These marking guidelines consist of 11 pages.
SECTION A

QUESTION 1

1.1 1.1.1 C ✔✔
     1.1.2 B ✔✔
     1.1.3 A ✔✔
     1.1.4 D ✔✔
     1.1.5 A ✔✔
     1.1.6 C ✔✔
     1.1.7 B ✔✔
     1.1.8 C ✔✔
     1.1.9 C/D ✔✔
     1.1.10 B ✔✔ (10 x 2) (20)

1.2 1.2.1 Both A and B ✔✔
     1.2.2 None ✔✔
     1.2.3 A only ✔✔
     1.2.4 B only ✔✔
     1.2.5 Both A and B ✔✔ (5 x 2) (10)

1.3 1.3.1 Digestibility co-efficiency ✔✔
     1.3.2 Dosing/drenching ✔✔
     1.3.3 Artificial Insemination/AI ✔✔
     1.3.4 Sterility ✔✔
     1.3.5 Progesterone ✔✔ (5 x 2) (10)

1.4 1.4.1 Sublingual ✔
     1.4.2 Free range ✔
     1.4.3 Hypoplasia ✔
     1.4.4 Prostate ✔
     1.4.5 Flushing/harvesting ✔ (5 x 1) (5)

TOTAL SECTION A: 45
SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Alimentary canal

2.1.1 Naming of the animal in
DIAGRAM 1 - Chicken/fowl/poultry ✓ (1)
DIAGRAM 2 - Cattle/sheep/goats ✓ (1)

2.1.2 Identification of the letters
(a) B ✓ (1)
(b) C ✓ (1)
(c) A ✓ (1)

2.1.3 TWO adaptations of the rumen to digest feed rich in fibre
- Presence of micro-organisms/rumen micro-flora ✓
- Presence of papillae/heat rods for the provision of heat ✓
- Contractions mix the food and bring it onto contact with microorganisms ✓
- It has a large fermentation vessel ✓ (Any 2) (2)

2.2 Components of feed

2.2.1 Identification of the components
A - Minerals/elements ✓ (1)
B - Proteins ✓ (1)

2.2.2 TWO ways of supplementing minerals to animals
- Mineral lick ✓
- Drinking water/mixing it with water ✓
- Soil sods ✓
- Dosing/drenching ✓
- Injection ✓
- Cafeteria-style mineral provision/free-choice ✓
- Supplementing rations ✓ (Any 2) (2)

2.2.3 Indication of the component
(a) Proteins/B ✓ (1)
(b) Carbohydrates ✓ (1)
2.3 Digestibility co-efficiency

2.3.1 Calculation of the digestibility co-efficiency

\[ \text{DC} = \frac{\text{Dry matter intake (kg)} - \text{dry mass manure (kg)}}{\text{Dry matter intake (kg)}} \times 100 \]

Moisture content in feed: 15 kg \(\times\) 10 \(\div\) 100 = 1,5 kg

Dry material in feed: 15 kg – 1,5 kg = 13,5 kg

OR

\[ \frac{90}{100} \times 15 \text{ kg} = 13,5 \text{ kg} \]

\[ = \frac{13,5 \text{ kg} - 3,5 \text{ kg}}{13,5 \text{ kg}} \times 100 \]

\[ = 74,07 \% \]

(5)

2.3.2 Implication of the calculated value

- The feed was highly digested
- 74,07% of feed is digested
- 25,93% is excreted (Any 1)

(1)

2.3.3 TWO factors contributed to the digestibility of the feed used during the trial

- Composition of the feed/ration
- Preparation of the feed/ration
- Individuality/animal factor
- Type of the animal
- Age of the animal
- Feed additives/supplements NPN/molasses
- Palatability of the feed
- Water intake
- Age of the plant
- Level of feeding (Any 2)

(2)

2.4 Energy value of feeds

2.4.1 Energy important for production and maintenance

Net energy/NE

(1)

2.4.2 TWO reasons for knowledge of the energy value of the feed

- To determine the type of animal diet
- To determine feeding standards
- Meet animal requirements at different stages of production
- To determine ration formulation (Any 2)

(2)
2.5 **Nutritive ratio**

2.5.1 **Calculation of the nutritive ratio (NR)**

Nutritive Ratio = $1 : \frac{%DNNE}{%DP}$

1 : $\frac{62}{13}$

1 : 4.77

OR

Nutritive Ratio = $1 : \frac{%TDN – %DP}{%DP}$

1 : $\frac{75% – 13%}{13%}$

1 : 4.77

(3)

2.5.2 **Indication of the age group that will benefit most from the feed**

Young/growing/producing animal

(1)

2.5.3 **TWO reasons for using the feed to feed young animals**

- Ration has a narrow nutritive ratio/less than 1:6
- Has more protein needed by growing animals
- Low crude fibre content

(Any 2)

(2)

