



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

**AGRICULTURAL SCIENCES P1
FEBRUARY/MARCH 2015
MEMORANDUM**

MARKS: 150

This memorandum consists of 9 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	D ✓✓		
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	A ✓✓		
	1.1.5	A ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	C ✓✓		
	1.1.9	A ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	B only ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	B only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Biological value/BV ✓✓		
	1.3.2	Zinc/Zn ✓✓		
	1.3.3	Plywood ✓✓		
	1.3.4	Oogenesis/ovigenesis ✓✓		
	1.3.5	Reproductive ✓✓	(5 x 2)	(10)
1.4	1.4.1	Pearson ✓		
	1.4.2	Maintenance ✓		
	1.4.3	Rectum ✓		
	1.4.4	Acrosome ✓		
	1.4.5	Embryo transfer ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canals of two farm animals****2.1.1 Type of digestive systems represented by:**

- (a) Ruminant ✓
 - (b) Cattle/cows/sheep/goat/game ✓
 - (c) Non-ruminant/monogastric animal ✓
 - (d) Pig ✓
- (4)

2.1.2 Letter and name where hydrochloric acid is secreted in diagram A

- D ✓
 - Abomasum/true stomach/milk stomach ✓
- (2)

2.2 Planning fodder flow feed flow and fodder flow production**2.2.1 Definition of fodder flow**

- A strategic plan ✓
 - To ensure enough fodder ✓
 - To meet the requirements of all the animals ✓
 - Throughout the year ✓
 - In terms of quality and quantity ✓
- (Any 2) (2)

2.2.2 Aspects in planning for a fodder flow

- (a) **Economic viability:**
 - The farmer to take measures of ensuring that the fodder ✓ is cost effective/cheap ✓
 - (b) **Sustainability:**
 - Planning to ensure that the fodder ✓ is always available to livestock ✓
- (4)

2.3 Digestibility co-efficiency**2.3.1 Calculation of digestibility co-efficiency**

$$DC = \frac{\text{Dry matter intake (kg)} - \text{dry mass of manure (kg)}}{\text{Dry matter intake (kg)}} \times \frac{100}{1} \checkmark$$

$$25 \text{ kg} \times \frac{15}{100} = 3,75 \text{ kg}$$

$$25 \text{ kg} - 3,75 \text{ kg} = 21,25 \text{ kg} \checkmark$$

$$\frac{21,25 \text{ kg} - 8 \text{ kg}}{21,25 \text{ kg}} \times \frac{100}{1} \checkmark$$

$$= 62,35 \text{ OR } 62,4\% \checkmark$$

(5)

2.3.2 Implication of the answer in QUESTION 2.3.1

- The bulk of the feed (62,35%) ✓ is digested and absorbed by the heifer ✓

OR

- The lesser percentage of the feed (37,65%) ✓ was not digested hence not absorbed by the heifer ✓ (2)

2.4 A table on the nutritive ratio (NR)**2.4.1 The ration most suitable for the following:**

- Fattening of old ewes – A ✓
- Ewes in the last 4 weeks of pregnancy – B ✓
- Young growing animals – B ✓ (3)

2.4.2 Reason for the ration in 2.4.1(a)

- Ratio is wide ✓
- Feed has higher lipid/carbohydrate/energy content ✓
- Feed has lower protein content ✓
- Ewes need more energy than protein ✓ (Any 1) (1)

2.4.3 Ration with high levels of:

- Maize – A ✓
- Fish meal – B ✓ (2)

2.4.4 The implication of the nutritive ratio of ration B

- Ration has higher protein content ✓
- Recommended for growth, production and reproduction ✓
- Ration has lower lipid/carbohydrate/energy content ✓ (Any 2) (2)

2.5 Diagram on mineral supplements**2.5.1 Method of mineral supplement**

- Mineral lick ✓ (1)

2.5.2 TWO minerals that could be supplemented

- Calcium ✓
- Sodium ✓
- Phosphorus ✓
- Nitrogen ✓ (Any 2) (2)

2.5.3 The partial protein substitute

- Non-protein nitrogenous substance (NPN)/biuret/urea ✓ (1)

2.5.4 Role of growth regulators

- Hormones** – will stimulate metabolic reactions ✓ that will lead in increased growth rate ✓
- Antibiotics** – will provide immunity ✓ thereby increasing resistance to diseases ✓ (4)

[35]

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

A: Extensive production system✓

B: Intensive production system✓

(2)

3.1.2 Comparison of the TWO production systems(a) **Capital investment** – Low capital/technology input in extensive production system✓ and large capital/technology input in intensive production system✓(b) **Area/space of land occupied** – Low animal concentration in a large area in extensive production system✓ and high animal concentration in a small area in intensive production system ✓

