



**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**JUNE 2022**

**AGRICULTURAL SCIENCES  
MARKING GUIDELINE**

**MARKS: 150**

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This marking guideline consists of 12 pages.

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**SECTION A****QUESTION 1**

1.1	1.1.1	C ✓✓		
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	B ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	A ✓✓		
	1.1.8	B ✓✓		
	1.1.9	A ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	B only ✓✓		
	1.2.2	A only ✓✓		
	1.2.3	None ✓✓		
	1.2.4	A only ✓✓		
	1.2.5	Both A and B ✓✓	(5 x 2)	(10)
1.3	1.3.1	Concentrates ✓✓		
	1.3.2	Zoonotic ✓✓		
	1.3.3	Meiosis ✓✓		
	1.3.4	Hermaphroditism ✓✓		
	1.3.5	Cryptorchidism ✓✓	(5 x 2)	(10)
1.4	1.4.1	Fodder flow / Feed flow ✓		
	1.4.2	Endemic ✓		
	1.4.3	Acrosome ✓		
	1.4.4	Dystocia ✓		
	1.4.5	Infertility ✓	(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 Classification of the alimentary canal of farm animals**

- **DIAGRAM A:** Ruminants ✓ (1)
- **DIAGRAM B:** Non-ruminants ✓ (1)

**2.1.2 Identification of letters**

- **E:** Crop ✓ (1)
- **J:** Oesophagus ✓ (1)

**2.1.3 Identification of the alimentary canal of a young ruminant  
DIAGRAM C ✓ (1)****2.1.4 Justification**

- Very large abomasum compared to rumen ✓
- Presence of oesophageal groove ✓
- Under-development of fore stomach ✓ (Any 1 x 1) (1)

**2.1.5 Identification of the letters:**

- (a) H ✓ (1)
- (b) F ✓ (1)
- (c) A ✓ (1)

**2.2 Schematic representation of types of feeds**

2.2.1 Roughages ✓ (1)

2.2.2 Concentrates ✓ (1)

2.2.3 Silage/soilage/green lucerne/green forage ✓ (Any 1 x 1) (1)

2.2.4 Maize meal/oatmeal/barley meal/rye meal/sorghum meal ✓ (Any 1 x 1) (1)

### 2.3 Deficiency diseases:

- 2.3.1 Goitre ✓ (1)
- 2.3.2 Excessive bleeding/Poor blood clotting ✓ (1)
- 2.3.3 Parakeratosis ✓ (1)

### 2.4 Energy production in farm animals

#### 2.4.1 Units to express energy.

Joules (j)/Kilojoules (Kj) ✓ (1)

#### 2.4.2 TWO important uses of Net Energy

- Maintenance ✓
- Production ✓ (2)

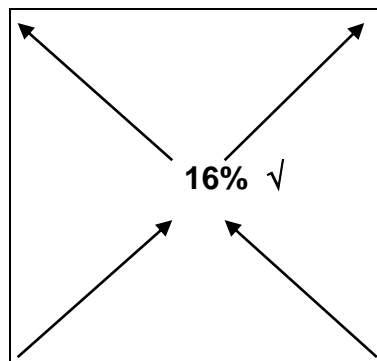
#### 2.4.3 TWO purposes of calculating energy value of feed

- To determine animal's diet ✓
- To determine feeding standards ✓
- To formulate rations ✓ (Any 2 x 1) (2)

### 2.5 Compounding rations

#### 2.5.1 The Pearson square calculation

(Barley meal): 9% 23 ✓ (parts) (39 – 16 = 23)



(Soya oilcake meal): 39% 7 ✓ (parts) (16 – 9 = 7)

The ratio of barley meal to soya oilcake meal is **23 : 6** ✓ (4)

### 2.5.2 Percentage of soya oilcake meal

$$23 + 7 = 30 \checkmark$$

$$\frac{7}{30} \times 100 \checkmark$$

$$23,3\% \checkmark$$

(3)

### 2.6 Calculating coefficient of digestibility of the hay

Dry feed intake:

$$\frac{10}{100} \times 15 \text{ kg} = 1,5 \text{ kg} \quad \text{therefore, } 15 \text{ kg} - 1,5 \text{ kg} = 13,5 \text{ kg} \checkmark$$

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

$$\frac{13,5 \text{ kg} - 3 \text{ kg}}{13,5 \text{ kg}} \times 100 \checkmark$$

$$77,8\% \checkmark\checkmark$$

(5)

### 2.7 TWO importance fodder flow

- Safe use of resources  $\checkmark$
- Meeting the animal's requirements  $\checkmark$
- For positive margin over feed costs  $\checkmark$
- Allowing livestock enterprise to run smoothly / Manageability / Flexible management  $\checkmark$

