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**SA EXAM
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**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2021

**AGRICULTURAL SCIENCES P1
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 10 pages.

SECTION A**QUESTION 1**

| | | | | |
|-----|--------|------------------------|----------|------|
| 1.1 | 1.1.1 | C ✓✓ | (10 x 2) | (20) |
| | 1.1.2 | B ✓✓ | | |
| | 1.1.3 | C ✓✓ | | |
| | 1.1.4 | D ✓✓ | | |
| | 1.1.5 | A ✓✓ | | |
| | 1.1.6 | D ✓✓ | | |
| | 1.1.7 | B ✓✓ | | |
| | 1.1.8 | C ✓✓ | | |
| | 1.1.9 | D ✓✓ | | |
| | 1.1.10 | C ✓✓ | | |
| 1.2 | 1.2.1 | B only ✓✓ | (5 x 2) | (10) |
| | 1.2.2 | A only ✓✓ | | |
| | 1.2.3 | None ✓✓ | | |
| | 1.2.4 | B only ✓✓ | | |
| | 1.2.5 | Both A and B ✓✓ | | |
| 1.3 | 1.3.1 | Biological value/BV ✓✓ | (5 x 2) | (10) |
| | 1.3.2 | Quarantine ✓✓ | | |
| | 1.3.3 | Cryptorchidism ✓✓ | | |
| | 1.3.4 | Impotence ✓✓ | | |
| | 1.3.5 | Freemartin ✓✓ | | |
| 1.4 | 1.4.1 | Lipase ✓ | (5 x 1) | (5) |
| | 1.4.2 | Weaning ✓ | | |
| | 1.4.3 | Colostrum/beestings ✓ | | |
| | 1.4.4 | Ovum/egg cell ✓ | | |
| | 1.4.5 | Repeat breeder ✓ | | |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Digestion in farm animals**

- 2.1.1 **Indication whether the teeth represent the lower or upper jaws**
Lower jaw ✓ (1)
- 2.1.2 **Naming the type of digestion done by the teeth**
Physical ✓ (1)
- 2.1.3 **Explaining the importance of teeth together with saliva in FARM ANIMAL 1**
Teeth break down large food particles into smaller particles ✓
Saliva moistens, softens and bind the particles together to form a bolus ✓ (2)
- 2.1.4 **Part of a fowl that performs the same function done by teeth**
Ventriculus/gizzard ✓ (1)
- 2.1.5 **Explanation of the path of milk in FARM ANIMAL 2**
Milk flows from the mouth to the oesophagal groove ✓ and land directly into the abomasum ✓ (2)

2.2 Villi

- 2.2.1 **Part in the alimentary canal where villi is found**
Small intestines ✓ (1)
- 2.2.2 **Indication of the nutrient absorbed in part A and B**
Part A – Digested protein and carbohydrates ✓
Part B – Digested fats ✓ (2)
- 2.2.3 **Process that follows after the absorption of nutrients**
Assimilation ✓ (1)
- 2.2.4 **ONE adaptation feature of the villi**
 - Presence of blood and lymph capillaries ✓
 - Microvilli to increase the surface area for absorption ✓
 - Thin layer of epithelial cells with carrier molecules ✓ (Any 1 x 1) (1)

2.3 Feed components

2.3.1 Identification of the feed suitable for:

- (a) Young growing animals – Feed **C** ✓
- (b) Fattening old ewes – Feed **A** ✓
- (c) Insulation against temperature changes – Feed **B** ✓ (3)

