



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2015**

**AGRICULTURAL SCIENCES P1  
MEMORANDUM**

**MARKS: 150**

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This memorandum consists of 12 pages.

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**SECTION A****QUESTION 1****1.1 MULTIPLE-CHOICE QUESTION**

- 1.1.1 B ✓✓
- 1.1.2 C ✓✓
- 1.1.3 C ✓✓
- 1.1.4 B ✓✓
- 1.1.5 D ✓✓
- 1.1.6 B ✓✓
- 1.1.7 C ✓✓
- 1.1.8 A ✓✓
- 1.1.9 C ✓✓
- 1.1.10 A ✓✓

(10 x 2) (20)

**1.2 COLUMN A/COLUMN B**

- 1.2.1 A only ✓✓
- 1.2.2 None ✓✓
- 1.2.3 B only ✓✓
- 1.2.4 Both A and B ✓✓
- 1.2.5 B only ✓✓

(5 x 2) (10)

**1.3 ONE WORD/TERM**

- 1.3.1 Essential ✓✓
- 1.3.2 Gross energy ✓✓
- 1.3.3 Injection ✓✓
- 1.3.4 Feedlot ✓✓
- 1.3.5 Oestrus identification ✓✓

(5 x 2) (10)

**1.4 CHANGE THE UNDERLINED WORD**

- 1.4.1 Rumen/Reticulum ✓
- 1.4.2 Burdizzo ✓
- 1.4.3 Progesterone ✓
- 1.4.4 Urethra ✓
- 1.4.5 Maceration ✓

(5 x 1) (5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 Stomach parts of farm animals****2.1.1 Identification of the type of farm animal**

ruminant / cow / sheep / goat ✓ (1)

**2.1.2 Description of the appearance of food particles in part C and B**  
**Part C**

- Undigested material ✓
- Not simplified chemically ✓
- Food particles physically broken down ✓
- Chewed particles mixed with saliva ✓ (Any 1 x 1) (1)

**Part B**

- Food particles chemically broken down ✓
- Food much more in liquid appearance ✓ (Any 1 x 1) (1)

**2.1.3 Comparing digestion in part F in DIAGRAM 1 and O in DIAGRAM 2.**

Part F – Secrete digestive juices and enzymes to digest food ✓

Part O – Grinding of food into smaller pieces occurs in this place ✓ (2)

**2.1.4 Letter indicating absorption of food in DIAGRAM 2.**

Letter J ✓ (1)

**2.1.5 TWO adaptations of part J.**

- Villi with capillary blood vessels for absorption of glucose/amino acids/vitamins. ✓
- Lymph vessels for absorption of fatty acids and glycerol. ✓
- Walls are heavy to allow food to move along by peristalsis. ✓
- In the mucous membrane between villi are crypts of lieberkuhn which secrete digestive juices. ✓
- Length increases surface area for absorption. ✓
- Have folds to increase absorption area. ✓ (Any 2 x 1) (2)

**2.1.6 Difference in the synthesis of amino acids between animals in DIAGRAMS 1 and 2.**

- Diagram 1 – Animal can synthesise their own amino acids through microbe actions. ✓
- Diagram 2 – Animal cannot synthesise their amino acids and must be included in their ration. ✓ (2)

## 2.2 Nutritional information of feeds

### 2.2.1 TWO protein rich concentrates with reason

- Fish meal ✓
- Milk powder ✓
- Linseed oilcake ✓  
1)

(Any 2 x

(2)

**Reason** – they have a high percentage of digestible protein ✓

(1)

### 2.2.2 Choice of feed for growing animals

Fishmeal ✓

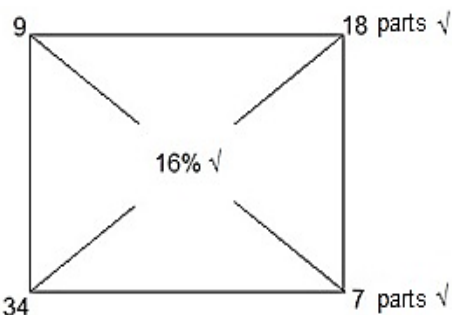
(1)

**Justification** – have a higher percentage of protein than the other feeds which is needed for growth. ✓

(1)

### 2.2.3 Pearson square

Maize meal



Linseed

- Ratio of maize meal to linseed oil cake is 18 : 7. ✓

(4)

## 2.3 Calculation of digestible co efficiency

$$\text{Moisture content of hay} = \frac{12\% \times 15 \text{ kg}}{100}$$

$$= 1,8 \text{ kg}$$

$$\begin{aligned} \text{Dry mass of hay} &= 15 \text{ kg} - 1,8 \text{ kg} \\ &= 13,2 \text{ kg} \checkmark \end{aligned}$$

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

$$= \frac{13,2 \text{ kg} - 6 \text{ kg}}{13,2 \text{ kg}} \times 100 \checkmark$$

$$= 54,5 / 55\% \checkmark$$

(5)

