



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

JUNE 2018

**AGRICULTURAL SCIENCES
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 12 pages.

SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|---|----------|------|
| 1.1 | 1.1.1 | C ✓✓ | | |
| | 1.1.2 | D ✓✓ | | |
| | 1.1.3 | A ✓✓ | | |
| | 1.1.4 | B ✓✓ | | |
| | 1.1.5 | A ✓✓ | | |
| | 1.1.6 | D ✓✓ | | |
| | 1.1.7 | B ✓✓ | | |
| | 1.1.8 | A ✓✓ | | |
| | 1.1.9 | B ✓✓ | | |
| | 1.1.10 | C ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | Both A and B ✓✓ | | |
| | 1.2.2 | B only ✓✓ | | |
| | 1.2.3 | None ✓✓ | | |
| | 1.2.4 | A only ✓✓ | | |
| | 1.2.5 | B only ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Coefficient of digestibility/Digestibility coefficient ✓✓ | | |
| | 1.3.2 | Bont tick ✓✓ | | |
| | 1.3.3 | Ejaculation ✓✓ | | |
| | 1.3.4 | Hydrocephalus ✓✓ | | |
| | 1.3.5 | Lactation/Milk Production ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Amylolytic ✓ | | |
| | 1.4.2 | Balancing point ✓ | | |
| | 1.4.3 | Hyaluronidase ✓ | | |
| | 1.4.4 | Weaning ✓ | | |
| | 1.4.5 | Colostrum/Beestings ✓ | (5 x 1) | (5) |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION**

- 2.1 2.1.1 **D: Cloaca ✓**
J: Omasum ✓ (2 x 1) (2)
- 2.1.2 **Indication of letters**
- (a) H ✓ (1)
- (b) A ✓ (1)
- (c) E ✓ (1)
- 2.1.3 **How part L is protected against stomach acids**
- Pancreas releases sodium bicarbonate, ✓ which neutralises the stomach acid ✓
 - Gall bladder secretes bile ✓ which neutralises the pH of the gastric juices ✓
 - Bruner's glands produce alkaline secretion, ✓ rich in mucus which protects the duodenum from acidic chime. ✓
 - The duodenum also regulates the rate of emptying of the stomach ✓ via hormonal pathways. ✓ (Any 1 x 2) (2)
- 2.1.4 **Adaptability of small intestines for absorption**
- It is very long so it makes the surface area for absorption bigger ✓
 - The inside has many folds that increase surface area for absorption ✓
 - The folds are covered with thousands of villi which increase surface area for absorption ✓
 - Each villus is covered with micro-villi which further increase surface area ✓
 - Each villus has blood and lymph capillaries for transport and the absorption of nutrients ✓
 - Thin layer of epithelial cells lining the villi is adapted for absorption ✓
 - Epithelial cells contain various carrier molecules to absorb specific chemicals and nutrients ✓ (Any 2 x 1) (2)
- 2.1.5 **Salivary glands found below or behind the ear**
Parotid salivary gland ✓ (1)
- 2.2 **Deficiency diseases**
- 2.2.1 Anaemia/Heart disease/Epileptic seizures/Dermatitis ✓ (1)
- 2.2.2 Parakeratosis/Keratinisation ✓ (1)

2.3 Digestibility Co-efficient of feeds

2.3.1 Calculations of digestibility coefficient

$$\text{DM manure} = 4 \text{ kg} \times \frac{40}{100} = 1,6 \text{ kg} \text{ therefore, } 4 \text{ kg} - 1,6 \text{ kg} = 2,4 \text{ kg} \checkmark$$

$$\text{DC} = \frac{\text{DM intake (kg)} - \text{DM manure (kg)}}{\text{DM intake (kg)}} \times 100 \checkmark$$

$$= \frac{15 \text{ kg} - 2,4 \text{ kg}}{15 \text{ kg}} \times 100 \checkmark$$

$$= 84\% \checkmark \quad (4)$$

2.3.2 ONE factor influencing digestibility of hay

- Crop from which hay was produced ✓
- Age of the plant/Growth stage ✓
- Method used to make hay ✓
- Preparation of feed ✓
- Supplementation/Feed additive ✓
- Composition of feeds/Composition of ration ✓
- Quantity of feed taken in ✓
- Palatability of the ration ✓
- Water quantity in the feed ✓
- Nutritive ratio ✓