(Any 2 x 1)

(2)

**[35]**

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

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

**3.1.2 Justification for QUESTION 3.1.1****FARMER A: Extensive production system**

- Few animals occupied a large area/low density/low stocking rate ✓
- Low capital investment ✓
- Low output per unit area ✓ (Any 1 x 1) (1)

**FARMER B: Intensive production system**

- Many animals in small area/high population density ✓
- High capital investment/high inputs ✓
- High output per unit area ✓ (Any 1 x 1) (1)

**3.1.3 Differentiation between *subsistence* and *commercial farming systems*****Subsistence farming**

Farming in small quantities to meet the needs of the family and sell the surplus ✓ (1)

**Commercial farming**

Farming in large quantities in order to make profit ✓ (1)

**3.2 THREE measures to reduce heat stress in cattle under intensive production conditions**

- Provision of shelter ✓
- Use of air conditioners/Misting/Fans ✓
- Provision of enough water ✓ (Any 3 x 1) (3)

**3.3 Identification of parts of the animal's space**

3.3.1 **Flight zone:** PART C ✓ (1)

3.3.2 **Blind spot:** PART A ✓ (1)

3.3.3 **Point of balance:** PART B ✓ (1)

**3.4 Animal handling****3.4.1 Identification of the equipment labelled A**

Plywood board ✓ (1)

**3.4.2 THREE reasons for handling pigs by farmers**

- Vaccination ✓
  - Marking ✓
  - Dosing ✓
  - Selection for breeding ✓
  - Marketing/Shows ✓
  - Reproductive processes/Mating/AI/ET/NT ✓
  - Giving birth ✓
  - Sanitation/cleaning ✓
  - Hoof trimming ✓
  - Health examination ✓
- (Any 3 x 1) (3)

**3.5 Equipment used on the farm.****3.5.1 Name of the management practice**

Castration ✓ (1)

**3.5.2 Suitability of the tools**

(a) **Adult farm animals:** DIAGRAM B ✓ (1)

(b) **Younger farm animals:** DIAGRAM A ✓ (1)

**3.6 Scenario****3.6.1 Name of the disease**

Rift Valley Fever (RVF) ✓ (1)

**3.6.2 Identification**

(a) **Vector:** Mosquito ✓ (1)

(b) **Pathogen:** Virus ✓ (1)

**3.6.3 Extract from the scenario**

If a farmer suspects that some animals are infected, authorities should be alerted immediately/Reporting to authorities when suspecting infection ✓

(Any 1 x 1) (1)

**3.6.4 Suggest TWO economic implications of animal diseases to the farmer**

- Banning of exports and imports/Decrease in international trade ✓
- Decreased production/loss of income ✓
- High treatment/vaccination costs to control/prevent diseases ✓

(Any 2 x 1) (2)

**3.7 Schematic representation for the life cycle of a parasite.****3.7.1 Identification of the parasite**

Blowfly ✓

(1)

**3.7.2 Indication of the most harmful stage in the life cycle**

Larval stage ✓

(1)

**3.7.3 Identification of the condition that cause wounds**

Blowfly strike/attack ✓

(1)

**3.7.4 Term used for the removal of wool around the tail**

Crutching ✓

(1)

**3.7.5 THREE non-chemical management practices**

- Tail docking ✓
- Lipping and cleaning of wounds ✓
- Correct timing of shearing and crutching ✓
- Lambing time after shearing ✓
- Breeding and selection of resistant breeds ✓

(Any 3 x 1) (3)

**3.8 Indication of roles****(a) Import and export bans:** State ✓

(1)

**(b) Research:** State ✓

(1)

**(c) Sanitation:** Farmer ✓

(1)

**[35]**



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

- **F:** Urethra ✓
- **G:** Uterus/Uterine body ✓
- **K:** Oviduct/Fallopian tubes ✓ (3)