## 2.4 Deficiency symptoms of minerals

2.4.1 Phosphorus ✓

(1)

2.4.2 Iron ✓

(1)

2.4.3 Iodine ✓

(1)

**2.5 Calculation of fodder requirement**

Fodder requirement = 225 FU x 10 kg DM/day

= 2250 kg DM/ day ✓

Therefore Fodder requirement per month = 2 250 kg x 30 ✓

= 67 500 kg DM/month ✓

Fodder requirement per year = 67 500 kg x 12 months ✓

= 810 000 kg DM/per year /

810 tons DM/per year ✓ (5)

**2.6 Methods of mineral supplementation**

2.6.1 Cafeteria-style / free choice (1)

2.6.2 Injection (1)

2.6.3 Supplementing ration (1)

**[35]**

**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 Critical temperature, heat production, space requirements of animals****3.1.1 Animal that can be kept extensively**

Dairy cows ✓

**Reason**

They have the lowest lower critical temperature. ✓

(2)

**3.1.2 Explanation of high heat production in cows**

Rumen micro-organisms generate heat ✓ during the fermentation of crude fibre. ✓

(2)

**3.1.3 TWO farm animals raised most intensively**

Chickens ✓

Piglets ✓

(2)

**3.1.4 TWO reasons to support answer in QUESTION 3.1.3.**

- They have the highest lower critical temperature (°C). ✓
- They produce less heat (kJ/hour). ✓

(2)

**3.1.5 Equipment to ensure correct temperature for chickens.**

- Heaters ✓
- Insulation material ✓

(Any 1 x 1)

(1)

**3.2 Processes through which animals lose heat.**

3.2.1 Conduction ✓

(1)

3.2.2 Convection ✓

(1)

3.2.3 Heat radiation ✓

(1)

3.2.4 Excretion ✓

(1)

**3.3 Structures used for sheltering farm animals****3.3.1 Identification of structures**

- (a) C/A ✓ (1)
- (b) C/E ✓ (1)
- (c) D ✓ (1)

**3.3.2 B ✓**

- D ✓ (2)

**3.4 Foot-and-mouth disease****3.4.1 Pathogen causing the disease**

- Virus ✓ (1)

**3.4.2 Support that the disease can infect a number of animals**

- FMD is epidemic. ✓
- Highly contagious disease that spreads rapidly. ✓ (Any 1 x 1) (1)

**3.4.3 THREE symptoms of the disease**

- Blisters on the tongue, nose, mouth and between the toes ✓
- Severe lameness ✓
- Lack of appetite ✓
- Sticky, foamy salivation ✓ (Any 3 x 1) (3)

**3.4.4 TWO steps to prevent the spread of this disease.**

- Vaccinate animals ✓
- Destroy vectors ✓
- Clean and disinfect farm equipment ✓
- Put infected animals under quarantine ✓
- Burn all infected and susceptible animals ✓ (Any 2 x 1) (2)

**3.5 Life cycle of a parasite****3.5.1 Identification of an external parasite**

Bont-legged tick ✓ (1)

**3.5.2 Classification based on life cycle**

2-host tick ✓ (1)

**3.5.3 THREE forms in which parasite appears during the life cycle.**

- Eggs ✓
  - larvae ✓
  - Nymph ✓
  - Adult ✓
- (Any 3 x 1) (3)

**3.5.4 TWO economic losses**

- Expensive to eradicate ticks from a herd of cattle. ✓
  - Cost of building facilities like spray race, dipping tanks. ✓
  - Cost of labour during livestock treatment. ✓
  - Reduced productivity. ✓
- (Any 2 x 1) (2)

**3.6 Plant poisoning**

3.6.1 To neutralise the plant poison ✓ (1)

3.6.2 To maintain liver function ✓ (1)

3.6.3 To expel the poison ✓ (1)

**[35]**



**QUESTION 4: ANIMAL REPRODUCTION****4.1 4.1.1 Identification of reproductive organs**

- A Seminal vesicles / Vesicular gland ✓
- B Urethra / Penis / Sigmoid flexure ✓
- D Testis/Testicles ✓ (3)

**4.1.2 TWO congenital defects causing sterility in part D.**

- Hypoplasia ✓
- Cryptorchidism ✓
- Sperm defects ✓ (Any 2 x 1) (2)

**4.1.3 ONE functions of the hormone secreted in part D**

- Production of male gametes / Stimulates sperm formation/spermatogenesis. ✓
- Responsible for male masculine characteristics. ✓
- Promote sexual desire. ✓
- Promote sexual activity. ✓ (Any 1 x 1) (1)

**4.2 Cloning****4.2.1 Differentiation between reproductive and therapeutic cloning.**

- Reproductive cloning – is a cloning where a new organism is created. ✓
- Therapeutic cloning – is a cloning that produces embryonic stem cells with the aim of creating tissues to replace injured tissues. ✓ (2)

