



# **basic education**

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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **SENIOR CERTIFICATE EXAMINATION**

**AGRICULTURAL SCIENCES P1**

**2015**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 10 pages.**

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

1.1	1.1.1	A ✓✓	(10 x 2)	(20)
	1.1.2	D ✓✓		
	1.1.3	B ✓✓		
	1.1.4	C ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	A ✓✓		
	1.1.9	D ✓✓		
	1.1.10	C ✓✓		
1.2	1.2.1	B only ✓✓	(5 x 2)	(10)
	1.2.2	Both A and B ✓✓		
	1.2.3	B only ✓✓		
	1.2.4	A only ✓✓		
	1.2.5	None ✓✓		
1.3	1.3.1	Oesophageal groove ✓✓	(5 x 2)	(10)
	1.3.2	Bacteria/micro organisms ✓✓		
	1.3.3	Red ✓✓		
	1.3.4	Meiosis ✓✓		
	1.3.5	Freemartin/freemartinism/queen ✓✓		
1.4	1.4.1	Iodine/I ✓	(5 x 1)	(5)
	1.4.2	Roasting ✓		
	1.4.3	Tranquilisers ✓		
	1.4.4	Homoeothermic/endothermic/warm blooded ✓		
	1.4.5	Oxytocin ✓		
<b>TOTAL SECTION A</b>			<b>45</b>	

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 The alimentary canal of a farm animal****2.1.1 Type of farm animal represented by the diagram**

Chicken/fowl/poultry/bird ✓

(1)

**2.1.2 Motivation for the answer**

- Crop ✓
- Proventriculus/granular/true stomach ✓
- Ventriculus/muscular/gizzard ✓
- Caeca/blind guts ✓
- Cloaca/vent ✓

(Any 3) (3)

**2.1.3 Letters of the parts where each of the following occurs**

(a) Excretion - I ✓

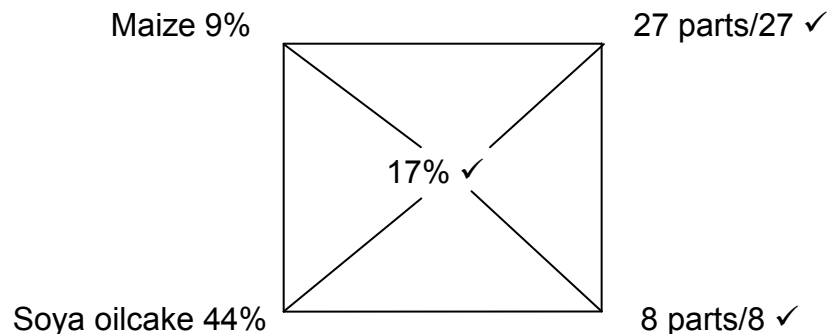
(1)

(b) Microbial fermentation - G ✓

(1)

(c) Mechanical digestion - D ✓

(1)

**2.2 Pearson square method****2.2.1 Pearson square method to balance the ration**

(3)

**2.2.2 Calculations to show the percentage of feeds in a ration**Total:  $27 + 8 = 35$  ✓% Maize:  $27 \div 35 \times 100$  ✓ = 77,14/77% ✓% Soya oilcake:  $8 \div 35 \times 100$  ✓ = 22,86/23% ✓

(5)

**2.3 Fodder flow programme**

2.3.1 **Total quantity of lucerne (DM in kg) required per year**  
600kg x 12 ✓ = 7 200kg lucerne ✓ (2)

2.3.2 **Availability of feed for the animals for one year**  
There will not be enough feed ✓  
**Reason**  
Animals require 7 200kg, production is 5 800kg of lucerne/1 400kg deficit/less feed ✓ (2)

2.3.3 **Month with the highest production**  
• December ✓ (1)

2.3.4 **Alternatives to fulfill feed requirements of the animals**  
• Protein rich supplement/sources ✓  
• Green fodder ✓  
• Plant crops to be used as silage ✓  
• Crop residues to be utilized as stover ✓ (Any 2) (2)

**2.4 Piglets in a concrete pen**

2.4.1 **The appropriate term for this condition**  
Anaemia ✓ (1)

2.4.2 **THREE visible symptoms associated with the condition**  
• Diarrhoea ✓  
• Paleness of the mucus membranes/skin ✓  
• Loss of appetite/anorexia ✓  
• Listlessness/appear tired/weakness ✓  
• Rapid breathing ✓  
• Loose, wrinkled skin ✓  
• Swelling of the head/eyes/shoulders ✓ (Any 3) (3)

