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# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**FEBRUARY/MARCH 2012**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 11 pages.**

**SECTION A****QUESTION 1.1**

1.1.1	<b>A</b>	<b>B</b>	<b>C</b>	<b>X✓✓</b>
1.1.2	<b>X✓✓</b>	<b>B</b>	<b>C</b>	<b>D</b>
1.1.3	<b>A</b>	<b>X✓✓</b>	<b>C</b>	<b>D</b>
1.1.4	<b>A</b>	<b>B</b>	<b>C</b>	<b>X✓✓</b>
1.1.5	<b>A</b>	<b>X✓✓</b>	<b>C</b>	<b>D</b>
1.1.6	<b>A</b>	<b>B</b>	<b>X✓✓</b>	<b>D</b>
1.1.7	<b>X✓✓</b>	<b>B</b>	<b>C</b>	<b>D</b>
1.1.8	<b>A</b>	<b>B</b>	<b>C</b>	<b>X✓✓</b>
1.1.9	<b>A</b>	<b>B</b>	<b>C</b>	<b>X✓✓</b>
1.1.10	<b>A</b>	<b>B</b>	<b>X✓✓</b>	<b>D</b>

(10 x 2) (20)

**QUESTION 1.3**

1.3.1 Silage/green feeds ✓✓

1.3.2 Mineral licks/Lick ✓✓

1.3.3 Cross-breeding ✓✓

1.3.4 Holding pen/crush ✓✓

1.3.5 Feedlot ✓✓

(5 x 2) (10)

**QUESTION 1.2**

1.2.1	<b>A✓✓</b>
1.2.2	<b>C✓✓</b>
1.2.3	<b>C✓✓</b>
1.2.4	<b>A✓✓</b>
1.2.5	<b>B✓✓</b>

(5 x 2) (10)

**QUESTION 1.4**

1.4.1 Cobalt ✓

1.4.2 Homogenous ✓

1.4.3 Indigenous ✓

1.4.4 Endothermic ✓

1.4.5 Subsistence ✓

(5 x 1) (5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 THE PROCESS OF RUMINATION IN RUMINANTS**

- 2.1.1 A- rumen  
B- omasum (2)
- 2.1.2 Explanation of the process of rumination  
 • Swallowed food (bolus) from the mouth enters the rumen (storage) through the oesophagus ✓  
 • Mixing, moistening and softening by the fluid and bacterial action occurs ✓  
 • Reverse/retro-peristalsis takes place and food (cud) is forced back into the mouth for rumination to occur ✓  
 • The chewed food is swallowed and then fall into the reticulum (mixing of food) ✓  
 • Food then passes to the omasum (drying) then into the abomasum (enzymatic digestion occurs) ✓ (Any 3) (3)
- 2.1.3 Letters that correspond with the descriptions  
 (a) D ✓  
 (b) C ✓  
 (c) C ✓ (3)
- 2.1.4 Two functions of bacteria and protozoa in the alimentary canal  
 • Synthesis of vitamins ✓  
 • Synthesis of amino acids ✓  
 • Digestion of cellulose ✓  
 • Hydrolysis of proteins ✓ (Any 2) (2)

**2.2 Digestibility of a feed**

- 2.2.1 Hay :10% of 15 kg=15 kg  
 15 kg -1,5 kg =13,5 kg dry material ✓
- Digestible coefficient=  

$$\frac{\text{DM intake (kg)} - \text{DM of manure (kg)}}{\text{DM intake (kg)}} \times 100$$

$$= \frac{13,5 \text{ kg} - 4 \text{ kg} \times 100}{13,5 \text{ kg}}$$

$$= 70,4\% \quad (4)$$
- 2.2.2 The actual quantity of feed absorbed by an animal ✓ (1)
- 2.2.3 • Crude fibre is not easily digestible/the more the crude fibre content ✓  
 • hence it makes the feed to be difficult to digest/the less the digestibility of the feed becomes ✓ (2)

### 2.3 Nutritional information of selected feeds

- 2.3.1 (a) Silage ✓  
(b) Lucerne ✓  
(c) Maize ✓ (3)

#### 2.3.2 Pearson square calculation

Sunflower oil cake meal  
DP 38 %

14% - 8.9%  
= 5,1 parts sunflower meal ✓

Maize meal  
DP 8,9 %

38 - 14 %  
= 24 parts maize meal ✓

**5,1:24 ✓✓ / Mix 5,1 parts of sunflower meal with 24 parts of maize meal ✓✓** (5)

### 2.4 Biological value of feedstuffs

#### 2.4.1 Description of the biological value

- BV = is the index or a measure ✓
- of the quality of the protein in a feed ✓
- And gives an indication of the amino-acids in the proteins ✓  
(Any 2)

**OR**

- The efficiency ✓ with which a protein supplies nitrogen/amino-acid requirement of an animal ✓