2.6 **Planning and managing of the feed**

2.6.1 **Appropriate term**

Feed/fodder flow programme

(1)

2.6.2 **TWO importance of planning fodder production**

- To ensure safe use of resources
- To meet the animal feed requirements throughout the year
- To marginalise feed costs
- To manage for production/animal feed

(Any 2)

(2)

2.6.3 **TWO aspects to be considered when planning fodder production**

- The number of livestock
- Nutrient content of the feed
- Possible feeds available
- Requirements of the herd
- Cost of buying the feed
- Timing of production season
- Carrying capacity of the veld

(Any 2)

(2) [35]
QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Temperature requirements for broiler chickens

3.1.1 Bar graph

![Bar graph showing temperature requirements for broilers at various ages](chart)

**Temperature requirements for broilers at various ages**

**CRITERIA/RUBRIC/MARKING GUIDELINES**

- Correct heading ✓
- X-axis: Correctly calibrated with label (Age in weeks) ✓
- Y-axis: Correctly calibrated with label (Temperature) ✓
- Correct units (weeks and °C) ✓
- Bar graph ✓
- Accuracy ✓

(6)

3.1.2 Trend of temperature requirement for broiler chickens

- Temperature requirement of broiler chickens decreases ✓ with increase in age ✓
- The younger the chickens ✓ the higher the temperature requirements ✓
- The older the chickens ✓ the lower the temperature requirements ✓ (Any 1)

(2)

3.1.3 Equipment to maintain temperature in a broiler house

Heaters/air conditioners/fans/infra-red lamps/curtains/insulators ✓

(1)

3.2 Indication of the animals showing the behaviour

3.2.1 Cattle ✓

(1)

3.2.2 Sheep ✓

(1)

3.2.3 Pigs ✓

(1)

3.2.4 Chickens/poultry/birds ✓

(1)
3.3  Farming systems

3.3.1  Identification of the farming system

PICTURE A - Commercial ✓

PICTURE B - Subsistence ✓

(1)

3.3.2  Comparison of the farming systems

- Commercial farming system - High environmental pollution due to heavy use of chemicals/release gases like methane ✓

- Subsistence farming system - Low environmental pollution due to low animal density/less use of chemicals ✓

(1)

3.4  Parasites

3.4.1  Classification of diseases according to pathogens

- Bacterial ✓

- Viral ✓

(1)

3.4.2  Meaning of zoonotic diseases

Diseases that can be transmitted from animals to humans ✓ and humans to animals ✓

(2)

3.4.3  Reason for swine flu to be enzootic

Affects specific animals in a particular region ✓

(1)

3.4.4  TWO roles of the state in controlling notifiable diseases

- Implementation of legislation ✓

- Creation of buffer zones for testing and vaccination of clean stock before movement ✓

- Establish quarantine zones/isolation ✓

- Research ✓

- Prevent stock movement ✓

- Deployment of state veterinarians for testing and vaccination ✓

- Removal/culling of infected stock ✓

- Public awareness ✓

- Import/export bans ✓

(Any 2)

(2)

3.5  Internal parasites

3.5.1  Identification of the internal parasites

- Parasite A - Round worm/hematodes ✓

(1)

- Parasite B - Tape/flat worm/cestodes ✓

(1)
3.5.2 **TWO visible symptoms in sheep infested with roundworm**
- Diarrhoea ✓
- Whitish mucus membranes in the inside of the eyelids ✓
- Anaemia ✓
- Weight loss ✓
- Rough coat ✓
- Loss of appetite ✓
- Bottle jaw ✓
- Rapid breathing ✓
- Coughing ✓
- Bloating stomach ✓
- Wasting diseases ✓
- Pneumonia ✓

(Any 2) (2)

3.5.3 **TWO management practices to manage heavy infestation of a flock by internal parasites**
- Resting, rotational grazing of camps ✓
- Avoid wet grazing areas ✓
- Feed animal well ✓
- Clean drinking water/sanitation ✓
- Veld burning ✓
- Fencing off infected areas ✓
- Use feeders to avoid contamination of food/zero grazing ✓
- Hygienic measures ✓
- Breeding animals that are more resistant ✓
- Good health programme (deworming/dosing) ✓

(Any 2) (2)

3.6 **Plant poisoning**

3.6.1 **Identification of the poison**
Maize fungus ✓

(1)

3.6.2 **TWO measures to prevent fungus contamination of stored feeds**
- Store feeds in a dry cool place/avoid wet areas ✓
- Improved ventilation ✓
- Continuously checking the place for leaks/dampness where feed is stored ✓
- Clean the sheds ✓

(Any 2) (2)

3.6.3 **TWO actions to be taken once the presence of maize fungus is detected in feeds**
- Remove and dispose of the feed contaminated with fungus ✓
- Clean off the space and give animals fresh feed ✓
- Use fungicides to prevent fungal growth ✓