2.4.3 **TWO precautionary measures for this condition**  
• Iron/Fe-injection ✓  
• Putting soil sods in the pen ✓  
• Painting teats with an iron solution/iron sulphate ✓  
• Supplementing/creep feeding/ration ✓ (Any 2) (2)

**2.5 Ration formulated for dairy cattle****2.5.1 Calculation of the nutritive ratio**

% digestible non-nitrogen substances = TDN – DP

$$= 80\% - 10\% = 70\% \checkmark$$

$$\text{NR} = 1: \frac{\% \text{DNNS}}{\% \text{DP}} \quad \text{OR} \quad \text{NR} = 1: \frac{\% \text{TDN} - \% \text{DP}}{\% \text{DP}} \checkmark$$

$$\text{NR} = 1: \frac{70\%}{10\%} \checkmark$$

$$\text{NR} = 1:7 \checkmark$$

(4)

**2.5.2 Suitability of ration**

- Unsuitable/not suitable  $\checkmark$

(1)

**2.5.3 TWO reasons for the answer**

- NR is wider than 1:6  $\checkmark$
- Protein content is too low  $\checkmark$

(2)

**[35]**

**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 FARMER A and FARMER B have each started an intensive production venture with young lambs****3.1.1 Reason for the housing layouts of FARMER A**

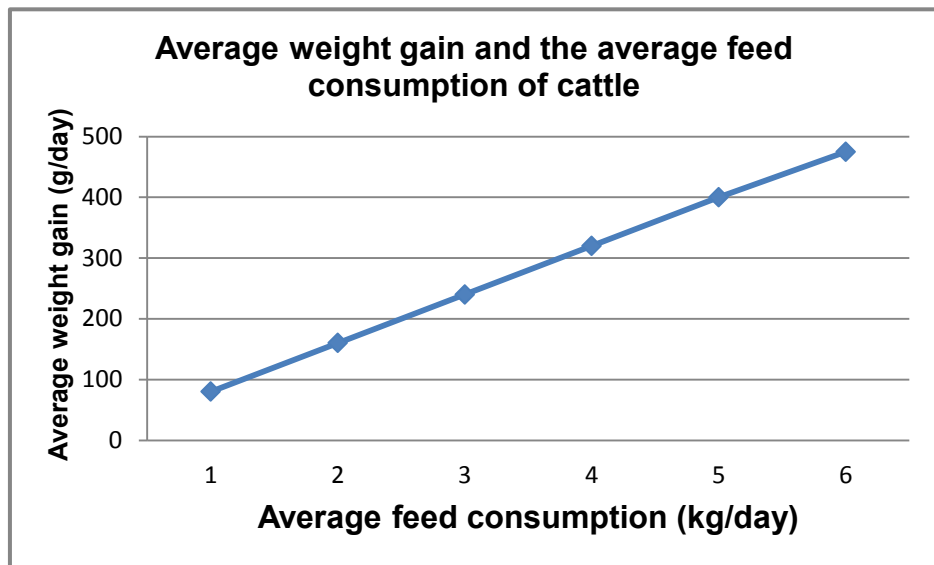
- (a) **Building on a slight slope**  
• Water can run off ✓ (1)
- (b) **Dry bedding**  
• Protect animals against cold ✓ (1)
- (c) **Cemented floor**  
• Easy to clean/hygienic conditions/avoid mud when wet ✓ (1)
- (d) **Long building with long axis facing east**  
• Warmer in winter/cooler in summer ✓ (1)

**3.1.2 The impact on production for FARMER B:**

- (a) **House facing north direction**  
• Very hot in summer ✓  
• Warm in winter ✓ (2)
- (b) **Muddy floor**  
• Foot diseases ✓  
• Hygienic problems ✓  
• Parasite infestation ✓ (Any 2) (2)
- (c) **Build on level ground**  
• Water cannot run off/poor drainage/stagnation of water ✓  
• Muddy/unhygienic conditions ✓ (2)

### 3.2 Graph on feed consumption and weight gain for beef cattle

#### 3.2.1 Line graph on average feed consumption/average weight gain



#### 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 ✓
- Line graph ✓

(6)

#### 3.2.2 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 ✓✓

(2)

### 3.3 Various stages of the life cycle of a parasite

#### 3.3.1 Name and type of parasite represented

- Bont tick ✓
- External/ecto parasite ✓

(2)

#### 3.3.2 Classification of the type of parasite according to the life cycle

Three-host parasite ✓

(1)

