



# **basic education**

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

## **SENIOR CERTIFICATE EXAMINATIONS**

**AGRICULTURAL SCIENCES P1**

**JUNE 2017**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 10 pages.**

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

|                         |        |                                |           |      |
|-------------------------|--------|--------------------------------|-----------|------|
| 1.1                     | 1.1.1  | C ✓✓                           | (10 x 2)  | (20) |
|                         | 1.1.2  | A ✓✓                           |           |      |
|                         | 1.1.3  | B ✓✓                           |           |      |
|                         | 1.1.4  | D ✓✓                           |           |      |
|                         | 1.1.5  | D ✓✓                           |           |      |
|                         | 1.1.6  | B ✓✓                           |           |      |
|                         | 1.1.7  | C ✓✓                           |           |      |
|                         | 1.1.8  | C ✓✓                           |           |      |
|                         | 1.1.9  | A ✓✓                           |           |      |
|                         | 1.1.10 | D ✓✓                           |           |      |
| 1.2                     | 1.2.1  | A only ✓✓                      | (5 x 2)   | (10) |
|                         | 1.2.2  | None ✓✓                        |           |      |
|                         | 1.2.3  | B only ✓✓                      |           |      |
|                         | 1.2.4  | Both A and B ✓✓                |           |      |
|                         | 1.2.5  | A only ✓✓                      |           |      |
| 1.3                     | 1.3.1  | Eructation/belching/burping ✓✓ | (5 x 2)   | (10) |
|                         | 1.3.2  | Farrowing pen ✓✓               |           |      |
|                         | 1.3.3  | Lactation ✓✓                   |           |      |
|                         | 1.3.4  | Flushing/harvesting ✓✓         |           |      |
|                         | 1.3.5  | Concentration ✓✓               |           |      |
| 1.4                     | 1.4.1  | Finisher ✓                     | (5 x 1)   | (5)  |
|                         | 1.4.2  | Optimal/optimum ✓              |           |      |
|                         | 1.4.3  | Oxytocin ✓                     |           |      |
|                         | 1.4.4  | Multiple ✓                     |           |      |
|                         | 1.4.5  | Implantation ✓                 |           |      |
| <b>TOTAL SECTION A:</b> |        |                                | <b>45</b> |      |

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 An alimentary canal of fowls****2.1.1 Identification of the letter of TWO parts representing accessory glands**

- D ✓
- E ✓

(2)

**2.1.2 Function of the parts**

B - Secretion of digestive juices/enzymes/chemical digestion ✓

C - Grinding of the food/mechanical (physical) digestion ✓

(2)

**2.1.3 Structural difference between the large intestines of fowls and cattle**

- Fowls have caeca/two blind guts ✓
- Cattle have caecum/one blind gut ✓

(2)

**2.2 Energy distribution****2.2.1 Identification**

A - Metabolic energy/ME ✓

B - Faeces/manure ✓

C - Energy loss through heat ✓

(1)

(1)

(1)

**2.2.2 DE in full**

Digestible energy ✓

(1)

**2.2.3 THREE important uses of net energy by farm animals**

- Maintenance ✓
- Production ✓
- Growth ✓
- Reproduction ✓
- Fattening ✓
- Work ✓

(Any 3) (3)

**2.3 Ration in sheep****2.3.1 Identification of the feed components**

(a) - Lucerne hay ✓

(b) - Maize meal ✓

(c) - Urea ✓

(3)

**2.3.2 Calculation (in percentage) of the mineral content**

5% + 2% ✓

= 7% ✓

(3)

**2.3.3 Reason for the inclusion of salt in licks**

To regulate/control the intake of licks ✓

(1)

## 2.4 The composition of feeds

### 2.4.1 Calculation of the nutritive ratio (NR) of feed A

$$\text{NR} = 1: \frac{\% \text{ digestible non-nitrogen components}}{\% \text{ digestible crude protein}} \checkmark$$

OR

$$\text{NR} = 1: \frac{\text{TDN} - \text{DP}}{\text{DP}} \checkmark$$

$$= 1: \frac{80\% - 8\%}{8\%} \checkmark \quad \text{OR} \quad 1: \frac{72\%}{8\%} \checkmark$$

$$= 1:9 \checkmark$$

(3)

