This memorandum consists of 11 pages.
SECTION A

QUESTION 1.1

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

(10 x 2) (20)

QUESTION 1.3

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1</td>
<td>Silage/green feeds ✓ ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.2</td>
<td>Mineral licks/Lick ✓ ✓</td>
<td></td>
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<tr>
<td>1.3.3</td>
<td>Cross-breeding ✓</td>
<td></td>
<td></td>
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<tr>
<td>1.3.4</td>
<td>Holding pen/crush ✓</td>
<td></td>
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<tr>
<td>1.3.5</td>
<td>Feedlot ✓</td>
<td></td>
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</table>

(5 x 2) (10)

QUESTION 1.2

<table>
<thead>
<tr>
<th></th>
<th>A</th>
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<tbody>
<tr>
<td>1.2.1</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.2</td>
<td>C</td>
<td></td>
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</tr>
<tr>
<td>1.2.3</td>
<td>C</td>
<td></td>
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<tr>
<td>1.2.4</td>
<td>A</td>
<td></td>
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<tr>
<td>1.2.5</td>
<td>B</td>
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</table>

(5 x 2) (10)

QUESTION 1.4

<p>| | | | | |</p>
<table>
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<tr>
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<tbody>
<tr>
<td>1.4.1</td>
<td>Cobalt ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4.2</td>
<td>Homogenous ✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4.3</td>
<td>Indigenous ✓</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1.4.4</td>
<td>Endothermic ✓</td>
<td></td>
<td></td>
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<tr>
<td>1.4.5</td>
<td>Subsistence ✓</td>
<td></td>
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</tbody>
</table>

(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

2.1.2 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)

2.1.3 Letters that correspond with the descriptions
(a) D
(b) C
(c) C

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

2.2 Digestibility of a feed

2.2.1 Hay :10% of 15 kg=15 kg

\[ 15 \text{ kg} - 1,5 \text{ kg} = 13,5 \text{ kg dry material} \]

Digestible coefficient=
\[ \frac{\text{DM intake (kg)} - \text{DM of manure (kg)}}{\text{DM intake (kg)}} \times 100 \]
\[ = \frac{13,5 \text{ kg} - 4 \text{ kg} \times 100}{13,5 \text{ kg}} \]
\[ = 70,4\% \]

2.2.2 The actual quantity of feed absorbed by an animal

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
2.3 **Nutritional information of selected feeds**

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

2.3.2 **Pearson square calculation**

Sunflower oil cake meal
DP 38% = 5.1 parts sunflower meal ✓

Maize meal
DP 8.9% = 24 parts maize meal ✓

5.1:24 ✓ ✓/ Mix 5.1 parts of sunflower meal with 24 parts of maize meal ✓ ✓

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 ✓

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

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 ✓
2.4.3 The biological value of different feeds

![Bar graph showing biological value (BV) of different feeds: Fishmeal, Soya beans, Wheat, Groundnuts, Maize, Meat meal.]

Checklist for marking:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Evidence No</th>
<th>Evidence Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heading available</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>X-axis labelled</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Y-axis labelled</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Correct values (X-axis)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Correct values (Y-axis)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Bar graph</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Total marks = 6 (6)

QUESTION 3: ANIMAL PRODUCTION

3.1 Influence of environmental temperatures on production

3.1.1 Pigs
- They are most affected 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

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

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 ✓

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) ✓

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

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

- 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 ✓
(b) Maceration ✓

(1)

(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 ✓

4.5.4 During March and April ✓

4.5.5 • Burning the veld/pastures ✓
- Dipping the animals regularly ✓
- Resting some camps for long periods ✓ (Any 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)

4.6.2 • Wet condition/broken drinking trough ✓
- Summer conditions/warmer weather ✓
- Water-logged fields/marshy areas ✓ (Any 2)

TOTAL SECTION B: 105
GRANDTOTAL: 150