(1)

2.3.3 Improving digestibility of grain feeds

- Grinding/Crushing/Milling ✓
- Pelleting ✓
- Boiling/Cooking ✓
- Roasting ✓/Crushing ✓
- Soaking ✓
- Dry rolling/Cracking ✓
- Popping/Micronising ✓
- Supplementation ✓

(Any 1 x 1) (1)

2.4 Energy flow diagram

A – Energy loss through manure/faeces ✓

B – Metabolic Energy/ME ✓

C – Maintenance ✓

(3 x 1) (3)

2.5 Feed components required by animals

2.5.1 Age of animal mostly fed maintenance ration

5 years / 4 years ✓

(1)

2.5.2 Reason

The graph shows that older non-producing animals are fed more carbohydrates for maintenance ✓ / Fed less protein. ✓ (Any 1 x 1)

(1)

2.5.3 Reason for a high protein requirement in young animals

- Growth and production ✓
- Repairing of body tissues ✓
- Provision of antibodies for immunity against diseases ✓
- Functioning of rumen microbes ✓

(Any 1 x 1)

(1)

2.6 The Pearson square or box method of balancing rations

2.6.1 Indication of part representing protein-rich concentrate

- 7 parts ✓

(1)

2.6.2 • Has smaller portion in the ratio/7 parts of feed B to get the required 16% DP ✓

(1)

2.6.3 Percentage of Feed A

$$= \frac{22}{29} \times 100 \quad \checkmark$$

$$= 75,9\% \quad \text{OR} \quad 76\% \quad \checkmark$$

(2)

2.6.4 Feed B amount in the mixture

$$= \frac{7}{29} \times 850 \text{ kg} \quad \checkmark$$

$$= \frac{205,2}{1\,000} \quad \checkmark$$

$$= 0,21 \text{ tons} \quad \checkmark$$

OR

$$= 24,1\% \text{ of } 850 \text{ kg} = 850 \text{ kg} \times \frac{24,1}{100} \quad \checkmark$$

$$= \frac{204,9 \text{ kg}}{1\,000} \quad \checkmark$$

$$= 0,21 \text{ tons} \quad \checkmark$$

(3)

2.7 Fodder-flow planning**2.7.1 The month during which the available feed will be most insufficient for the animals**

- September ✓ (1)

2.7.2 Calculation for surplus feed for February

$$\begin{aligned}\text{Surplus feed} &= \text{Feed available} - \text{Feed required} \\ &= 160 \text{ tons} - 140 \text{ tons} \quad \checkmark \\ &= 20 \text{ tons} \times 1\,000 \quad \checkmark \\ &= 20\,000 \text{ kg} \quad \checkmark\end{aligned}$$

(3)
[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Animal body temperature****3.1.1 Deduction of environmental condition**

- Higher temperatures/Very hot/Hot/Warm/Heat stress ✓ (Any 1 x 1) (1)

3.1.2 TWO reasons for the deduction

- Less feed intake than normal. ✓ More than twice the normal water intake / increased water intake ✓ (2)

3.1.3 TWO measures to reduce heat stress of dairy cows under intensive conditions

- Sprayers/Fogger with water/Soakers/Misters ✓
- Insulation ✓
- Cooling the bedding ✓
- Fans/conditioners/ventilators ✓
- Shelter/housing/Shade/Housing orientation ✓
- Cooling pond ✓ (Any 2 x 1) (2)

3.1.4 Definition of homoeothermic

- Animals with a constant body temperature that is slightly higher than their environment ✓
- Animals that are able to keep their body temperature at the same level despite any changes in the temperature around it ✓
- Thermoregulation in animals that maintains a stable internal body temperature regardless of external influence. ✓ (Any 1 x 1) (1)