2.3.2 Calculation of the nutritive ratio of feed B

$$\text{NR} = 1 : \frac{\% \text{TDN} - \% \text{DP}}{\% \text{DP}} \checkmark$$

$$1 : \frac{85\% - 20\%}{20\%} \checkmark$$

$$1 : 3,25 \checkmark$$

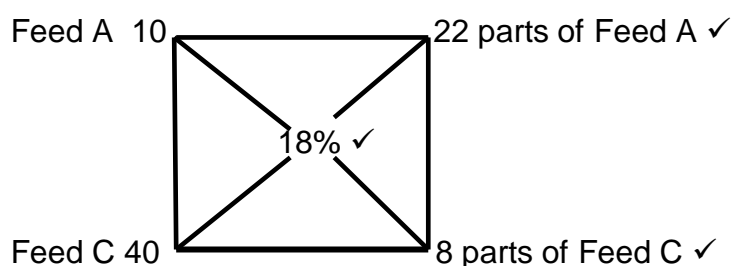
OR

$$\text{NR} = 1 : \frac{\% \text{digestible non-nitrogen substances}}{\% \text{digestible protein}} \checkmark$$

$$1 : \frac{65}{20} \checkmark$$

$$1 : 3,25 \checkmark \quad (3)$$

2.3.3 Determining the ratio of feed A and feed C to be mixed to get a feed with 18% DP



Ratio of feed **A** : Feed **C** is 22 : 8 ✓ (4)

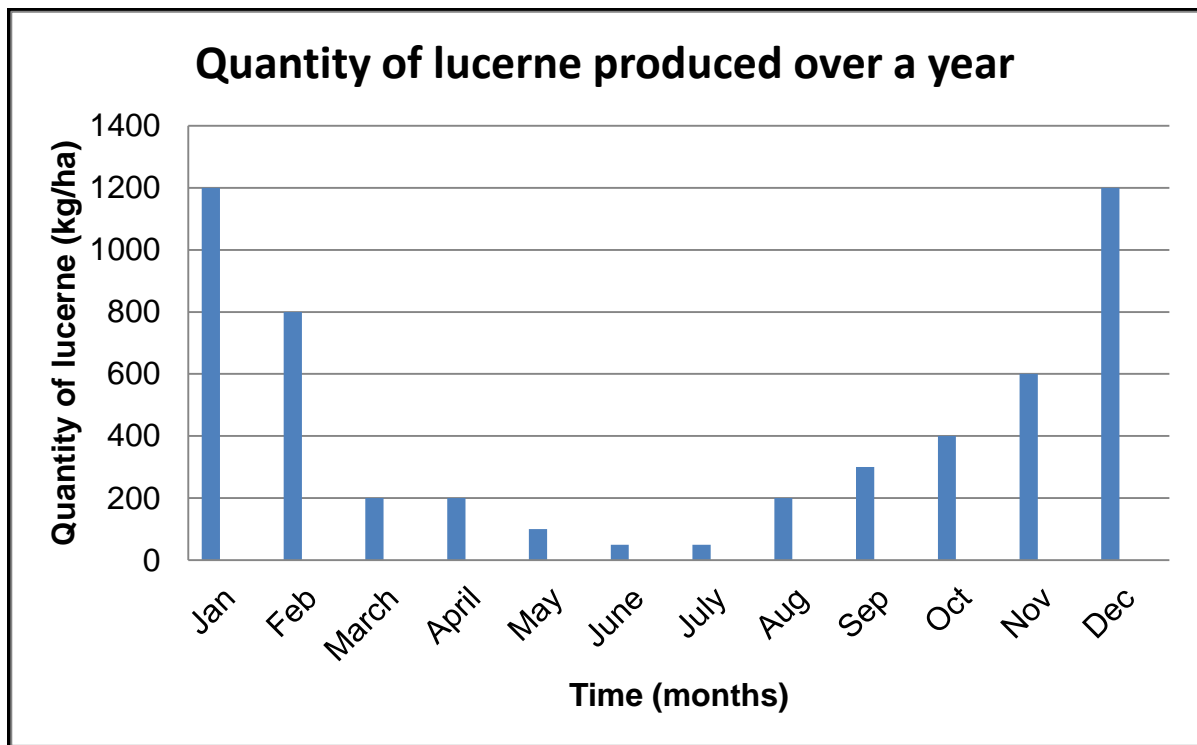
2.4 Growth stimulants

Naming the most applicable substance:

- (a) Tranquilisers ✓
- (b) Thyroid regulator ✓ (2)