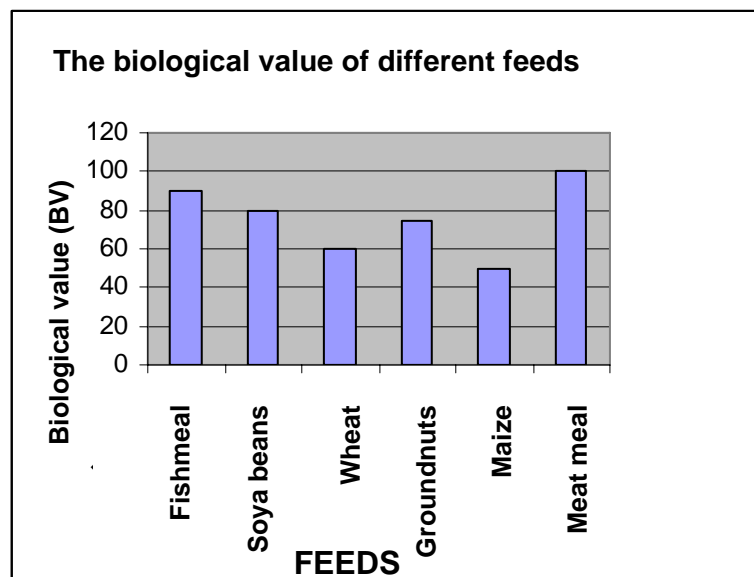
(2)

#### 2.4.2 Quality of proteins in ruminants and non-ruminants

- Ruminants: they form their own protein from feed protein through micro organisms in the Reticulo-rumen ✓
- When these micro organisms die, the amino acids are released and the protein become available for the ruminants ✓

(2)

## 2.4.3

**Checklist for marking:**

Criteria	Evidence No	Evidence Yes
Heading available	0	1
X-axis labelled	0	1
Y-axis labelled	0	1
Correct values (X-axis)	0	1
Correct values (Y-axis)	0	1
Bar graph	0	1

Total marks = 6

(6)  
[35]**QUESTION 3: ANIMAL PRODUCTION****3.1 Influence of environmental temperatures on production**

- 3.1.1
- Pigs✓
  - They are most effected by lower temperatures (lower growth rate at lower temperatures) ✓ (2)
- 3.1.2 **Methods to protect animals against extreme weather**
- Cold weather**
- Natural or artificial shelter with heaters/infra red lights and fans can be used for extreme cold conditions ✓ (Any 1)
- Hot weather**
- High temperatures: large fans/sprinklers/foggers that disperse very fine droplets of water/misters or showers ✓ (Any 1) (2)

**3.1.3 Advantages of constant body temperature**

- The metabolic rate of the animal is now kept at a constant level ✓
- And not dependant on the environmental temperatures ✓
- This will lead to a more effective utilisation/digestion/assimilation/absorption of feed in the body for production ✓
- Although it requires more feed to be utilised under extreme temperature conditions ✓
- Enzymes in the body function at optimal levels at different temperature conditions ✓
- As the body temperature is kept at the optimal temperatures for these enzymes to function ✓ (Any 2) (2)

**3.1.4**

- Cow ✓
- Is bigger than the pig and less heat loss in ratio with body size ✓
- Micro-organisms and rumen (fermentation) generate more heat ✓
- Pigs that are smaller have a bigger surface in relation with its volume ✓
- More heat radiation ✓ (Any 2) (2)

**3.2 Poultry production in South Africa****3.2.1 Two types of production systems**

- Extensive ✓
- Intensive ✓ (2)

**3.2.2 Three factors to consider when constructing an animal shelter**

- Location ✓
- Design ✓
- Type of animal ✓
- Material ✓
- Layout ✓ (Any 3) (3)

**3.2.3 Factors determining behaviour of farm animals**

- Breed tameness ✓
- Type of animal breed ✓
- Age of animal ✓
- Physiological and health status of an animal ✓
- Frequency of handling ✓
- Facilities and equipment used ✓
- Prevailing environment ✓ (Any 2) (2)

**3.2.4 Characteristics displayed by animals to indicate fear, aggression and contentment**

- Raised or pinned ears
- Raised tail
- Raised back hair ✓
- Bared teeth ✓
- Pawing the ground ✓
- Snorting ✓
- Wild look in the eyes ✓
- Screaming/bellowing ✓
- Fast movements/excessive movements ✓
- Scratching with hooves on ground ✓
- Fast breathing rate ✓
- Unfamiliar behaviour ✓

(Any 2) (2)

**3.3 Enterprise systems**

- 3.3.1 Structure (a) - 2✓  
(b) - 1✓

(1)  
(1)**3.3.2 Characteristics of production system marked 2**

- Animals graze freely in camps ✓
- Less capital intensive ✓
- Few labourers needed ✓
- Little human interference ✓
- Free animal movement ✓
- Minimal control and supervision of animals ✓
- Animals kept in low density ✓
- Large area utilized for production purpose ✓

(Any 2) (2)



## 3.3.3 Comparison of production system marked 2 and 3

ASPECT	PRODUCTION SYSTEM 2	PRODUCTION SYSTEM 3
(a) Environmental control	Minimal or no control of the environment✓	Environmental conditions controlled to suit the animals✓
(b) Drought risk	High drought risk/animals travel long distances in search for fodder and water✓	No drought risk/water is supplied/provided all the times✓
(c) Production output	Relatively low production output/dependent on availability of natural grazing/dependant on environmental conditions/rainfall✓	High animal production output/optimal/maximum production output/not dependant on environmental conditions/enviromental control✓