**4.2.2 TWO disadvantages of cloning**

- It is expensive and inefficient. ✓
- Cloned animals age prematurely. ✓
- Dystocia problems can rise because clones can be very large at birth. ✓
- Cloned animals do not have good immune systems. ✓
- Clones can produce oversize offspring with enlarged hearts, immature lungs and damaged kidneys. ✓ (Any 2 x 1) (2)

### 4.3 Foetus presentation

#### 4.3.1 Letter representing foetus presentation

(a) B ✓ (1)

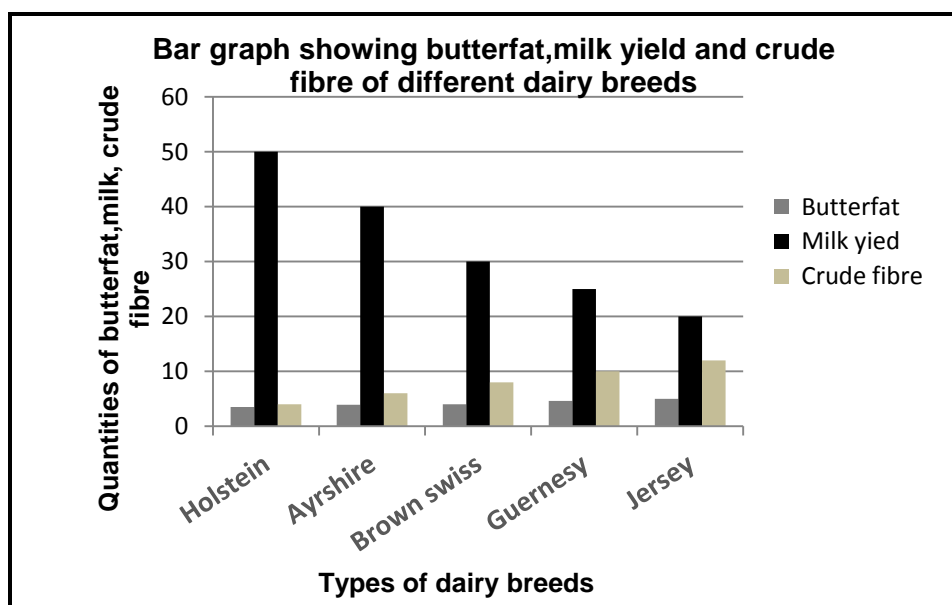
(b) A ✓ (1)

#### 4.3.2 TWO conditions resulting in the illustration marked diagram B.

- Heavy birth weight ✓
- Foetus malformation ✓
- Flexion of the elbow ✓
- Deviation of the head ✓
- Retention of one or both legs ✓ (Any 2 x 1) (2)

### 4.4 Butterfat content, milk yield and crude fibre of dairy breeds

#### 4.4.1 Bar graph



Marking graph with the following checklist

Criteria	Yes: 1 mark	No: 0 mark
• Bar graph	1	0
• Y-axis labelled	1	0
• X-axis labelled	1	0
• Points correctly plotted	1	0
• Correct heading	1	0
• Key	1	0

(6)

4.4.2 **Dairy breed with the highest milk yield:**  
Holstein ✓ (1)

4.5 **Equipment and techniques used in animal reproduction.**

4.5.1 **Instrument in DIAGRAM A**  
Artificial vagina ✓ (1)

4.5.2 **Technique in DIAGRAM B**  
Artificial insemination/AI ✓ (1)

4.5.3 **Correct time for AI**  
When signs of oestrus are observed in the morning, inseminate in the afternoon ✓ and vice versa (1)

4.5.4 **Type of evaluation illustrated by DIAGRAM C**

- Sperm evaluation ✓
- Microscopic evaluation ✓ (Any 1 x 1) (1)

4.5.5 **TWO characteristics of semen**

- 80% of sperms should show forward movement ✓
- Dead sperms should be less than 15% ✓
- Fewer than 20% of sperms showing signs of deviation ✓
- No blood should be present ✓
- No infection ✓ (Any 2 x 1) (2)

4.6 **Process of ovogenesis**

4.6.1 **Identification of the process**  
Ovogenesis/Oogenesis ✓ (1)

4.6.2 **Process indicated by letters**  
A – Mitosis ✓  
B – Meiosis II ✓ (2)

4.6.3 **Letter and name representing haploid cell**  
D ✓ secondary oocyte ✓ (2)

**4.7 Technique of embryo transfer****4.7.1 Identification of the technique**

Embryo transfer/transplantation/ET ✓

(1)

**4.7.2 TWO advantages of the technique**

- Ten or more progeny from the best cows is produced per year. ✓
- Profit is made from the increased sale of quality genetics without losing the bloodline. ✓
- The productive life of older cows is extended. ✓
- Animals can be bred with improved efficiency of milk or meat production and improved resistance to diseases. ✓
- Offspring can still be obtained from genetically valuable cows that have become infertile. ✓
- Genetic material can be transported internationally. ✓(Any 2 x 1)

(2)  
**[35]****TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**