### 2.4.2 Feed recommended for fattening

Feed A  $\checkmark$

(1)

### 2.4.3 Reason

Wide NR/1:9/contains more carbohydrates than proteins  $\checkmark$

(1)

### 2.4.4 Distinction between Narrow NR

- NR is lower than 1:6/contains more proteins  $\checkmark$

(1)

### Wide NR

- NR is greater or equal to 1:6/contains more carbohydrates and fats  $\checkmark$

(1)

## 2.5 Production of lucerne over a period of one year

### 2.5.1 Identification of the months with the lowest lucerne production

- June  $\checkmark$
- July  $\checkmark$

(2)

### 2.5.2 Reason for the answer in QUESTION 2.5.1

- Lowest quantity/50 kg DM/ha  $\checkmark$
- Winter/dry season in the summer rainfall areas  $\checkmark$
- Limited rain in the summer rainfall areas  $\checkmark$
- Not in the growing season  $\checkmark$

(Any 1) (1)

### 2.5.3 TWO measures to address low production

- Storage of excess feed during the growing season  $\checkmark$
- Reduce livestock  $\checkmark$
- Provision of supplementary feeding  $\checkmark$

(Any 2) (2)

### 2.5.4 Calculation of the production from August to December

$$200 + 300 + 400 + 600 + 1\,200 \checkmark$$

$$= \underline{2\,700 \text{ kg}} \checkmark$$

$$\frac{1\,000}{1\,000}$$

$$= 2,7 \text{ tons} \checkmark$$

(3)

**[35]**

**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 Scenario on animal handling****3.1.1 THREE basic guidelines for vehicles transporting animals**

- Suitable for the animals ✓
- Sufficient floor space ✓
- Sides must be strong ✓
- The back must be closed to avoid inhalation of exhaust fumes ✓
- Sides need to be high enough ✓
- Floors should not be slippery/bedding ✓
- No sharp edges to harm/injure animals ✓
- Protection against cold/hot conditions
- Well ventilated ✓
- Provide shade ✓
- Must be kept clean ✓

(Any 3) (3)

**3.1.2 TWO important aspects for moving animals on a public road**

- Red flag 200 m in front/behind ✓
- Move on the side of the road ✓
- Preferably in the morning ✓
- Move the animals slowly at their own pace ✓
- Always carry proper documentation/permit ✓

(Any 2) (2)

**3.1.3 TWO guidelines when moving cows with calves**

- Give cows time to pick up their calves before moving ✓
- Avoid chasing cows and calves with dogs ✓
- Beware of aggressive behaviour/avoid being too close ✓
- Move them slowly ✓
- Keep an obstruction between handler and the cows ✓

(Any 2) (2)

**3.2 Facility used in an animal production system****3.2.1 Reason for handling farm animals in facility**

- A** Administration of medication/observation/handling/management practices/procedure ✓
- B** Dipping ✓

(1)

(1)