#### 3.3.3 Letters representing the stages in the life cycle of the parasite:

- (a) The larvae that hatches from the eggs - B ✓
- (b) The nymph feeding on the second host - D ✓
- (c) Ticks feeding on the third host - E ✓
- (d) The first host - C ✓

(1)

(1)

(1)

(1)

**3.3.4 TWO damaging effects this parasite has on livestock**

- Damage the skin/teats/genitals ✓
- Lowering the resistance of the host ✓
- Anaemia as a result of blood sucked from the host ✓
- Transmission of diseases ✓
- Death ✓
- General deterioration ✓
- Irritation ✓

(Any 2) (2)

**3.4 Scenario on an integrated production system****3.4.1 Definition of intensive production system**

- Small area with lots of animals ✓
- Human and technological involvement and intervention ✓
- High production in/outputs ✓
- Independent from nature ✓

(Any 2) (2)

**3.4.2 Evidence of TWO intensive production systems**

- Irrigation ✓
- Feedlot ✓
- Planted pastures ✓

(Any 2) (2)

**3.4.3 TWO reasons for planting trees on the natural pastures**

- Protect animals against extreme environmental conditions (sunlight/heat/radiation/cold/wind/rain) ✓
- Provide shade ✓
- Provide shelter/protection ✓
- Feeding/nutrition ✓

(Any 2) (2)

**3.4.4 Scientific term for the farming system**

- Extensive production system ✓

(1)

**3.4.5 Influence of feedlot on the stock density**

- Stock density will go up/increase/improve/become more ✓

(1)

**[35]**



**QUESTION 4: ANIMAL REPRODUCTION****4.1 The pie chart is a representation of the oestrus cycle in cows****4.1.1 Duration of the oestrus cycle in non-pregnant cows**

- 18 - 24 days ✓ (1)

**4.1.2 Percentage which corresponds with the stage at which the cow will mate with a bull**

- 4% ✓ (1)

**4.1.3 Stage and hormone responsible for the condition**

- Oestrus ✓
- Oestrogen ✓ (2)

**4.1.4 The hormone responsible for each of the following percentages:**

- (a) 4% - Oestrogen ✓ (1)
- (b) 12% - Follicle stimulating hormone/FSH ✓ (1)
- (c) 15% - Luteinising hormone/LH ✓ (1)
- (d) 69% - Progesterone ✓ (1)

**4.2 Artificial insemination****4.2.1 Definition of artificial insemination**

- The collection of semen from the bull and ✓
- Placing of the semen into the reproductive canal of a cow ✓
- Leading to the fertilisation without natural mating ✓ (3)

**4.2.2 TWO prerequisites for the successful artificial insemination**

- Cows must be in oestrus/heat ✓
  - AI must take place on the correct point in oestrus/timing ✓
  - Use healthy/uninfected/viable semen ✓
  - Used sterilized instruments ✓
  - Done by qualified person/personnel/correct technique ✓
- (Any 2) (2)

- 4.2.3 **THREE dilutants commonly used to dilute semen**
- Milk ✓
  - Fructose/glucose (nutrients) ✓
  - Egg yolk ✓
  - Lipids ✓
  - Glycerol ✓
  - Buffers/sodium citrate ✓
  - Antibiotics/penicillin ✓
- (Any 3) (3)

- 4.2.4 **ONE other method for his cows to produce offspring**
- Cloning ✓
  - Natural mating ✓
- (Any 1) (1)

### 4.3 The process of mating

- 4.3.1 **FIVE stages of mating in sequential order**
- Courtship/Sexual attraction ✓
  - Mounting ✓
  - Copulation/intromission ✓
  - Ejaculation ✓
  - Dismounting ✓
- (5)

- 4.3.2 **THREE factors regulating mating behavior among bulls**
- Genetic make-up ✓
  - Environmental factors ✓
  - Physiological factors ✓
  - Health ✓
  - Experience ✓
- (Any 3) (3)

### 4.4 Developing embryo

- 4.4.1 **Identification of letters and the names of parts:**
- (a) G ✓ Placenta ✓ (2)
- (b) A ✓ Amnion ✓ (2)
- (c) F ✓ Chorion ✓ (2)

- 4.4.2 **THREE functions of the part B (Amniotic fluid)**
- Shock absorber ✓
  - Allow movement of foetus ✓
  - Regulates temperature ✓
  - Lubricates birth canal ✓
  - Prevents desiccation of foetus ✓
- (Any 3) (3)

- 4.4.3 **The substance that is enclosed by the membrane labelled A**
- Amniotic fluid ✓ (1)
- [35]**

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