GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2024

MARKING GUIDELINES

AGRICULTURAL SCIENCES

(PAPER 1)

12 pages

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	C ✓✓		
	1.1.5	A ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	A ✓✓		
	1.1.9	C ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	B only ✓✓		
	1.2.2	None ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	Both A and B ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Fodder/Feed flow ✓✓		
	1.3.2	Nipple/nipple drinker ✓✓		
	1.3.3	Scrotum ✓✓		
	1.3.4	Cervix ✓✓		
	1.3.5	Infundibulum ✓✓	(5 x 2)	(10)

1.4 1.4.1 Urea ✓ / Buiret

1.4.2 Secretin ✓

1.4.3 Chronic ✓

1.4.4 Placenta ✓

1.4.5 Cryptorchidism ✓ (5 x 1) (5)

TOTAL FOR SECTION B: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 **The digestive system of a fowl**

2.1.1 **The letter of the part where … takes place.**

(a) **grinding of ingested feed –** C ✓ (1)

(b) **soaking and storage of food –** A ✓ (1)

(c) **digestion of fats –** F ✓ (1)

(d) **secretion of digestive enzymes** – B/F ✓ (1)

2.1.2 **ONE function of cloaca**

Serves as an opening for excretion ✓/An ending of the urogenital system of a fowl. ✓ (Any) (1)

2.1.3 **Comparing the oesophagus in a fowl with that of a sheep**

In a fowl the oesophagus has an enlargement/crop and ✓ the sheep has no enlargement/crop. ✓ (2)

2.2 **The diagram that depicts a sow with a litter of piglets**

2.2.1 **Important trace or micro-element**

Iron/Fe ✓ (1)

2.2.2 **The metabolic disease that is associated with deficient levels of iron**

- Anaemia ✓ (1)

2.2.3 **The cheapest and easiest method of supplementing iron**

Soil sods/injecting ✓ (1)

2.2.4 **TWO functions of iron**

- The formation of haemoglobin in the red blood corpuscles/prevents anaemia. ✓
- Formation of enzymes involved in oxygen transport. ✓
- Forms part of compounds which serves as iron reserves in the body. ✓
- Activates various enzymes in the body. ✓ (Any) (2)

2.2.5 **ONE nutritional component that is not indicated in the schematic representation**

- Fats/oils/lipids ✓
- Water ✓ (Any) (1)

2.3 **Pearson square**

2.3.1 **Ratio representing sunflower oilcake meal**

8 ✓ (1)

2.3.2 **Justification**

A feed high in protein ✓ constitutes a small portion of ratio in a mixture. ✓ (2)

2.3.3 **Calculation of the percentage of a carbohydrate-rich feed in the mixture**

8 + 20 = 28 ✓
Maize = 20/28 x 100 ✓
= 71,43% ✓ (3)

2.4 The energy value of a feed

2.4.1 Missing word/s in the flow chart

A – Faeces ✓ (1) (1)
B – Methane gas ✓/ Gasses/ Rumen Gasses (1) (1)
C – Metabolic energy/ME ✓ (1) (1)
D – Heat ✓ (1) (1)
E – Net energy/NE ✓ (1)

2.4.2 Two functions of Net Energy/NE

- NE is used for growth/production/reproduction. ✓
- For maintenance/physical activities. ✓ (2)

2.5 Calculation of digestibility co-efficient

Feed = $\frac{10}{100}$ x 30 kg Manure = $\frac{35}{100}$ x 16 kg

= 3 kg = 5,6 kg

30 kg – 3 kg 16 kg – 5,6 kg

= 27 kg = 10,4 kg ✓

DC = $\frac{\text{Dry Matter Intake (kg) – Dry Mass Manure (kg)}}{\text{Dry Matter Intake (kg)}} \times \frac{100}{1}$ ✓

= $\frac{27 \text{ kg} – 10,4 \text{ kg}}{27 \text{ kg}} \times \frac{100}{1}$ ✓

= 61,48 ✓ % ✓ **or** 61,5 ✓% ✓ (5)

2.6 Biological value of some feeds

2.6.1 Feed that has a low biological value

Barley ✓ (1)

2.6.2 Feed that is suitable for the following conditions:

(a) **For young growing animals –** Fishmeal/Milkprotein ✓ (1)

(b) **For fattening –** Maize ✓ (1)

(c) **Necessary for maintenance –** Barley ✓ (1)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Farming systems

3.1.1 Identification of farming systems, A and B

A – Subsistence farming ✓ (1)
B – Commercial farming ✓ (1)

3.1.2 Comparison of System A/Subsistence and System B/Commercial

	Subsistence	Commercial
Purpose	Produce enough to feed the family ✓	Produce to sell for profit ✓
Management	Limited to a small number of animals and crops ✓	Intensive to ensure increased production ✓

(4)

3.2 Equipment used in the physical handling of farm animals

3.2.1 Picture that matches the following descriptions:

(a) **An electric stick that shocks an animal to control movement**

– Picture B ✓ (1)

