AGRICULTURAL SCIENCES P1
2016
MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.
SECTION A

QUESTION 1

1.1 1.1.1 B ✓✓
1.1.2 A ✓✓
1.1.3 A/B/C/D ✓✓
1.1.4 D ✓✓
1.1.5 B ✓✓
1.1.6 B ✓✓
1.1.7 A ✓✓
1.1.8 C ✓✓
1.1.9 A ✓✓
1.1.10 D ✓✓

1.2 1.2.1 B only ✓✓
1.2.2 A only ✓✓
1.2.3 Both A and B ✓✓
1.2.4 B only ✓✓
1.2.5 None ✓✓

1.3 1.3.1 Ammonia ✓✓
1.3.2 Backyard/free range system ✓✓
1.3.3 Placenta retention ✓✓
1.3.4 Spermatogenesis ✓✓
1.3.5 Flushing/harvesting ✓✓

1.4 1.4.1 Mineral licks ✓
1.4.2 Antibodies ✓
1.4.3 Progesterone ✓
1.4.4 Mummification ✓
1.4.5 Pistolette ✓

TOTAL SECTION A: 45
SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Alimentary canal of poultry

2.1.1 Identification of the parts
   A - Crop ✓ (1)
   B - Proventriculus/glandular stomach ✓ (1)
   C - Ventriculus/gizzard/muscular stomach ✓ (1)

2.1.2 Letter of the part that contains small stones
   C ✓ (1)

2.1.3 Reason for the presence of stones
   Helps with mechanical digestion/grinding of the food ✓ (1)

2.1.4 Parts of the alimentary canal of poultry that will not be found in sheep
   • Crop/A ✓
   • Proventriculus/B ✓
   • Gizzard/ventriculus/C ✓
   • Cloaca/vent/uro-genital opening/E ✓
   • Caeca/D ✓ (Any 2) (2)

2.2 Composition of feed intake and excreted by a calf consuming 5kg

2.2.1 Feed component with lowest absorption rate
   Crude fibre ✓ (1)

2.2.2 TWO reasons for the answer
   • Has the highest rate of excretion ✓
   • Fore stomachs/rumen not well developed/not functional ✓
   • Absence/limited quantities of rumen micro flora ✓ (Any 2) (2)

2.2.3 ONE reason for not recommending it for dairy cows
   • Crude protein concentration is too low/5% ✓
   • Crude fibre concentration is too high/78% ✓ (Any 1) (1)

2.2.4 Calculate dry material (DM) in the feed (kg)
   • (15% moisture) 0,15 x 5kg = 0,75kg moisture ✓
   • 5kg – 0,75 = 4,25kg DM ✓
   OR
   • (85% DM) 0,85 x 5kg ✓
   • = 4,25kg DM ✓ (2)
2.3 Pearson square method (Information on two feeds)

2.3.1 Calculate percentage

(a) Maize meal
\[
\frac{31}{33} \times 100 = 93.93\% 
\]

(b) Soybean meal
\[
\frac{2}{33} \times 100 = 6.06\% 
\]

2.3.2 Cost of soybean in the ration
- \(0.0606 \times 285kg = 17.27kg\)
- \(17.27kg \times R4.58 per kg = R79.10\)

2.4 Biological value (BV) data

2.4.1 Explanation of biological value
- BV is an index of the % of nitrogen in a certain feed
- It reflects the quality of protein in the feed
- It is determined by the amino acid composition and the ratio of amino acids in the protein

2.4.2 Relation between the BV and the quality of a feed
- The higher the BV, the better the quality of a feed
- The lower the BV, the lower the quality of a feed

2.4.3 Identification of feed with the lowest BV
Maize meal

2.4.4 Determination of suitability of maize meal
- Suitable for energy/fattening
- Not suitable for production/growth/reproduction

2.4.5 Importance of feeding pigs feed with high BV
- They are not able to produce their own amino acids
- They need to be fed protein directly
2.5 Fodder flow planning

2.5.1 Calculate the:
(a) Quantity of Fescue (t DM/Ha)
   \[ \frac{210 \text{ t/year}}{15 \text{ Ha}} = 14 \text{ t DM/Ha} \]
(b) Ha planted with maize for silage
   \[ \frac{100 \text{ t/year}}{10 \text{ t/Ha}} = 10 \text{ Ha} \]

2.5.2 Fodder crop best utilized for:
(a) Summer grazing
   • Kikuyu (pasture)
(b) Succulent crop during the winter
   • Maize/silage/kikuyu/fescue/ryegrass (winter rain area)
(c) Most economic hay
   • Fescue

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Behaviour of farm animals

3.1.1 Area indicated
   • C - Blind spot
   • D - Balancing point

3.1.2 Position where the handler is safe
   Outside the flight zone/any area outside the circle/around A
   Reason
   In that position the handler is not a threat to the animal

3.1.3 THREE guidelines important when handling cattle
   • Have knowledge/understanding of their behaviour
   • Correct handling techniques
   • Correct handling facilities
   • Animal behaviour must be anticipated
   • Be careful/watchful/prepared when working with animals
   • Work calmly and quiet/no noise/no whips/sticks/dogs
   • Be aware of their flight/safety zone
   (Any 3)

3.2 Scenario on animal production systems

3.2.1 Farming systems practised
   • Farmer A - Commercial farming
   • Farmer B - Subsistence farming

3.2.2 Justification
   • Farmer A - Produces on a large scale/sells the produce for profit
   • Farmer B - Produce to sustain his family
3.2.3 Farmer with the highest contribution to environmental decline/deterioration

Farmer A ✓

(1)

3.2.4 TWO environmental effects

- Farmer A produces 1440 tons of manure per year ✓
- Produce methane as a by-product or ruminant digestion ✓

