



Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
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Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2024

AGRICULTURAL SCIENCES P1 MARKING GUIDELINE

MARKS: 150

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SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|--------------------|----------|------|
| 1.1 | 1.1.1 | C ✓✓ | | |
| | 1.1.2 | D ✓✓ | | |
| | 1.1.3 | C ✓✓ | | |
| | 1.1.4 | A ✓✓ | | |
| | 1.1.5 | D ✓✓ | | |
| | 1.1.6 | B ✓✓ | | |
| | 1.1.7 | D ✓✓ | | |
| | 1.1.8 | A ✓✓ | | |
| | 1.1.9 | C ✓✓ | | |
| | 1.1.10 | A ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | A only ✓✓ | | |
| | 1.2.2 | None ✓✓ | | |
| | 1.2.3 | Both A and B ✓✓ | | |
| | 1.2.4 | B only ✓✓ | | |
| | 1.2.5 | A only ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Solubility ✓✓ | | |
| | 1.3.2 | Metabolic ✓✓ | | |
| | 1.3.3 | Amniotic fluid ✓✓ | | |
| | 1.3.4 | Prolapse ✓✓ | | |
| | 1.3.5 | Colostrum ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Biological value ✓ | | |
| | 1.4.2 | Blowfly ✓ | | |
| | 1.4.3 | Cryptorchidism ✓ | | |
| | 1.4.4 | Dizygotic twins ✓ | | |
| | 1.4.5 | Lactation ✓ | (5 x 1) | (5) |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION**

- 2.1 2.1.1 **Classification of farm animal**
Non-ruminant ✓ (1)
- 2.1.2 **Letters of the parts in the diagram**
 (a) C ✓ (1)
 (b) F ✓ (1)
 (c) B ✓ (1)
 (d) D ✓ (1)
- 2.2 2.2.1 **Identification of the feed component that is classified as inorganic**
Minerals ✓ (1)
- 2.2.2 **Identification of relevant feed component**
 (a) Carbohydrates ✓ (1)
 (b) Protein ✓ (1)
- 2.2.3 **Absorption process that makes use of carrier molecules**
Active absorption ✓ (1)
- 2.2.4 **Vitamins/ Mineral elements**
 A Vitamin K ✓ (1)
 B Pica ✓ (1)
 C Iron ✓ / Copper / Vitamin B12 (1)
- 2.3 2.3.1 **Calculation of digestibility co-efficient**
 Dry matter excreted = 50% of 6 kg

$$= \frac{50}{100} \times 6 \text{ kg}$$

$$= 3 \text{ kg } \checkmark$$
 Coefficient of digestibility =

$$\frac{\text{Dry matter intake} - \text{Dry matter excreted}}{\text{Dry matter intake}} \times 100 \checkmark$$

$$= \frac{15 \text{ kg} - 3 \text{ kg}}{15 \text{ kg}} \times 100 \checkmark$$

$$= 80 \checkmark \% \checkmark$$
 (5)
- 2.3.2 **Interpretation of the calculation**
 • The feed is highly digestible/ 80% ✓
 • The feed contains concentrates ✓
 • The feed contains low levels of fibre ✓ (Any 1 x 1) (1)

2.3.3 TWO factors that might have influenced the digestibility of hay

- Preparation of the hay ✓
- Stage at which the plant was cut for making hay ✓
- Crop from which the hay was produced ✓
- Supplementation with non-protein nitrogen ✓
- Supplementation with molasses and protein ✓ (Any 2 x 1) (2)

2.4 2.4.1 Energy in B

Metabolic energy ✓ (1)

2.4.2 Calculation of the amount of net energy that the sheep would get from the daily ration

(1)