(b) **A tool that is used to strike animals to control their movement across the road**

– Picture C ✓ (1)

(c) **An implement used to clip ear tags into the ears of animals**

– Picture A ✓ (1)

3.3 **The facilities used when handling farm animals**

3.3.1 **Identification of facility B** – Loading ramp ✓ (1)

3.3.2 **One of the purposes of facility A**

- To restrain farm animals ✓
- To guide farm animals to the vehicle for transportation ✓ (Any) (1)

3.3.3 **Two design features for a crush to ensure safety**

- High solid/strong sides ✓
- No sharp curves ✓
- Angles are not too steep ✓
- Nothing to hurt/harm animals ✓
- Non- slippery/ concrete floors✓ (Any) (2)

3.3.4 **Two reasons for the physical handling of farm animals**

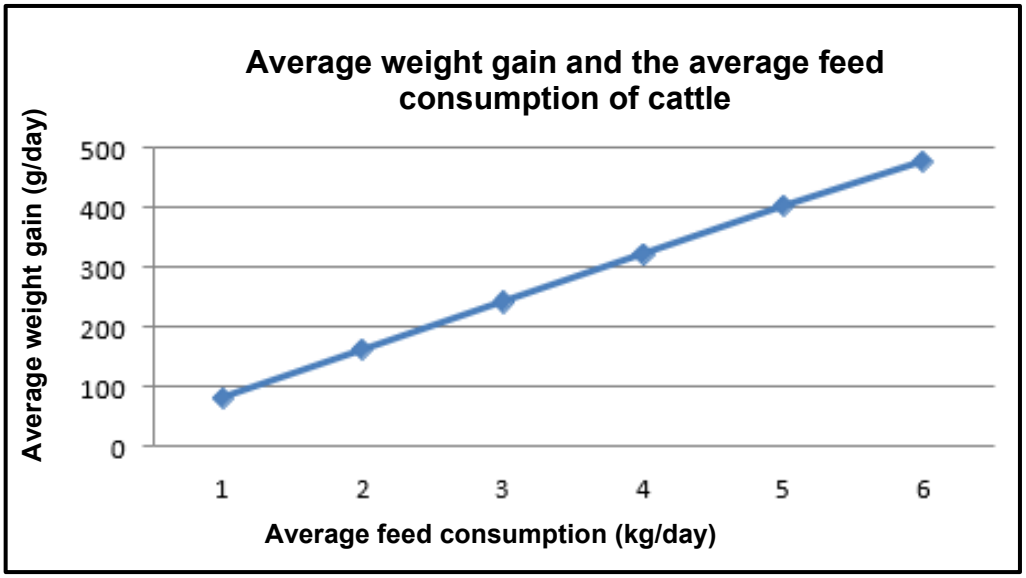
- Management practices/docking/castration/AI/identification ✓
- Application of medication/ treatment of parasites/dosing/ vaccinations ✓
- Transportation ✓
- Generation of data. ✓
- Determining the age of the animal ✓
- For pregnancy testing ✓
- For examining animals ✓ (Any) (2)

3.4 **THREE basic requirements for transporting farm animals**:

- Transporting animals of different ages/size/sex/species separately ✓
- Floors should not be slippery ✓
- No sharp edges/angles on the truck ✓
- Vehicle must be high/strong enough ✓
- Proper ventilation ✓
- Familiarise animals with the loading area ✓
- Do not feed animals less than 12 hours before loading ✓
- Red flag must be used when transporting animals by road ✓
- Animals should not be rushed ✓
- Do not load animals too long before departure ✓
- Transport must be roadworthy ✓
- The proper documentation must accompany the animals ✓ (Any) (3)

3.5 Feed consumption and average weight gain for beef cattle

3.5.1 Line graph



Criteria/rubric/marking guidelines

- Correct heading ✓
- X-axis – correctly calibrated and labelled (Feed consumption) ✓
- Y-axis – correctly calibrated and labelled (Weight gain) ✓
- Correct units (kg/day and g/day) ✓
- Accuracy (80% plotting) ✓
- Line graph ✓ (6)

3.5.2 The relationship between feed consumption and weight gain

- Weight gain is directly proportional to feed consumption ✓✓

OR

- The higher the feed consumed the higher/greater ✓ the weight gain ✓/vice versa (Any) (2)

3.6 **Scenario on avian flu**

3.6.1 **Pathogen that causes avian flu**

Virus ✓ (1)

3.6.2 **Justification**

- The disease is highly transmittable/infectious/contagious. ✓
- Farmers should alert authorities. ✓ (Any) (1)

3.6.3 **ONE common symptom of the avian flu**

- Fever and cough ✓
- Difficulty breathing/dyspnoea / Nasal discharge✓
- Sudden death ✓
- Drop in egg production and ruffled feathers ✓
- Depression ✓
- Loss of appetite ✓ (Any) (1)