(4)

3.1.3 TWO examples of intensive production system

- Cage✓
- Battery (layers/broilers) ✓
- Deep litter system ✓

(Any 2) (2)

3.2 Structures/practices for handling animals

3.2.1 A single strand of movable electrical wire✓

(1)

3.2.2 A rope with a halter to tie animals to a pole✓

(1)

3.2.3 A separate crush✓

(1)

3.2.4 Single strand of movable electric wire✓

(1)

3.3 Scenario on solar radiation**3.3.1 THREE measures to reduce heat stress under intensive conditions**

- Spray/Fogger with water✓
- Insulation✓
- Fans/conditioners/ventilators✓
- Housing systems/orientation✓

(Any 3) (3)

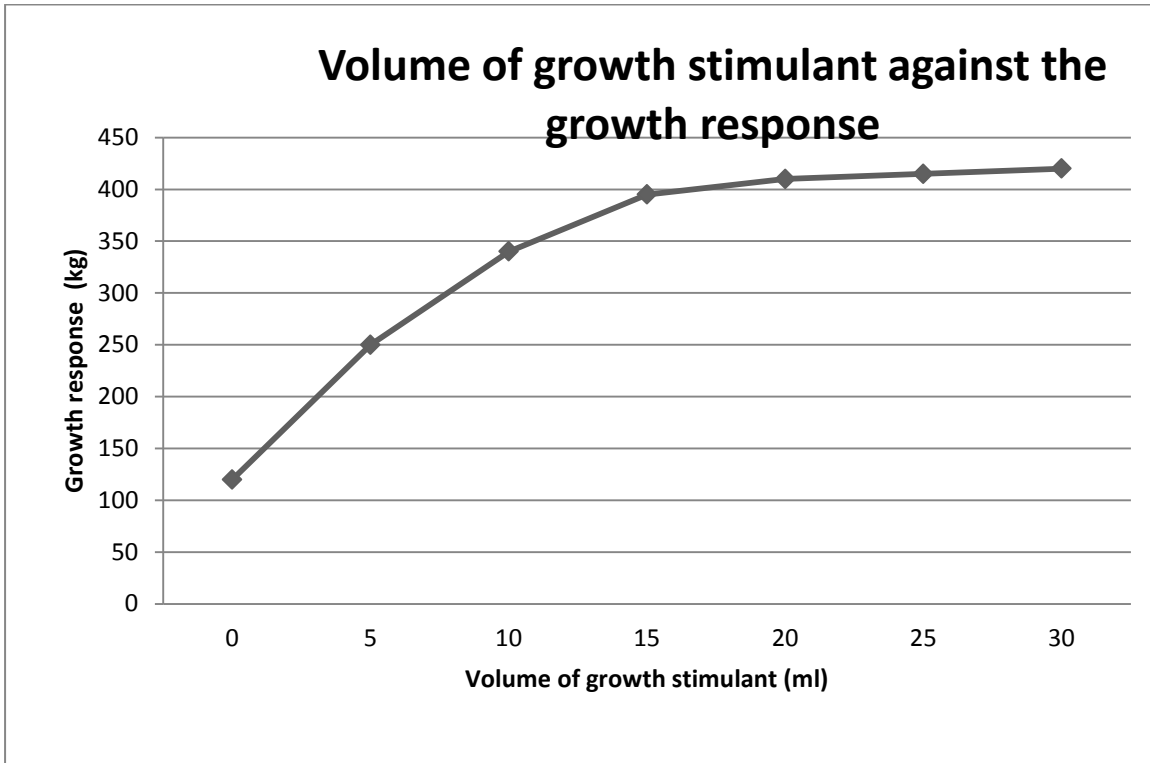
3.3.2 Correlation between high environmental temperature and feed consumption

- The higher the temperature ✓
- the less the feed intake✓

(2)

3.4 **Data on average body temperature and pulse rate in dairy cows**

3.4.1 **Line graph on the volume of stimulant and the growth response**



Line graph of growth stimulants against growth response
Criteria/marking guidelines

- Correct heading✓
- Y-axis – correct labelling (growth response)✓
- X-axis – correct labelling (volume of growth stimulants)✓
- Correct units✓
- Accuracy/correct plotting✓
- Line graph✓

(6)

3.4.2 **TWO growth stimulants used in animal production systems**

- Thyroid regulators✓
- Hormones✓
- Antibiotics✓
- Tranquilisers✓

(Any 2) (2)