(Any 2) (2) [35]
QUESTION 4: ANIMAL REPRODUCTION

4.1 Reproductive system of a bull

4.1.1 Identification of parts

A  Testes/scrotum ✓ (1)
B  Penis/urethra ✓ (1)
C  Vas deferens/semenal tube/ductus deferens/sperm duct ✓ (1)

4.1.2 ONE function of testes
- Secretion of hormone testosterone/male sex hormone ✓
- Production of sperm cells/male sex cells ✓ (Any 1) (1)

OR

ONE function of the scrotum
- Protects the testis ✓
- Regulates temperature of the testis ✓ (Any 1) (1)

4.1.3 Role of seminal vesicles
- Secrete fluid that transports the spermatozoa ✓
- Protect the semen against pH changes ✓
- Provide energy for sperm cells ✓ (Any 1) (1)

4.2 Lack of libido in bulls

4.2.1 Term for the condition
Lack of libido ✓ (1)

4.2.2 THREE causes of lack of libido
- Immaturity/lack of experience ✓
- Overwork/exhaustion/over exertion ✓
- Malnutrition ✓
- Poor health/diseases/low testosterone ✓
- Change in environment ✓
- Stress ✓
- Temperament ✓
- Age/senility ✓ (Any 3) (3)

4.3 Process of artificial insemination (AI)

4.3.1 Identification of the hours after oestrus to get the highest pregnancy rate
10 to 13 hours after onset of oestrus ✓ (1)

4.3.2 A reason why the cow would allow insemination between the first hour and 12 hours after the start of oestrus
The cow will be receptive to the bull/it will be on heat/in oestrus ✓ (1)
4.3.3 **TWO visible signs the cow will show when in oestrus**
- Allows mating/insemination ✓
- Mucus strings from the vulva ✓
- Swollen and red vulva ✓
- Mounts others ✓
- Hair on the back/rump are fluffed up ✓
- Mud patches on her back ✓
- Bellowing noises ✓
- Cows are excited/restless ✓
- Frequent urination ✓
- Sniffs the genitals of other cows ✓
- Raises their heads and curls her lips ✓
- Decrease in milk production ✓

(Any 2) (2)

4.3.4 **ONE reason to inseminate hours before ovulation**
- Ovum has a shorter lifespan than a sperm cell ✓
- Ovum needs to arrive when sperm cells are already waiting for fertilisation ✓

(Any 1) (1)

4.3.5 **ONE requirement for a successful insemination**
- Use of healthy/viable semen ✓
- Technique performed by a skilled/experienced technician ✓
- Insemination at the correct stage of oestrus ✓
- Use the correct sterilised equipment ✓

(Any 1) (1)

4.4 **Fertilisation**

4.4.1 **Labels**
- A Egg cell/ovum/female gamete ✓
- B Sperm cell/spermatozoon/male gamete ✓
- C Zygote/fertilized egg cell ✓

(1)

(1)

(1)

4.4.2 **Name of the process represented by the illustration**
- Fertilisation ✓

(1)

4.5 **Pregnancy**

4.5.1 **Identification of the process**
- Pregnancy/gestation ✓

(1)

4.5.2 **THREE stages of the process**
- Ovum/stage of ovum ✓
- Embryo/embryonic stage/stage of embryo ✓
- Foetal/stage of foetus ✓

(1)

(1)

(1)

4.5.3 **Indication of the normal presentation of the calf**
- Anterior ✓

(1)
4.6 Parturition

4.6.1 The condition experienced by heifers calving for the first time
Dystocia ✓

4.6.2 TWO signs of an animal experiencing birth problems
- Show signs of prolonged distress/excessive pain and discomfort ✓
- Foetus/after birth showing in birth canal without expulsion ✓
- Prolonged birth process ✓
- Exhaustion ✓

(Any 2) (2)

4.6.3 ONE cause of problems during birth in heifers
- Large foetus/small sized heifer ✓
- Small pelvic area ✓
- Inexperience ✓
- Incorrect presentation ✓
- Malformed foetus ✓
- Cervix not dilated ✓
- Twisted uterus ✓
- Weak labour ✓
- Diseases ✓
- Twinning/multiple birth ✓
- Hydrocephalus ✓
- Weak muscle contraction ✓
- Prolong gestation ✓
- Vaginal tear ✓

(Any 1) (1)

4.6.4 Hormone that initiates milk release
Oxytocin ✓

(1)

4.6.5 First milk produced in the first 3 days after calving
Colostrum/beestings ✓

(1)

4.7 Embryo transfer

4.7.1 Process in the scenario
Embryo transfer/ER ✓

(1)

4.7.2 Main importance of embryo transfer
Creation of multiple offspring ✓ with the desirable characteristics of superior parents ✓

(2)

4.7.3 Explanation of a donor cow
Production of superior ova ✓ for implantation to inferior cows ✓

(2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150