3.2 Calculation of FCR

3.2.1
$$\text{FCR} = \frac{4,6 \text{ kg}}{1,3 \text{ kg}} \checkmark$$
$$= 3,54 \checkmark \quad (2)$$

3.3 Animal production systems (2)**3.3.1 PICTURE A: Intensive production system ✓**

PICTURE B: Extensive production system ✓ (2)

3.3.2 Justification of PICTURE A

- Many animals kept in a small area/small enclosure/Total confinement ✓
- Zero grazing/Animals are fed with forage cut from pastures ✓
- Expensive/Iron enclosures around the animals ✓
- Large investment on the farm ✓

Justification of PICTURE B

- Few animals in a large grazing area ✓
- Animals depend on natural grazing ✓
- Less investment compared to picture A ✓ (Any 1 x 1) (2)

3.3.3 Relate subsistence and commercial farming systems

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

3.4 Identification of farming operations devices:**3.4.1 Identification of devices**

- 1 – Balling gun ✓
- 2 – Ear tag pliers/Ear tag applicator ✓ (1)

3.4.2 Uses of the devices**Device 1**

- Used for the oral administration of capsules and boluses to animals/Used for administering a bolus to an animal ✓ (1)

Device 2

- To apply ear tags/For identification using ear tags ✓ (2)

3.5 Foot and Mouth disease in South Africa**3.5.1 Pathogen causing FMD**

- Virus ✓ (1)

3.5.2 Impact of FMD outbreak on the South African economy

- Banning of exports ✓
- International trade decreases ✓
- Impact on food security ✓
- Decreased production/Loss of income/Less demand/Value of meat decreases/Loss of animals through death ✓
- Loss of jobs ✓
- More expenses for prevention and treatment ✓ (Any 1 x 1) (1)

3.5.3 Explanation of a notifiable disease

- A notifiable disease is any disease that is required by law to be reported ✓ to government authorities. ✓

OR

- A *disease* that must be reported ✓ to public health authorities, ✓ at the time it is diagnosed because it is potentially dangerous to human or animal health. (2)

3.5.4 Identification of the diseases

- (a) A: New Castle ✓ (1)

- (b) B: Coccidiosis ✓ (1)

- 3.5.5 **Prevention of the disease in A**
• Vaccination / Inoculation ✓ (1)
- 3.6 3.6.1 A – Chronic ✓
B – Acute / Per Acute ✓
C – Per Acute / Acute ✓ (3 x 1) (3)
- 3.7 **The life cycle of an internal parasite**
- 3.7.1 **Classification of the parasite**
• Internal parasite / Endoparasites ✓ (1)
- 3.7.2 **Main groups of internal parasites**
• Tapeworm / Cestodes ✓ Liver flukes / Trematodes ✓ (2)
- 3.7.3 **Name of the disease**
• Anaemia ✓ (1)
- 3.8 **Plant poisoning**
- 3.8.1 **Identification of poisonous plant**
• Thorn apple/*Datura stramonium* ✓ (1)
- 3.8.2 **TWO measures to prevent plant poisoning**
• Remove animals from the infested camp ✓
• Remove poisonous plants from the pasture ✓
• Avoid overstocking/overgrazing the camps ✓
• Practice rotational grazing ✓
• Provide feed to animals being transported ✓
• Prevent veldt fires ✓
• Provide enough water for livestock ✓ (Any 2 x 1) (2)

[35]

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

- 2: Urethra ✓
- 4: Vas deferens / Ductus deferens ✓ (2)

4.1.2 THREE functions of the epididymis

- Stores the spermatozoa ✓
- Allows the spermatozoa to mature ✓
- Concentrates the spermatozoa in the fluid ✓
- Transports the spermatozoa from the testis to vas deferens ✓
- Secretes the buffer that protects sperm from female sex organs' acidic secretions ✓ (Any 3 x 1) (3)

4.1.3 The name of the hormone secreted in part 1

- Testosterone ✓ (1)