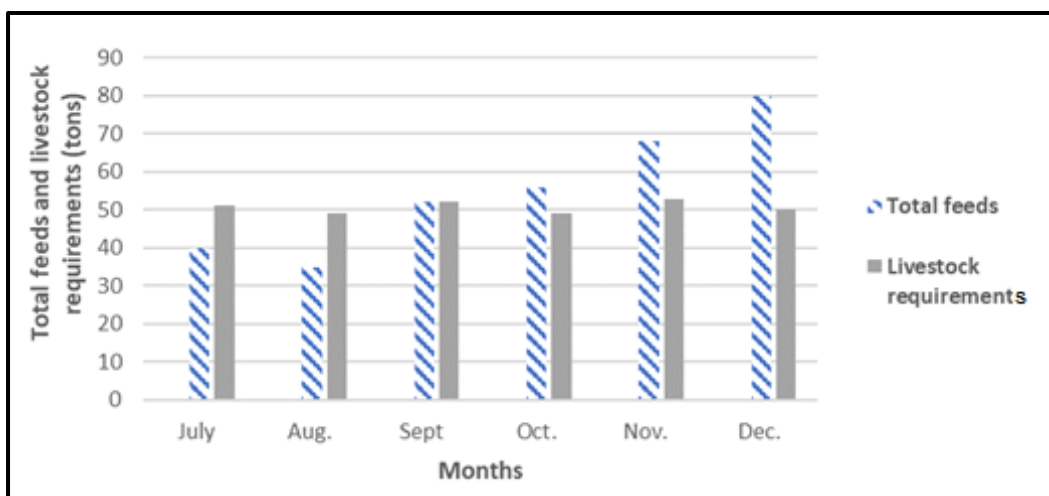
Net energy = gross energy – (faeces + urine and gases + heat) ✓
= 15 – (5 + 1,3 + 0,9) ✓
= 15 – 7,2 ✓
= 7,8 MJ/kg DM ✓

(3)

2.4.3 Interpretation of the calculations in QUESTION 2.4.2

- Out of the potential energy value of 15,648 MJ/kg DM, only 8,034 MJ/kg DM of that energy is available to the animal after all the losses occurred. ✓
- Almost 52% of the potential energy of that ration was lost. ✓
- Only 48% of the potential energy value is available for use by the animal. ✓ (Any 1 x 1) (1)

2.5 2.5.1 Comparison between total feed available and livestock requirements over six months



Marking criteria

- Correct title ✓
- Correctly calibrated and labelled y-axis (Total feeds and livestock requirements) ✓
- Correctly calibrated and labelled x-axis (Months) ✓
- Units (tons) ✓
- Correct graph type ✓
- Accuracy (80% + correctly plotted) ✓

(6)

2.5.2 Surplus in the month of December in kg

$$\begin{aligned} \text{Surplus} &= 30\text{t} \times 1\,000 \checkmark \\ &= 30\,000 \text{ kg} \checkmark \end{aligned}$$

(2)

2.5.3 Cost-effective measures a farmer can apply to deal with surplus in the month of December

- Ensiling ✓
- Making hay / Bailing / Storage ✓

(Any 1 x 2) (2)
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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

- 3.1 3.1.1 **Farming system depicted in PICTURE B**
Subsistence farming ✓ (1)
- 3.1.2 **Purpose of the farming system above**
Produce only enough products to support a family, without excess for sale or trade ✓ (1)
- 3.1.3 **Hypothesis of the productivity of the farming system in PICTURE A**
High ✓ (1)
- 3.1.4 **Description on how the factors below is used to increase production in the extensive farming production.**
- (a) **Reproduction**
- Choosing of animals with better characteristics for mating / Selection. ✓
 - Mating of male and female animals from different breeds / cross breeding ✓ (Any 1 x 1) (1)
- (b) **Nutrition**
- Adding of supplementary feeding at different stages if natural grazing is not sufficient ✓
 - Creep / flush feeding ✓
 - Good feeding practice/ balanced diet ✓ (Any 1 x 1)
- 3.2 **Facility recommended for livestock**
- 3.2.1 Infra-red lights ✓/Heater/Air conditioner (Any 1 x 1) (1)
- 3.2.2 Heater ✓ (1)
- 3.2.3 Feeders ✓ (1)
- 3.3 3.3.1 **Definition of homoeothermic**
Ability of an animal to maintain ✓ a constant body temperature. ✓ (2)
- 3.3.2 **ONE way a farmer can protect the farm animals from extremely high temperatures in an extensive production system**
- Plant trees ✓
 - Provision of water ✓
 - Breed animals that are resistant to extremely high temperatures ✓ (Any 1 x 1) (1)
- 3.3.3 **Relationship between feed, water intake and the production of farm animals under extremely high temperatures**
When temperatures are very high farm animals drink high amount/ lots of water, ✓ consumes /eats/ grazes less feed ✓ and produces less/ production drops. ✓ (3)

