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 **OR** 62,4✓% ✓ (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:**

(a) Fattening of old ewes – A✓
(b) Ewes in the last 4 weeks of pregnancy – B✓
(c) 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:**

(a) Maize – A✓
(b) 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**

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

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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)

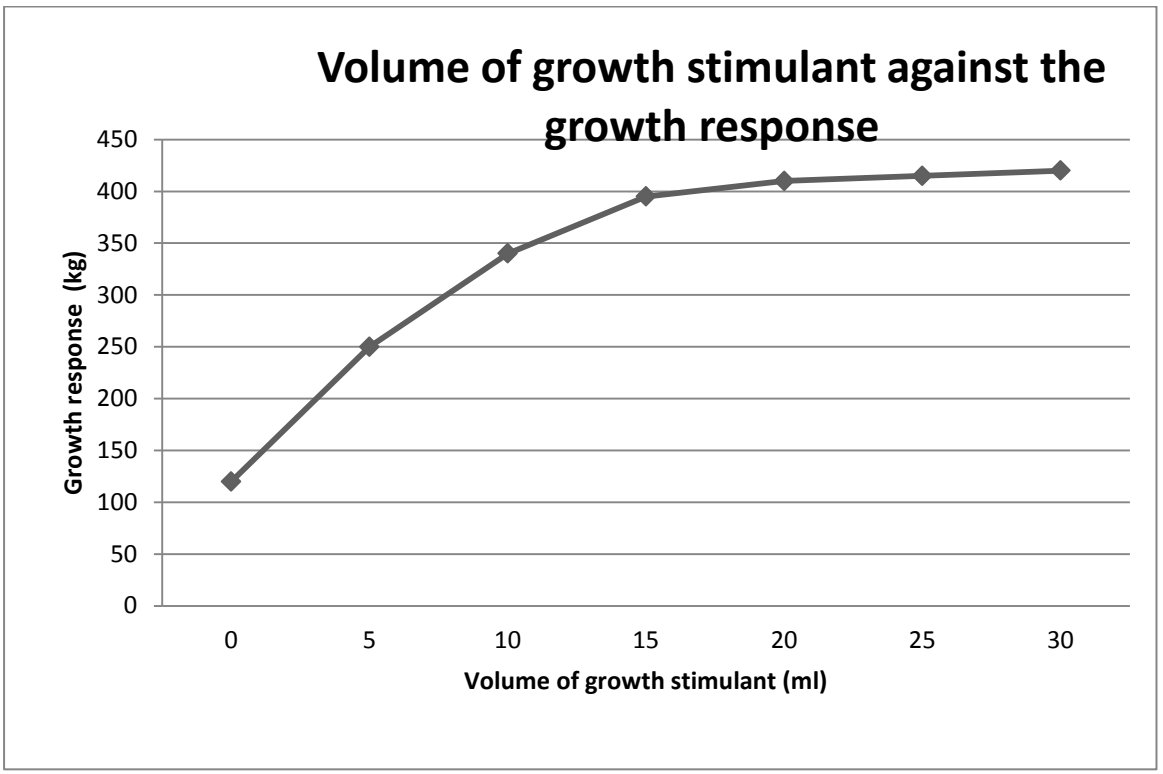
3.3 Scenario on solar radiation

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)

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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✓
- after day 16✓ (2)

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