4.1.4 The name of the biological process that takes place in part labelled 1

- Gametogenesis ✓ (1)

4.1.5 Identification of A and C

- A: Mitochondria ✓
- C: Tail ✓ (2)

4.1.6 Functions of A and C
Functions of A

- Provide energy for movement of the cell ✓

Functions of C

- Motility/Movement of the sperm cell/Swimming in the semen ✓ (2)

4.2 Reproductive process of farm animals**4.2.1 Name of process**

- Oogenesis/Ovogenesis ✓ (1)

4.2.2 Types of cell division

- A: Mitosis ✓
- B: Meiosis/First meiotic ✓ (2)

4.2.3 Site of the process

- Ovaries ✓

4.3 The reproductive process in male and female animals

4.3.1 Name of the process

- Mating ✓

(1)

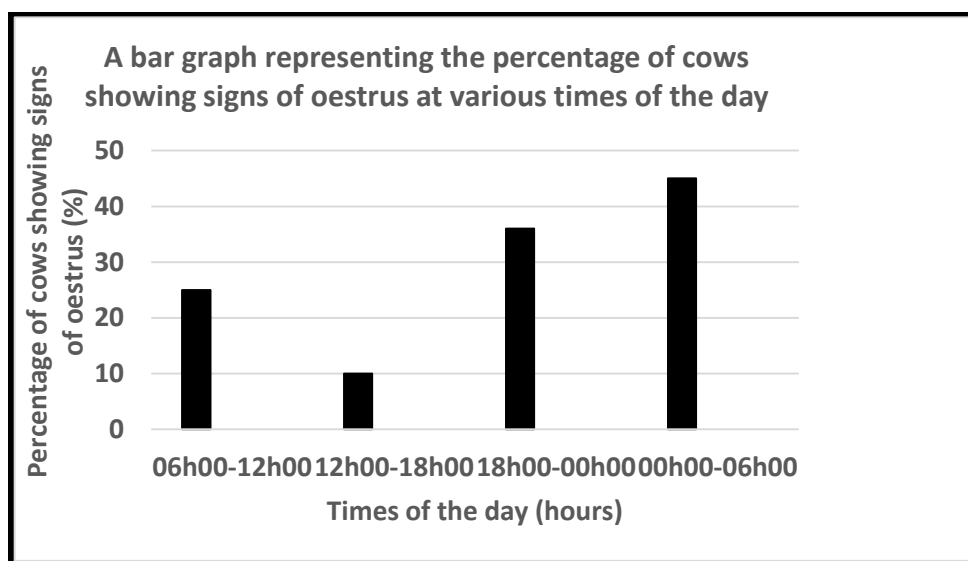
4.3.2 Labelling of A, B and C

- A – Courtship ✓
- B – Copulation ✓
- C – Ejaculation ✓

(3)

4.4 Graph

4.4.1 A bar graph



Criteria for marking

- Correct heading/title ✓
- Correct type of graph (Bar graph) ✓
- Correct labelling of x-axis and y-axis ✓
- Correct units on y-axis (%) and x-axis (hours) ✓
- Correct plotting of bars on the graph ✓

4.4.2 Identification of the time of the day

- 12h00–18h00 ✓

4.5 Pictures of equipment used in the animal reproduction industry:

4.5.1 Identification of the equipment

- C ✓
- B ✓
- A ✓

4.5.2 TWO basic requirements for semen collection

- All equipment must be sterilised before use ✓
- The semen should not be exposed to sunlight ✓
- The floor area must not be slippery ✓

4.6 Multiple births**4.6.1 Naming of multiple births**

- **A** – Non-identical/Dizygous ✓
- **B** – Identical/Monozygous ✓
- **C** – Freemartin ✓ (3)

4.6.2 Identification of the part labelled 1

- Ovum/Egg cell/Female reproductive organ/Female gamete ✓ (1)

4.6.3 Naming of the process indicated by 2

- Fertilisation ✓ (1)
- [35]**

TOTAL SECTION B: 105

GRAND TOTAL: 150