- 3.4 3.4.1 **Facility in the picture**
Holding pen ✓ (1)
- 3.4.2 **TWO design features that a farmer needs to consider when designing the facility**
- Solid sides ✓
 - No sharp edges ✓
 - Sides should be high and strong enough to handle specific animal ✓ (Any 2 x 1) (2)
- 3.4.3 **ONE use of the facility**
Holding pen is used to keep the animals prior to handling ✓ (1)
- 3.5 3.5.1 **Disease affecting the udder of a cow in the picture**
Mastitis ✓ (1)
- 3.5.2 **Classification of the disease in QUESTION 3.5.1 based on causative pathogen.**
Bacterial disease ✓ (1)
- 3.5.3 **TWO symptoms an animal displays when infected by the disease**
- Thick flaky milk which may contain clots ✓
 - Discoloured serum and sometimes be blood-stained or watery ✓
 - Decline in milk production ✓
 - Cow or ewe reluctant for calf or lamb to nurse. ✓
 - Infected quarter of the udder is hot, swollen and painful and the other side is hard ✓
 - Rapid pulse rate ✓
 - Limping with one hind leg far from the udder ✓ (Any 2 x 1) (2)
- 3.5.4 **TWO economic implications of the disease to the farmer**
- Decreased milk production ✓
 - Loss of livestock/ death of livestock ✓
 - High treatment costs ✓
 - Loss of income/ profit ✓ (Any 2 x 1) (2)
- 3.6 3.6.1 **Classification of parasites in PICTURES A and B**
A – External/ ecto-parasite ✓
C – Internal/ endo-parasite ✓ (2)
- 3.6.2 **Disease caused by the microscopic parasite in PICTURE A**
Mange ✓
Scab ✓ (Any 1 x 1) (1)

3.6.3 TWO symptoms of an animal infested by the disease mentioned in QUESTION 3.6.2

- Skin irritation with severe itching that causes rubbing, scratching, and hair loss. ✓
 - Dermatitis ✓
 - Round hairless lesions ✓
- (Any 2 x 1) (2)

3.6.4 TWO control measures of the parasite in PICTURE B

- Rotational grazing/ Keep animals away from an area for a specific period. ✓
 - Avoid wet areas/ areas around drinking spots should be kept dry. ✓
 - Camping off areas on the farm. ✓
 - Breed animals that are genetically more resistant to this internal parasite. ✓
- (Any 2 x 1) (2)

3.7 3.7.1 TWO common salt poisoning symptoms, from the passage, that can be noticed in farm animals

- Excessive salivation ✓
 - Constipation ✓
 - Increased thirst ✓
- (Any 2 x 1) (2)

3.7.2 ONE preventative measure of salt poisoning

- Supplying animals with enough salts ✓
 - Supplying animals with enough water ✓
 - If animals are deprived salt for an extended period, they should not be allowed free access to an abandon supply of salt. ✓
 - Lick should be close to water supply ✓
- (Any 1 x 1) (1)

3.7.3 ONE role of the state in animal protection

- Training of agricultural specialists at colleges and universities. ✓
 - Generation and implementation of legislation to address priorities in the livestock industry. ✓
 - Veterinary research/ Advice, monitoring and control of animal diseases. ✓
 - Veterinary services/ Control of production, distribution and use of agricultural medication according to appropriate legislation. ✓
 - Import and export bans. ✓
 - Control of the spread of diseases by meat inspectors that identify diseases in animal products, whether contagious or not. ✓
 - The production of some specialised livestock remedies. ✓
 - Quarantine services/ Control in the movement of farm animals, locally and abroad, to prevent diseases from spreading through quarantine services. ✓
 - Research to address and promote priorities identified by the livestock industry. ✓
- (Any 1 x 1) (1)