**3.2.2 TWO basic design features of the handling facility A**

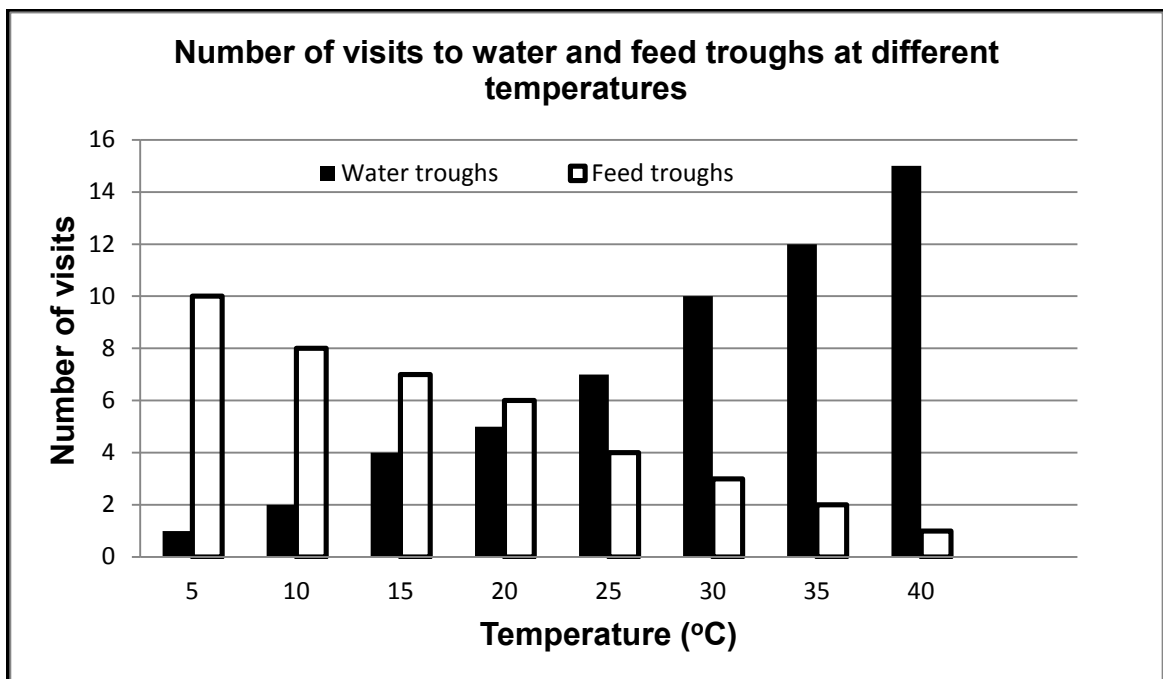
- Must be strong ✓
- Functional for the specific animal ✓
- Able to see other animals in front of them/no dead ends ✓
- Sufficient width according to the type of animal ✓
- Make provision to immobilise/sort animals ✓
- Animals should be able to see through ✓
- No sharp edges to harm/injure animals ✓

(Any 2) (2)

**3.2.3 THREE effects of incorrect handling of sheep**

- Damages the skin/wool/meat ✓
- Leads to injured and stressed animals ✓
- Rams can harm a handler ✓
- Ewes may reject their lambs ✓
- Sheep will get frightened ✓

(Any 2) (2)

**3.3 Graph on the visits to feed and water troughs.****3.3.1 Bar graph on the visits to the feed and water troughs at different temperatures****Criteria/rubric/marketing guidelines**

- Correct heading ✓
- Y-axis - correctly calibrated and labelled (Number of visits) ✓
- X-axis - correctly calibrated and labelled (Temperature) ✓
- Correct unit (°C) ✓
- Bar graph ✓
- Accuracy ✓

(6)

**3.3.2 Indication of the trend**

The higher the temperature the more visits to the water troughs ✓  
and the fewer the visits to the feed troughs ✓

**OR**

The lower the temperature the lesser visits to the water troughs ✓  
and the more the visits to the feed troughs ✓

(2)

**3.3.3 Measure to reduce the impact of varying temperatures**

- Provision of shelter ✓
- Heating/cooling/air conditioners ✓

(Any 1) (1)

**3.4 The life cycle of an internal parasite in farm animals****3.4.1 Classification according to the life cycle**

Two host parasite ✓

(1)

**3.4.2 Identification of the two hosts needed by the parasite**

- Mites ✓
- Sheep ✓

(2)

**3.4.3 THREE symptoms of parasite infestation**

- Poor growth/production/dry rough hair/wool ✓
- Weight loss (weakness/listlessness) ✓
- Loss of appetite/anorexia/eating disorders ✓
- Pot/bloated belly ✓
- Diarrhoea ✓
- White segments in the faeces ✓
- Digestive disorders ✓

(Any 3) (3)

**3.5 Management practices to control external parasites****3.5.1 Identification of the management practice**

- (a) Biological control ✓
- (b) Immunization ✓
- (c) Breeding ✓

(1)

(1)

(1)

**3.5.2 THREE economic implications of these parasites**

- Production losses ✓
- Death of animals ✓
- Skin/hides/teats/udders/ears are damaged ✓
- Financial/cost/time/labour implications of treatment ✓
- Loss of profit ✓

(Any 3) (3)

**[35]**

**QUESTION 4: ANIMAL REPRODUCTION****4.1 The reproductive tract of the bull****4.1.1 Identification of parts**

- A** Seminal vesicle/vesicular gland ✓ (1)  
**B** Prostate gland ✓ (1)