(6)

## 3.4 Effect of crude fibre on quality/quantity of milk produced

## 3.4.1 Describe the effect of crude fibre on the fat content

- The higher the quantity of crude fibre taken in by cows✓
- the higher the fat content becomes in the milk✓

(2)

## 3.4.2 Prediction of the effect of crude fibre on milk yield

- At lower crude fibre content values the quantity of milk is high (from month 4) ✓
- At higher crude fibre values the milk production becomes less (up to month 7) ✓

(2)

- 3.4.3
- The disease developed at month 8/just after month 7✓
  - There was a drastic drop in milk production ✓

(2)

- 3.4.4
- Full recovery/animal recovered ✓
  - The animal completely recovered as the milk production increased to a possible projected value ✓

(2)

**[35]**

**QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL****4.1 Oestrus cycle****4.1.1 THREE changes that take place with the follicle during the oestrus**

- Follicle becomes bigger/grows/enlarged ✓
- Ovum develops in the follicle ✓
- Ovulation takes place/ovum is released ✓
- Corpus Luteum develops ✓

(Any 3) (3)

**4.1.2 (a) Progesterone**

- Prepare the uterus for the reception of the fertilised ovum✓  
Supporting the attachment of the embryo✓
- Maintain pregnancy✓

(Any 1) (1)

**(b) Oestrogen**

- Characteristics of oestrus✓
- Increased blood supply to uterus to prepare it for the reception of the fertilised ovum✓

(Any 1) (1)

**4.2 Physiological causes of infertility****4.2.1 Anoestrus**

- Show no signs of oestrus ✓
- Bull is totally unaware that the heifer/cow is in oestrus ✓

(2)

**4.2.2 b) Infantilism**

- Ovaries and other general organs are underdeveloped ✓
- No follicles develop and no estrogen can be secreted ✓

(2)

**4.3 Development of the foetus****4.3.1 Functions of the placenta**

- Attaches embryo to the uterus wall ✓
- Brings the blood vessels of the mother and embryo close together✓
- Allows nutrients, gases, antibodies and wastes to be excreted ✓

(Any 2) (2)

**4.3.2 (a) Mummification ✓**

(1)

**(b) Maceration ✓**

(1)

**4.4 Foot-and-mouth disease**

- 4.4.1 Meat from infected animals cannot be marketed/infected animals may be killed and carcass not used/stock loss✓ (1)
- 4.4.2 **TWO control measures of foot-and-mouth disease**
- Quarantine animals ✓
  - Isolate infected animals ✓
  - Control movement of infected ✓
  - Kill infected animals ✓
  - Report to the veterinarian or stock inspector ✓ (Any 2) (2)
- 4.4.3 **Three main types of livestock affected by foot-and-mouth disease:**
- Cattle ✓
  - Sheep ✓
  - Goats ✓
  - Pigs ✓ (Any 3) (3)
- 4.4.4 **Symptoms of Foot-and-Mouth disease**
- Sores in the mouth, on the tongue, and between hooves ✓
  - Excess saliva (spit) secreted from the mouth ✓
  - Animals eat less food/decrease in appetite ✓
  - Animals walk as if they have sore feet ✓
  - Animals are weak ✓ (Any 3) (3)

**4.5 CONTROL OF TICKS IN CATTLE**

- 4.5.1
- More adult ticks are treated and fewer eggs are produced ✓
  - Eggs that precede to the larvae and nymph stages are prevented from reaching the adult stage✓
  - Areas that are highly infested are aggressively treated/no chance of genetic inheritance✓
  - It breaks the resistance to the normal active chemical substance✓
  - It is a systemic chemical tick control measure✓ (Any 2) (2)
- 4.5.2 **Two measures for prevention of resistance to acaricides**
- Specific chemicals should not be repeatedly used so that ticks cannot develop resistance ✓
  - Sufficient strength dip mixtures should be used ✓
  - Breeding genetically modified breeds that are resistant to the ticks✓ (Any 2) (2)

**4.5.3 Two ways to deal with tick resistance**

- The farmer should breed animals that are resistant to the ticks and avoid using miticides ✓

- The farmers can biologically control the ticks using oxpeckers ✓ (2)

**4.5.4 During March and April ✓ (1)****4.5.5**

- Burning the veld/pastures ✓
- Dipping the animals regularly ✓
- Resting some camps for long periods ✓

(Any 2) (2)

**4.6 Internal parasites****4.6.1**

- Animals lose condition under good feeding conditions ✓
- Manure is watery ✓
- Tail areas are dirty ✓
- Swollen area under the jaw ✓

(Any 2) (2)

**4.6.2**

- Wet condition/broken drinking trough ✓
- Summer conditions/warmer weather ✓
- Water-logged fields/marshy areas ✓

(Any 2) (2)  
**[35]**

**TOTAL SECTION B: 105**  
**GRANDTOTAL: 150**