3 | Diagnosis ✓✓ | | |
| | 1.3.4 | Superovulation ✓✓ | | |
| | 1.3.5 | Hermaphroditism ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Proteolytic ✓ | | |
| | 1.4.2 | Endemic ✓ | | |
| | 1.4.3 | Mitochondria/Mitochondrion ✓ | | |
| | 1.4.4 | Lactation ✓ | | |
| | 1.4.5 | Sterility ✓ | (5 x 1) | (5) |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 A representation of the alimentary canal of a farm animal****2.1.1 Identification of A and C**

- **A:** Oesophageal groove ✓ (1)
- **C:** Omasum ✓ (1)

2.1.2 Explanation of the main function of part A in DIAGRAM 1

- It directs the milk to the abomasum ✓ (1)

2.1.3 Identification of the true stomach

- **D** ✓ (1)

2.1.4 Justification for not feeding urea or biuret to young ruminants

- Its fore-stomachs (rumen, reticulum and omasum) are still underdeveloped ✓ with very few or no micro-organism to assist in digesting ✓ urea and biuret. (2)

2.2 The part of the alimentary canals of farm animals**2.2.1 Identification of A**

- A:** Villi / Villus ✓ (1)

2.2.2 TWO reasons visible to support adaptation of villi for absorption

- There are many folds that increase surface area for absorption ✓
- The folds are covered with thousands of villi which increases surface area for absorption ✓
- Each villus is covered with micro-villi which further increases surface area ✓
- Presence of blood vessels ✓
- Presence of lymphatic vessels ✓ (Any 1 x 2) (2)

2.3 The name of the diseases caused by a deficiency of vitamin/mineral in lambs

- 2.3.1** Swayback / Anaemia ✓ (1)

- 2.3.2** Muscular dystrophy / White muscle / Stiff lamb disease ✓ (1)

2.4 Energy flow diagram

2.4.1 Energy type represented by A and B

- **A:** Digestible energy / DE ✓
- **B:** Metabolised energy / ME / Metabolisable ✓ (2)

2.4.2 (a) The amount of energy left for production and maintenance in joules

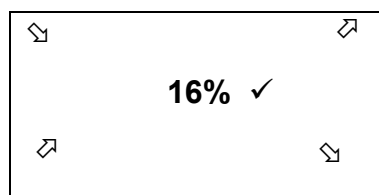
- Net energy is 40% (Net) of 1 250 j (Gross Energy)
 - Net energy = $\frac{40}{100} \times 1\,250\text{ j}$ ✓
- $$= 500\text{ j} \quad \checkmark \quad (2)$$

(b) Total energy losses in kilojoules

$$\begin{aligned} \text{Total energy losses} &= (30\%) + (5\%) + (5\%) + (20\%) = 60\% \text{ of } 1\,250\text{ j} = 750\text{ j} \checkmark \\ &= \frac{750\text{ j}}{1\,000} \checkmark = 0,75\text{ Kj} \checkmark \end{aligned} \quad (3)$$

2.5 The Pearson square

2.5.1 (Maize meal): **8%** **23** ✓ (parts) (39 – 16 = 23)



(Soya bean meal): **39%** **8** ✓ (parts) (16 – 8 = 8)

The ratio of maize meal to soya bean meal is **23 : 8** ✓ (4)

2.5.2 Formulation of 1 500 kg swine ration:

- The ratio into which feeds should be mixed is 23 : 8 (maize meal to soya bean meal) = 23 + 8 = 31 ✓

Quantity of maize meal in mixture	Quantity of soya bean meal in mixture
Maize meal = $\frac{23}{31} \times 1\,500\text{ kg}$ ✓ = 1 112,9 / 1 113 kg ✓	Soya bean meal = $\frac{8}{31} \times 1\,500\text{ kg}$ ✓ = 387,1 / 387 kg ✓

(5)

2.5.3 Reason for a high protein requirement in piglets

- Growth and production ✓
 - Provision of antibodies for immunity against diseases ✓
 - Repairing of body tissues ✓
- (Any 2 x 1) (2)

2.6 Fodder-flow:

2.6.1 The number of months during which there will be less feed available than required by the animals

- 5 months ✓ (1)

2.6.2 Calculation of the surplus amount of feed during the month of October in kilograms (kg)

- 55 tons – 20 tons = 35 tons ✓
- 35 tons x 1000 ✓ = 35 000 kg ✓ (3)

2.6.3 TWO strategies a farmer can apply to make sure that the required feed balances feed available

- Culling ✓
 - Controlled calving ✓
 - Producing more food at particular times ✓
 - Storage ✓
- (Any 2 x 1) (2)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Animal production systems****3.1.1 Identification production systems**

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

3.1.2 Justification for QUESTION 3.1.1**FARM A: Intensive production system**

- Many animals in small area (high density) ✓
- High capital investment ✓
- Labour intensive ✓
- Use of sophisticated technology ✓ (Any 1) (1)

FARM B: Extensive production system

- Few animals occupied a large area (low density) ✓
- Low capital investment ✓
- Very few labour employed ✓
- Minimal or no technology use ✓ (Any 1) (1)

3.1.3 Examples of an intensive production system

Piggery / Broilers / Layers / Sheep / Boer goats ✓ (Any 1) (1)

3.1.4 Differentiation between: Subsistence farming:

Farming in small quantities to meet the needs of their families and sell the surplus ✓

Commercial farming:

Farming in large quantities in order to make profit ✓ (2)

3.2 Scenario on animal body temperature**3.2.1 Indication of the situation at points A and B****Point A:**

- Cold stress / extremely cold / very cold ✓ (1)

Point B:

- Heat stress / extremely hot / very hot ✓ (1)