3.6.4 **TWO economic implications**

- Banning of exports/ decrease in trade ✓
- High treatment/vaccination costs to control/prevent diseases ✓
- Decreased production ✓
- Loss of income/profit ✓
- Loss of livestock/death ✓ (Any) (2)

3.7 **Various stages of the life cycle of a parasite**

3.7.1 **Letter that represents each of the following stages in the life cycle of the parasite**

(a) **The larvae hatches from the eggs** – B ✓ (1)

(b) **The nymph will feed on the second host** – D ✓ (1)

(c) **The tick will feed on the third host** – E ✓ (1)

(d) **The first host** – C ✓ (1)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 Male reproductive organs

4.1.1 Letter representing the part where each of the following occurs:

(a) **Feeding of sperm cells by SERTOLI cells during Spermatogenesis** – B ✓ (1)

(b) **Transportation of sperm cells to the urethra** – D ✓ (1)

(c) **Secretion of a sticky liquid that provides energy for the sperm cells** – E ✓ (1)

4.1.2 TWO congenital defects in part B/testis leading to loss of fertility

- Hypoplasia ✓
- Cryptorchidism ✓
- Sperm defect / Azoospermia✓ (Any) (2)

4.1.3 Role played by part labelled C/penis in reproduction

It deposits semen into the vagina during mating ✓ (1)

4.2 The distinctive characteristics of each phase of the oestrus cycle

4.2.1 Identification of phases of oestrus

A – Di-oestrus ✓ (1)
B – Pro-oestrus ✓ (1)
C – Oestrus ✓ (1)
D – Met-oestrus ✓ (1)

4.2.2 TWO signs of oestrus

- Restlessness ✓
- Sudden decrease of milk production ✓
- The cow mounts other cows/jumps on other cows and allows other cows to jump on her ✓
- The vulva swells and becomes larger and softer ✓
- Excessive mucus excretion from the vulva ✓
- Mucus membrane of the vagina appear moist and red ✓ (Any) (2)

4.3 Equipment used during artificial insemination

4.3.1 Purpose of using the pistolette

To deposit semen during artificial insemination ✓ (1)

4.3.2 TWO basic requirements for storage

- Semen to be stored at 5 ˚C if stored for a short period. ✓
- Semen be kept frozen in liquid nitrogen at –196 ˚C if stored for a longer time. ✓
- Must be stored in polyvinyl straws. ✓
- The ends of the straws are sealed to prevent liquid nitrogen from entering. ✓
- Straws should be labelled for identification. ✓ (Any) (2)

4.3.3 Identification of the letter

(a) **Semen is not contaminated with pathogens by the inseminator** – A ✓ (1)

(b) **Semen is ready for use after being kept frozen** – E ✓ (1)

4.3.4 ONE disadvantage of using the equipment

It is expensive./ Expert knowledge is needed/ veterinarian services needed ✓ (1)

4.3.5 TWO advantages of artificial insemination

- Decreases the occurrence of sexually transmitted diseases ✓
- More female animals can be fertilised by superior male animals ✓
- It is a quick and economical way to improve the herd ✓
- Semen from males in other countries can be used ✓
- Semen of superior bulls can be used even after death ✓
- It improves the commercial value of the herd ✓
- Semen of multiple sires can be used without keeping and maintaining expensive bulls ✓ (Any) (2)

4.4 Pregnancy testing in a cow

4.4.1 Identification of parts

A – Uterus wall/caruncles/placenta ✓
B – Uterus ✓
C – Cervix ✓ (3)

4.4.2 **TWO advantages of early pregnancy testing**

- For proper feeding ✓
- For proper management of diseases and parasites ✓
- For proper management of breeding cycles/records/calving dates ✓

(Any) (2)

4.4.3 **Role of the mucus plug**

- Protects the animal ✓
- against external diseases and infections. ✓ (2)

4.4.4 **The condition that would occur in the following situations:**

(a) **The foetus dies, decays and remains inside the cow** – Maceration ✓ (1)

(b) **The fluid around the foetus is reabsorbed and a hard skeleton remains** – Mummification ✓ (1)

4.5 **The diagram that illustrates a technique used in animal reproduction**

4.5.1 **The name of the process**

Embryo transplantation/transfer/ET ✓ (1)

4.5.2 **The main benefit of using this technique on female animals**

- Many offspring ✓ from a single superior animal are produced. ✓
- Surrogate/recipient cows ✓ now reproduce valuable offspring. ✓ (Any) (2)

4.6 **The first milk produced by the cow, within the first three days of lactation**

4.6.1 **Identification of the first milk produced by a cow**

Colostrum/beestings ✓ (1)

4.6.2 **TWO ways in which colostrum differs from the normal milk**

- More yellow in colour than normal milk ✓
- Higher fat content/creamier/more concentrated/nutritious/thicker ✓
- Contains anti-disease substances/anti-bodies ✓ (Any) (2)

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TOTAL SECTION B: 105

TOTAL: 150