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QUESTION 4: ANIMAL REPRODUCTION

- 4.1 4.1.1 **Farm animal with the reproductive system**
Cow ✓ (1)
- 4.1.2 **Parts labelled B and E**
B – Vagina ✓
E – Oviduct/ fallopian tube ✓ (2)
- 4.1.3 **LETTER corresponding to the part where the following occurs:**
(a) F ✓ (1)
(b) C ✓ (1)
- 4.2 4.2.1 **Period in the cycle characterised by the formation of the corpus luteum**
Met-oestrus/ Meta-oestrus ✓ (1)
- 4.2.2 **Hormone that is responsible for ovulation during this cycle**
Luteinising hormone/ LH ✓ (1)
- 4.2.3 **Definition of oestrus**
• Oestrus is the time during the reproductive cycle when the female shows interest ✓ in mating and will stand to be mounted by both sexes and mated by the bulls. ✓
• Oestrus is the period in the oestrus cycle when the non-pregnant cow ✓ is most receptive to a male. ✓
• Oestrus is when the female is receptive to the male ✓ and will stand for mating. ✓ (Any 1 x 2) (2)
- 4.2.4 **TWO methods of identifying cows on heat**
• Chin-ball markers ✓
• Tail chalking ✓
• Pedometer ✓
• Heat mount detector ✓ (Any 2 x 1) (2)
- 4.3 4.3.1 **Mating stage displayed by the bull in the picture**
Courtship ✓ (1)
- 4.3.2 **TWO factors that regulate mating behaviour in bulls**
• Genetics ✓
• Environmental factors ✓
• Physiological factors ✓
• Health ✓
• Previous experience ✓ (Any 2 x 1) (2)
- 4.4 4.4.1 **Equipment in PICTURE A**
Electro-ejaculation probe ✓ (1)

- 4.4.2 **Use of the equipment mentioned in QUESTION 4.4.1**
Stimulate ejaculation ✓ (1)
- 4.4.3 **Temperature requirement of the collected semen**
-196 °C ✓ (1)
- 4.4.4 **Functions of the semen dilutants**
(a) Provides protection against changes in pH ✓ (1)
(b) Provides nutrients for the sperm cells ✓ (1)
(c) Prevents bacterial growth ✓ (1)
- 4.4.5 **Explanation of the correct time for artificial insemination**
Cows showing signs of oestrus in the morning are inseminated in the afternoon ✓ and cows showing signs of oestrus in the afternoon are inseminated the next morning. ✓ (2)
- 4.5 4.5.1 **Identification of the procedure in the diagram**
Cloning/ Nuclear transfer ✓ (1)
- 4.5.2 **Name of animal C in the procedure**
Surrogate sheep ✓ (1)
- 4.5.3 **Suitability of technique for subsistence farming**
Not suitable ✓ (1)
- 4.5.4 **Justification of answer to QUESTION 4.5.3**
 - It is expensive
 - Requires specific skills (Any 1 x 1) (1)
- 4.6 4.6.1 **Process depicted in the picture**
Parturition/ calving ✓ (1)
- 4.6.2 **Name of condition which may interfere with the process**
Dystocia ✓ (1)
- 4.6.3 **TWO causes of the condition mentioned in QUESTION 4.6.2**
 - Flexion of the elbow ✓
 - Deviation of the head ✓
 - Retention of one or both forelegs ✓
 - Hydrocephalus ✓
 - Twins ✓
 - Congenital defects/ deformities ✓
 - Posterior presentation ✓ (Any 2 x 1) (2)
- 4.6.4 **Phases of reproduction in cows**
E ✓
D ✓
B ✓
C ✓
A ✓ (5)

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TOTAL SECTION B: 105
GRAND TOTAL: 150