2.5 Fodder flow

2.5.1 Bar graph



Criteria/rubric/markings guideline

- Correct heading ✓
- *x*-axis: Correctly calibrated and labelled (Time) ✓
- *y*-axis: Correctly calibrated and labelled (Quantity of lucerne) ✓
- Correct units (kg/ha and months) ✓
- Bar graph ✓
- Accuracy ✓

(6)

2.5.2 Calculation of the total amount of lucerne the cows will need in June

$$\begin{aligned} &\text{Number of animal} \times \text{requirement/kg/day} \times 30 \\ &= 35 \times 5 \text{ kg} \times 30 \checkmark \\ &= 5\,250 \text{ kg} \checkmark \end{aligned}$$

(2)

2.5.3 Determination of whether there will be enough lucerne for these lactating cows in June

$$\begin{aligned} &\text{Supply in June} = 50 \text{ kg/Ha} \times 42 \text{ hectares} \\ &= 2\,100 \text{ kg} \checkmark \\ &2\,100 \text{ kg} - 5\,250 \text{ kg} = 3\,150 \text{ kg} \checkmark \\ &\text{There will be a shortage of } 3\,150 \text{ kg.} \checkmark \end{aligned}$$

(3)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Production system****3.1.1 Identification of the animal production system**

Extensive production system ✓ (1)

3.1.2 TWO reasons

- Lot of space and few animals/low-density ✓
- Animal production adapted to existing environment/environment not modified ✓
- Low input costs ✓
- Use of thorny shrubs as fencing ✓ (Any 2 x 1) (2)

3.1.3 Linking the production system with a relevant farming system

Subsistence ✓ (1)

3.1.4 Identification of the measures to increase animal production under the following:

- (a) **Nutrition** – Planting of the kikuyu ✓
- (b) **Reproduction** – Breeding animals adapted to the environment ✓
- (c) **General enterprise management** – Dividing grazing area into camps/practising rotational grazing ✓ (3)

3.2 Facilities/equipment**3.2.1 Identification of the facilities/equipment**

PICTURE B – Furrowing crate ✓
PICTURE D – Drinker ✓ (2)

3.2.2 Purpose of using the facility

Labelled A in PICTURE C – to restrain an animal ✓ (1)

3.2.3 TWO design features of the facility labelled B in PICTURE C

- Should have high solid sides to prevent animals from seeing out ✓
- Narrow curved/not curved too sharply ✓ (2)

3.2.4 Indication of the information to be included in the permit

- Details of the owner ✓
- Number of animals ✓
- Type of animals ✓
- Description of animals ✓
- Registration number of the vehicle ✓
- Destination to which animals are being taken ✓
- Name and ID number of the driver ✓ (Any 2 x 1) (2)

3.3 Animal handling and behaviour

3.3.1 TWO signs of pigs in distress

- Tail biting ✓
- Ear biting ✓
- Cannibalism ✓
- Belly nibbling ✓
- Snout rubbing ✓

(Any 2 x 1) (2)

3.3.2 TWO effects of incorrect handling of animals during transportation

- Animals will be injured ✓
- Delayed rigor mortis ✓
- Poor quality of meat ✓

(Any 2 x 1) (2)

3.4 Diseases

3.4.1 TWO signs showing that the animal is sick

- Dull glossy eyes ✓
- Pink membrane around the eyes ✓
- Rapid pulse rate ✓
- Laboured breathing ✓
- Animal walks slowly or limps when forced to walk ✓
- Discoloured urine and faeces may be too hard or too soft ✓
- Dull rough coat ✓

(Any 2 x 1) (2)

3.4.2 TWO methods a farmer can use to test animal health

- Taking an animal's temperature ✓
- Determining pulse rate ✓
- Determining respiratory rate ✓

(Any 2 x 1) (2)

3.5 Life cycle of an anthrax

3.5.1 Indication of the pathogen

Bacteria ✓

(1)

3.5.2 TWO ways in which the disease can be transmitted

- Ingestion of the animal product ✓
- Inhalation ✓
- Cutaneous/through the skin ✓

(Any 2 x 1) (2)

3.5.3 Justification that the disease is zoonotic

It is transferred from the animals ✓ to human beings ✓

(2)