**4.1.2 ONE function of part G**

- Secretes the seminal fluid ✓ (1)

**4.1.3 The role of the hormone secreted in part E**

- Responsible for the development of the secondary male characteristics ✓
- Normal mating behaviour/enhance sexual behaviour/libido ✓
- Production/transportation of spermatozoa ✓
- Maintenance of optimal conditions for spermatogenesis ✓
- Maintenance of the male duct system ✓ (Any 1) (1)

**4.1.4 Reason for part F located outside the body of the bull**

- Regulate the temperature of the testis for spermatogenesis ✓ (1)

**4.1.5 The process used to remove part E in young calves**

- Castration ✓ (1)

**4.2 Infertility in bulls****4.2.1 A term for identified condition**

- Infertility/sterility ✓ (1)

**4.2.2 THREE causes of infertility**

- Diseases ✓
- Infections ✓
- Congenital defects ✓
- Malnutrition ✓
- Old age/senility ✓
- High environmental temperatures ✓ (Any 3) (3)

**4.2.3 THREE characteristics of a good quality semen**

- Mobility/live sperm cells ✓
- Concentration of sperm cells ✓
- Less than 20%/few abnormalities/defects ✓ (3)



### 4.3 Scenario on artificial insemination

#### 4.3.1 Method of detecting the presence of the diseases in semen

- Microscopic examination ✓
- Macroscopic/physical examination ✓ (Any 1) (1)

#### 4.3.2 TWO requirements for successful artificial insemination

- Use only good quality/live/viable/healthy/clean semen ✓
- Correct technique ✓
- Operator with experience/expert knowledge/skill ✓
- Correct timing/cows needs to be in oestrus ✓
- Clean/sterile equipment ✓ (Any 2) (2)

#### 4.3.3 Equipment used for artificial insemination

- (a) Electro-ejaculator/electrical stimulation probe ✓ (1)
- (b) Nitrogen flask/tank ✓ (1)
- (c) Semen straw ✓ (1)

#### 4.3.4 TWO disadvantages of artificial insemination

- Spread of diseases if semen is not tested ✓
- Inexperience/unskilled operator may cause damage to the animal ✓
- Decreased genetic variation ✓
- Some heifers are difficult to inseminate successfully ✓
- May not give the desirable results ✓
- Higher management demands ✓
- Undesirable traits/congenital defects may be transferred to more offspring ✓
- Labour intensive ✓
- Time consuming ✓
- Expensive procedure ✓ (Any 2) (2)

### 4.4 The reproduction process

#### 4.4.1 Identification of parts

- A Ovum/female reproductive cell/gamete/egg cell ✓ (1)
- B Embryo ✓ (1)

#### 4.4.2 The structure/organ in the reproduction canal

- (a) Uterus ✓ (1)
- (b) Fallopian tube/oviduct ✓ (1)
- (c) Ovary ✓ (1)

- 4.4.3 **Termination of pregnancy**  
 (a) Abortion/miscarriage ✓ (1)  
 (b) **One cause of abortion**
- Malnutrition ✓
  - Injuries ✓
  - Hormonal disturbances/stress conditions ✓
  - Toxins/poisonous substances/laxatives/clovers high in oestrogen/immunization of pregnant animals ✓
  - Diseases ✓
  - Multiple births ✓ (Any 1) (1)
- 4.5 **Embryo transplant (ET)**
- 4.5.1 **Type of cow**  
 Donor/superior cow ✓ (1)
- 4.5.2 **Motivation**  
 Embryos are flushed from the uterus ✓ (1)
- 4.5.3 **The concept recipient cow**  
 An inferior/surrogate cow that receives an embryo, mothers and gives birth ✓ to a superior calf ✓ (2)
- 4.5.4 **TWO disadvantages of embryo transplant**
- Conception rate is low ✓
  - Expensive procedure/no guarantees for success ✓
  - Very scientific/complex procedure ✓
  - Expert knowledge/skills required/veterinarian ✓
  - Time consuming/labour intensive ✓
  - Diseases can be transmitted ✓
  - Abortions may occur ✓ (Any 2) (2)
- 4.5.5 **The main reason for embryo transplant**  
 To produce more genetically superior offspring from genetically superior parents ✓ (1)  
**[35]**

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