(2)

3.3 Apparatus used in sheep production process

3.3.1 Identification of apparatus

Electrical hot knife/pliers ✓

(1)

3.3.2 Function of apparatus in sheep

Tail docking/castration ✓

(1)

3.3.3 TWO reasons why apparatus is preferred

- Easy to use/fast ✓
- Cheap ✓
- Bloodless method ✓
- Hygienic method ✓

(Any 2) (2)

3.3.4 Age at administering

- Young as possible/before day 7 after birth ✓

Reason

- Animals are easier to handle/smaller ✓
- Less tissue damage/blood/stress to animals ✓

(Any 1) (1)

3.3.5 ONE other apparatus that can be used

- Knife/Scalpel ✓
- Rubber/elastrator ring/castrator ✓
- Burdizzo ✓

(Any 1) (1)

3.4 Diseases in farm animals

3.4.1 Complete table

A - Bacteria/Bacterium ✓
B - Cattle/Sheep/Goat ✓
C - Protozoa/Protozoan ✓
D - Lumpy wool ✓

(4)

3.4.2 Disease affecting only dairy cows

Mastitis ✓

(1)

3.4.3 A management practice used that will prevent red water

- Inoculation/vaccination/immunisation ✓
- Dipping to control ticks ✓
- Move animals/veld management/rotational grazing/burning of the veld ✓

(Any 1) (1)

3.4.4 Farm animal susceptible to mastitis

Lactating dairy cattle/cow/female animal ✓

(1)
3.5 **Poisonous plants**

3.5.1 **Phrase describing plants**
Poisonous/toxic plants ✓ (1)

3.5.2 **Farm animal mainly affected by poison leaf**
Cattle ✓ (1)

3.5.3 **TWO other poisonous plants**
- Maize fungus ✓
- Thorn apple ✓
- Poisonous bulb ✓ (2)

3.5.4 **Sheep most susceptible for poisonous plants**
- Exotic breeds ✓
- Young animals/lambs ✓
- Old animals ✓
- Pregnant animals ✓ (Any 2) (2)

3.5.5 **Protein substitute for ruminants**
Urea ✓ (1) [35]

**QUESTION 4: ANIMAL REPRODUCTION**

4.1.1 **Reproductive organs of a bull**

(a) B ✓ (1)

(b) D ✓ (1)

(c) A ✓ (1)

4.1.2 **TWO congenital defects**
- Sperm defects ✓
- Cryptorchidism ✓
- Hypoplasia ✓ (Any 2) (2)

4.1.3 **TWO functions of the hormone secreted by part D**
- Development of the secondary sex characteristics ✓
- Normal mating behaviour ✓
- Functioning of the accessory glands ✓
- Production of spermatozoa ✓
- Maintenance of the male duct system ✓ (Any 2) (2)
4.2 Synchronisation

4.2.1 Identify process
Synchronisation of oestrus ✓

4.2.2 ONE hormone inducing the process
- Prostaglandin ✓
- Synthetic progesterone/Progestin/Oestradiol ✓
- Co-Synch oestrus synchronisation/GnRH ✓
- MGA/Melengestrol acetate ✓

4.2.3 Financial implication of synchronisation
- High costs for labour/hormone treatments ✓
- High management inputs/costs ✓

4.3 Re-arranging the statements in sequential order

1. C ✓
2. D ✓
3. A ✓
4. E ✓
5. B ✓

4.4 Difficulties giving birth

4.4.1 Scientific term
Dystocia ✓

4.4.2 THREE conditions that may interfere with normal parturition
- Deviation of the head ✓
- Flexion of the elbow ✓
- Retention of the fore leg/legs ✓
- Hydrocephalus ✓
- Congenital defects/deformities ✓
- Vaginal tear ✓
- Twins/multiple births ✓
- Premature/late birth ✓
- Induction of parturition ✓
- Posterior/abnormal presentation ✓
- Incomplete cervical dilation ✓
- Size of the calf ✓
- Malnutrition of the cow ✓
- Age of the female animal ✓

4.4.3 Indigenous lubricant used by breeders in assisting delivery
Animal fat/oil/soap ✓
4.5 Line graph

4.5.1 Line graph showing the percentage of fat and lactose

![Line graph showing the percentage of fat and lactose](image)

**Criteria/rubric/marking guidelines**
- Correct heading ✓
- X-axis: correct calibrations and labelled (Weeks of the year) ✓
- Y-axis: correct calibrations and labelled (Fat and lactose) ✓
- Correct unit (%) ✓
- Line graph ✓
- Accuracy ✓

4.5.2 Trend shown by the protein content of milk
- Protein will increase from 3.0 to 4.2% ✓
- With progression in weeks/from week 5 to 45 ✓

4.5.3 Constituents of the first milk
- Immunoglobulin/Antibodies ✓
- Minerals/Calcium(Ca)/Phosphorus(P) ✓
- Vitamins ✓

(Any 2)
4.6  Semen

4.6.1  TWO semen dilutants
- Buffers/sodium citrate ✓
- Egg yolk ✓
- Lipids/Skim milk ✓
- Nutrients/Fructose ✓
- Antibiotics/Penicillin/Streptomycin ✓
- Glycerol ✓

(Any 2) (2)

4.6.2  TWO functions of the dilutants
- Control the pH ✓
- Control the isotonic environment ✓
- Protect spermatozoa against temperature changes/shocks ✓
- Provide energy to spermatozoa/increase viability ✓
- Protect sperm against bacterial growth ✓
- Protect spermatozoa against the lethal effects of freezing ✓
- Increase the volume of semen ✓

(Any 2) (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150