3.5.4 TWO steps the farmer can take to prevent further spread of the disease

- Burn or bury the carcasses of infected animals ✓
- Dispose all manure, bedding and other contaminated materials ✓
- Clean and disinfect stables, pens, milking parlours and all equipment ✓

(Any 2 x 1) (2)

3.6 Ticks**3.6.1 Classification of the parasite**

External parasite ✓

(1)

3.6.2 Reason

They create an opening on the skin of an animal ✓

(1)

3.6.3 Name of the tick belonging to the following class:(a) **Three-host tick** – Bont tick ✓(b) **One-host tick** – Blue tick ✓

(2)

3.6.4 TWO economic impacts of ticks for the farmer

- Decreased production ✓
- Decreased income/profit ✓
- High cost of treatment ✓

(Any 2 x 1)

(2)

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QUESTION 4: ANIMAL REPRODUCTION**4.1 Reproductive systems****4.1.1 Identify the letter**

- (a) B ✓ (1)
- (b) I ✓ (1)
- (c) G ✓ (1)
- (d) Diagram A – C ✓
Diagram B – J ✓ (2)

4.1.2 Naming the inner and the middle membranes surrounding the foetus

Inner membrane – Amnion ✓

Middle membrane – Allantois ✓ (2)

4.1.3 Explanation of the role of the parts

Part A – Regulates the temperature of the testis for optimum sperm production ✓

Part F – Collects the ovum released during ovulation ✓ (2)

4.2 Reproductive processes**4.2.1 Identification of the processes**

B – Fertilisation ✓

C – Pregnancy/gestation ✓ (2)

4.2.2 Indication of the first and the last stage of pregnancy

First stage– Ovum phase ✓

Last stage- Foetal stage ✓ (2)

4.2.3 Name of the process labelled A

Artificial Insemination/AI ✓ (1)

4.2.4 TWO economic benefits of artificial insemination for the farmer

- Less expensive because there is no need to buy a bull ✓
- Large number of offspring can be produced from the superior bulls ✓
- Semen of superior bulls can be used even after death ✓
- Semen of multiple sires can be used without maintaining many expensive bulls
- Higher conception rate is achieved ✓ (Any 2 x 1) (2)

4.2.5 TWO factors causing retention of placenta

- Deficiency of vitamin A ✓
- Sexually transmitted diseases ✓
- Infections/abortion ✓
- Exhaustion following difficult calving ✓
- Mineral deficiency ✓
- Hereditary defects ✓
- Over-conditioning of dry cows ✓ (Any 2 x 1) (2)

4.3 Cloning

- 4.3.1 **Identification of the reproductive process**
Cloning/nuclear transfer ✓ (1)
- 4.3.2 **Explanation of a reason**
Somatic cell from the donor is fused with a nucleated egg cell ✓
giving rise to an offspring that is genetically identical to the donor
sheep ✓ (2)
- 4.3.3 **Naming of the process**
Enucleation ✓ (1)
- 4.3.4 **Indication of the letter of the sheep**
(a) D ✓
(b) A ✓
(c) B ✓ (3)
- 4.3.5 **TWO aims of the cloning**
 - Produce large number of genetically identical animals ✓
 - Produce offspring from high quality animals ✓
 - Preserve and extend proven superior genetics ✓
 - Achieve high quality meat and dairy products ✓
 - Increase number of endangered species ✓ (Any 2 x 1) (2)

4.4 Udder and lactation

- 4.4.1 **Identification of parts**
A – Alveoli ✓
B – Lobe ✓
C – Teat ✓ (3)
- 4.4.2 **Indication of the role of alveoli**
It is where milk is formed ✓ (1)
- 4.4.3 **Naming the stage in the lactation cycle between month 10 and the next calving period**
Dry/rest period ✓ (1)
- 4.4.4 **Importance of dry period for lactating cow**
To give time for glandular tissue of the udder to recover ✓ and
prepare for optimum milk production in the next lactation cycle ✓ (2)
- 4.4.5 **Identification of the number of months' lactation period last**
10 months ✓ (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150