3.4.3 **Growth response of the heifers at a volume of 15 ml**

- 395 kg✓

(1)

3.5 Internal parasites

- 3.5.1 **Identification of the type of a parasite**
- Internal parasite✓ (1)
- 3.5.2 **TWO negative impacts of an internal parasite**
- Depriving host of nutrients✓
 - Sucks host's blood/causes anaemia✓
 - Lesions/cysts inside host✓
 - Decreases host's productivity✓
 - Progressive weakness✓
 - Death✓ (Any 2) (2)
- 3.5.3 **How the animal is infected**
- The animal will ingest ✓
 - Metacercaria through grazing✓ (2)
- 3.5.4 **Intermediate host**
- Snail✓ (1)
- 3.5.5 **THREE pasture management measures of controlling Internal parasite**
- Rotational grazing✓
 - Resting of infected pastures✓
 - Allowing animals that are resistant to specific internal parasites✓
 - Avoid wet places✓
 - Use of zero grazing✓
 - Removal of manure/hygienic measures✓ (Any 3) (3)

[35]**QUESTION 4: ANIMAL REPRODUCTION**

- 4.1 **The diagram below represents the reproductive canal of a farm animal**
- 4.1.1 **Process in part D**
- Spermatogenesis✓ (1)
- 4.1.2 **Identify parts A, B and E**
- **Label A** – Seminal vesicles/vesicular glands✓
 - **Label B** – Vas deferens/sperm duct✓
 - **Label E** – Scrotum/scrotal sac✓ (3)

- 4.1.3 **TWO congenital defects of part D**
- **Cryptorchidism**✓ – the condition whereby the testes remain in the abdominal cavity and do not descend into the scrotum✓
 - **Hypoplasia**✓ – the condition whereby the testes are underdeveloped✓ (4)
- 4.1.4 **TWO functions of the part C**
- Storage of semen✓
 - Maturation of sperms✓
 - Secretion of buffer✓
 - Transportation of semen✓
 - Concentration of semen✓ (Any 2) (2)
- 4.2 **Oestrus**
- 4.2.1 **Oestrus**
- It is a period when non pregnant female animals✓
 - are receptive to male animals/allow mating✓ (2)
- 4.2.2 **THREE signs of oestrus**
- Vulva is swollen/reddish✓
 - Mucous discharge✓
 - Cow is restless and bellows often✓
 - Mounting other cows✓
 - Isolation✓
 - Decrease in food intake/loss of appetite✓
 - Legs and flanks are muddy✓
 - Allows mating✓ (Any 3) (3)
- 4.2.3 **THREE 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✓
 - Tail paint on tail head/tail paint markers✓
 - Heat mount detectors✓ (Any 3) (3)
- 4.3 **Graph of Oestrogen/Progesterone levels in a cow over 22 days**
- 4.3.1 **Day cow will mate with a bull**
- Day 4–6✓ (1)
- 4.3.2 **Motivation**
- Highest level of oestrogen✓
 - Cow will be on heat✓ (2)
- 4.3.3 **Day of ovulation**
- Day 4–5✓ (1)

- 4.3.4 **Stage when progesterone is highest**
 • Met-oestrus✓ (1)
- 4.3.5 **Whether cow became pregnant**
 • Cow did not become pregnant✓ (1)
Motivation
 • Progesterone levels declined/decreased✓ (2)
 • after day 16✓
- 4.4 **Modern technologies: artificial insemination (AI), synchronization, etc.**
- 4.4.1 **Description of synchronisation of oestrus**
 • Making the oestrus cycle of a number of female animals✓
 • to occur approximately at the same time✓ (2)
- 4.4.2 **THREE advantages of AI in dairy cows**
 • Improving the genetic quality of the offspring✓
 • No need to buy/manage expensive bulls✓
 • Can use semen of one bull to inseminate many cows✓
 • Prevents the spread of sexually transmitted diseases✓
 • Inferior sires can be detected✓
 • Can use semen from a bull after injury or death✓
 • Animals of different size can be mated without injury✓
 • Semen can be frozen for many years✓
 • Semen can be transported and used worldwide✓
 • An ejaculation of one bull can be used for many cows✓
 • Higher conception rate can be achieved✓ (Any 3) (3)
- 4.4.3 **FOUR sequential stages used in ET**
 • Synchronisation of oestrus in donor and recipient cows✓
 • Superovulation of donor cows✓
 • Insemination of donor cows✓
 • Washing of the embryo from the uterus✓
 • Transfer embryo into the uterus of recipient cows✓ (Any 4) (4)
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- TOTAL SECTION B: 105**
GRAND TOTAL: 150