3.2.2 Description of how the situation affects feeding and milk production in dairy cows**Point A:**

- They eat more to keep themselves warm ✓ resulting in low milk production ✓

Point B:

- Animals eat less feed ✓ and milk production decreases ✓ (4)

3.2.3 Recommended measures:**Point A:**

- Provision of shelter / heaters / air conditioners ✓ (Any 1)

Point B:

- Provision of shelter / air conditioners / misting
- Provision of enough water ✓ (Any 1) (2)

3.3 Completion of the table

- **A:** Elastrator with elastic rings / knife / blade ✓
- **B:** Ear tag pliers / Ear tag applicator ✓
- **C:** Elastrator with elastic rings ✓ (3)

3.4 Scenario**3.4.1 Micro-organism responsible for the disease**

Bacteria ✓ (1)

3.4.2 Statement stating that Bovine TB is a zoonotic diseases

It can be transmitted from animals to humans as well as to other animals ✓ (1)

3.4.3 TWO examples of zoonotic diseases

- Anthrax ✓
- Rabies ✓
- Ringworm ✓ (Any 2) (2)

3.4.4 TWO symptoms of animals with TB

- Respiratory tract problems / increased rate of breathing ✓
- Pneumonia symptoms ✓
- Chronic cough ✓
- Fever ✓ (Any 2) (2)

3.4.5 TWO methods to prevent and control the spread of TB

- Disinfecting of premises ✓
- Vaccination ✓
- Quarantine ✓
- Eradication programme ✓ (Any 2) (2)

3.4.6 **Table:**

Reported cases of improvement in TB infections presented as a percentage for six years

Years	Infection improvement (%)
2009	5
2010	15
2011	25
2012	35
2013	45
2014	50

Criteria for marking

- Correct heading/title ✓
- Populated table ✓
- Labelling: Years and Infections improvement ✓
- Data correctly captured in both columns of the table ✓
- Correct units: Percentage (%) ✓

(5)

3.5 **TWO preventative /control measures of internal parasites**

- Good management / rotational grazing / avoid wet areas ✓
- Good nutrition ✓
- Use of feeders ✓
- Provision of clean water ✓
- Prevent overstocking ✓
- Separate young and adult animals ✓
- Strict hygiene / Strict sanitary measures / removal of dung ✓
- Breeding resistant animals ✓
- Deworming ✓

(Any 2) (2)

3.6 **TWO roles of state in animal protection**

- Quarantine services ✓
- Enforce legislation ✓
- Movement permits ✓
- Import bans ✓
- Veterinary services ✓
- Importation of vaccines ✓
- Research ✓

(Any 2) (2)

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QUESTION 4: ANIMAL REPRODUCTION**4.1 The reproductive system of a cow****4.1.1 Identification of parts**

- **G:** Infundibulum ✓
- **F:** Oviduct / Fallopian tubes ✓
- **B:** Vulva ✓

(3)

4.1.2 Matching functions with the letter

- (a) E ✓
- (b) C / B ✓
- (c) D ✓

(3)

4.1.3 Name and letter of the part

Clitoris: ✓ A ✓

(2)

4.2 Sperm morphology**4.2.1 Identification**

- E ✓

(1)

4.2.2 Naming of the process

- Spermatogenesis ✓

(1)

4.2.3 Explanation of how sperm cells A and G can cause infertility in a bull**A:** The sperm cannot move to the point of fertilisation ✓

(1)

G: The sperm cannot fertilise the egg cell ✓

(1)

4.2.4 TWO characteristics of good quality semen

- It must be viable ✓
- Thick whitish to yellow fluid ✓
- It must have normal morphology ✓
- Should have no odour ✓
- Must have good sperm concentration ✓
- Correct pH ✓
- High motility rate ✓

(Any 2)

(2)

4.3 Oestrus cycle graph**4.3.1 Name of the hormone labelled C**

Progesterone ✓

(1)

4.3.2 Indication of the stage of oestrus

- Di-oestrus ✓

Reason

- It is the longest / it lasts longer ✓
- High levels of progesterone ✓

(Any 2)

(2)

4.3.3 Process represented by A

- Ovulation ✓

(1)

4.3.4 TWO visible signs of a cow on oestrus

- Vulva is swollen with reddish mucus membranes ✓
- Mucus strings visible from the vulva ✓
- Jumps on other cows / allows other cows to jump on her ✓
- Scratch marks and dirt on the side and back ✓
- Allows mating with the bull ✓

(Any 2) (2)

4.4 Re-arranged stages of mating

- Erection of the penis ✓
- Mounting ✓
- Gaining intromission into the vagina ✓
- Ejaculation of semen into vagina ✓

(4)

4.5 Table of different processes

- (a) 2 ✓
- (b) 3 ✓
- (c) 1 ✓

(3)

4.6 Stages of parturition

4.6.1 Stages of parturition

- A: Preparatory stage ✓
- D: Ejection stage ✓

(2)

4.6.2 TWO visible signs of parturition

- Restlessness / walking around ✓
- Urinates and defecates often ✓
- Cow isolates itself ✓
- Vulva enlarges ✓
- String of mucus hangs from the vulva ✓
- Teats tight and swollen / milk drops ✓

(Any 2) (2)

4.7 Milk production graph

4.7.1 Name of the graph

- Lactation curve / Milk production curve ✓

(1)

4.7.2 Identification of the range of days

- 30 to 60 days ✓

(1)

4.7.3 TWO factors influencing the production of milk during the peak period

- Age of cow ✓
- Pregnancy inhibits milk production ✓
- Increased levels of oestrogen ✓
- Climatic conditions ✓
- Proper nutrition ✓
- Number of times the cow is milked ✓

(Any 2) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