**4.1.2 Matching the functions with a letter**

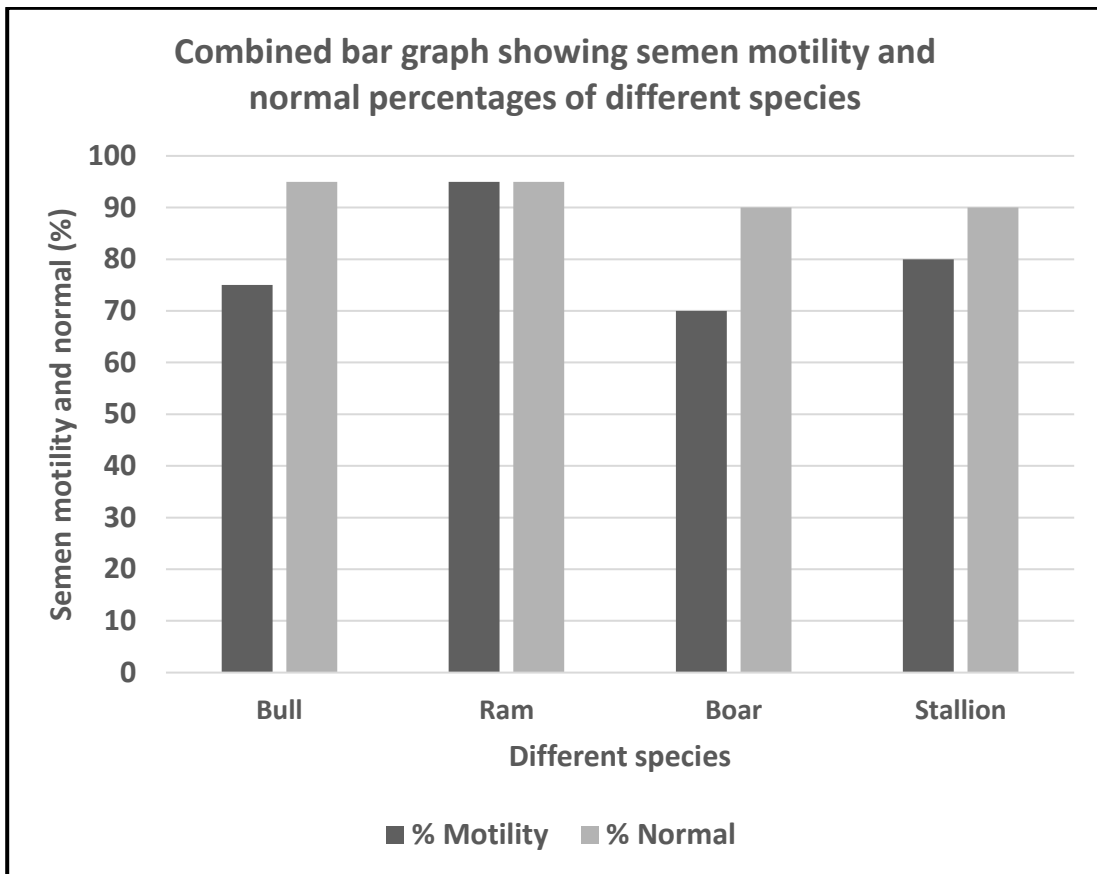
- (a) H ✓ (1)
- (b) K ✓ (1)
- (c) J ✓ (1)
- (d) I ✓ (1)
- (e) C ✓ (1)
- (f) A ✓ (1)

**4.2 Sperm cell****Indication of the letters**

- (a) D ✓ (1)
- (b) C ✓ (1)
- (c) B ✓ (1)

### 4.3 Graph

#### 4.3.1 Bar graph



#### Criteria/rubric/marking guidelines

- Correct heading ✓
- X-axis – correctly calibrated with label (Species) ✓
- Y-axis – correctly calibrated with label (Motility and normal) ✓
- Correct units (%) ✓
- Combined bar graph
- Accuracy (80 % and above correct plotting) ✓ (6)

#### 4.3.2 Identification of the species with the highest concentration

Ram ✓ (1)

#### 4.4 Stages of mating

##### 4.4.1 Arranging the stages of mating sequentially

- C ✓
  - A ✓
  - D ✓
  - B ✓
- (4)

##### 4.4.2 The stage of mating not listed

Courtship ✓ (1)

##### 4.4.3 Indication of the stage

Oestrus ✓ (1)

##### 4.4.4 ONE sign of a cow on heat

- Vulva is swollen with reddish mucus membranes ✓
  - Mucus strings visible from the vulva ✓
  - Jumps on other cows / allows the cows to jump on her ✓
  - Scratch marks and dirt on the side and back ✓
  - Allows mating with a bull ✓
- (Any 1 x 1) (1)

#### 4.5 Embryo transfer:

##### 4.5.1 Identify of the reproduction procedure

Embryo Transfer (ET) ✓ (1)

##### 4.5.2 Naming of the farm animal A and farm animal B

- **Farm animal A:** Donor cow ✓
  - **Farm animal B:** Recipient cow ✓
- (2)

##### 4.5.3 Naming of the processes C and D

- **C:** Superovulation ✓
  - **D:** Embryo flushing ✓
- (2)

**4.6 Milk production curve****4.6.1 Name of the curve**

- Lactation curve / Milk production curve ✓ (1)

**4.6.2 Name of point A**

- Peak period/peak stage ✓ (1)

**4.6.3 Hormones**

- (a) Prolactin ✓ (1)
- (b) Oxytocin ✓ (1)

**[35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**