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# **basic education**

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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

**AGRICULTURAL SCIENCES P1**

**2022**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 10 pages.**

**SECTION A****QUESTION 1**

|     |        |   |          |      |
|-----|--------|---|----------|------|
| 1.1 | 1.1.1  | C ✓✓  | (10 x 2) | (20) |
|     | 1.1.2  | D ✓✓  |          |      |
|     | 1.1.3  | C ✓✓  |          |      |
|     | 1.1.4  | D ✓✓  |          |      |
|     | 1.1.5  | B ✓✓  |          |      |
|     | 1.1.6  | A ✓✓  |          |      |
|     | 1.1.7  | A ✓✓  |          |      |
|     | 1.1.8  | B ✓✓  |          |      |
|     | 1.1.9  | C ✓✓  |          |      |
|     | 1.1.10 | A ✓✓  |          |      |
| 1.2 | 1.2.1  | B only ✓✓   | (5 x 2)  | (10) |
|     | 1.2.2  | B only ✓✓   |          |      |
|     | 1.2.3  | A only ✓✓   |          |      |
|     | 1.2.4  | None ✓✓   |          |      |
|     | 1.2.5  | A only ✓✓   |          |      |
| 1.3 | 1.3.1  | Digestibility coefficient ✓✓                            | (5 x 2)  | (10) |
|     | 1.3.2  | Sustainable medication/integrated disease management ✓✓ |          |      |
|     | 1.3.3  | Placenta retention/retained placenta ✓✓                 |          |      |
|     | 1.3.4  | Embryo flushing/harvesting ✓✓                           |          |      |
|     | 1.3.5  | Mitochondrion ✓✓  |          |      |
| 1.4 | 1.4.1  | Biological value/BV ✓                                   | (5 x 1)  | (5)  |
|     | 1.4.2  | Drenching/dosing gun/syringe ✓                          |          |      |
|     | 1.4.3  | Natural mating/copulation ✓                             |          |      |
|     | 1.4.4  | Ectoderm ✓  |          |      |
|     | 1.4.5  | Ejection/delivery/expulsion ✓                           |          |      |

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 Stomach compartments of two ruminant farm animals**

- 2.1.1 **The development stage of the ruminant farm animal in A**  
Young ruminant farm animal ✓ (1)
- 2.1.2 **TWO reasons**
- Presence of oesophagal groove ✓
  - Underdeveloped fore-stomach (rumen/reticulum/omasum) ✓
  - Large abomasum ✓ (Any 2) (2)
- 2.1.3 **Identification of the letter**
- (a) D ✓ (1)
- (b) C ✓ (1)
- 2.1.4 **Adaptation feature of part E /omasum**  
It has folds/leaves that squeeze water from the feed ✓ (1)
- 2.1.5 **Fowl's stomach corresponding with the abomasum**  
Proventriculus/glandular stomach ✓ (1)

**2.2 Energy flow of feed**

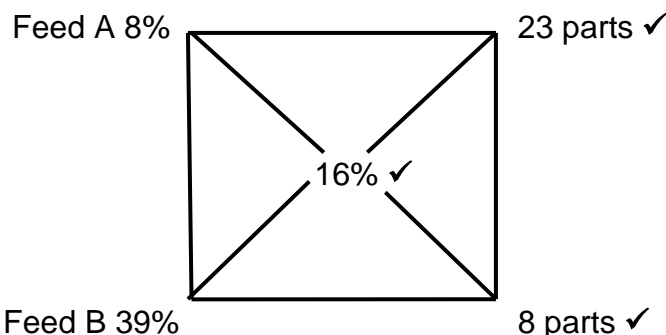
- 2.2.1 **Energy represented by A**  
Metabolic energy/ME ✓ (1)
- 2.2.2 **Calculation of the digestible energy**
- DE = Gross Energy – energy lost through faeces ✓
  - DE = 850 joules – 255 joules ✓
  - DE = 595 joules ✓ (3)
- 2.2.3 **Importance of net energy**
- For growth/production/reproduction/work ✓
  - For maintenance ✓ (Any 1) (1)
- 2.2.4 **TWO aims of calculating energy value of the feed**
- To determine animal diet ✓
  - To determine feeding standards ✓
  - To determine ration formulation ✓ (Any 2) (2)

**2.3 Nutritional composition of two feeds**

- 2.3.1 **The purpose of using feed B**
- For growth ✓
  - For production ✓
  - For reproduction ✓ (Any 1) (1)

**2.3.2 ONE reason**

It has a high protein content (39%)/narrow NR (less than 1:6) ✓ (1)

**2.3.3 Pearson square method**

**Ratio** Feed A : Feed B is 23 : 8 ✓ (4)

**2.4 Minerals, vitamins and deficiency symptoms**

- (a) Zinc/Zn ✓ (1)
- (b) Night blindness/keratomalaise/malformation of bones/lower disease resistance/lower fertility/loss of appetite/diarrhoea ✓ (1)
- (c) Wasting disease/stunted growth/poor appetite/listlessness/drop in milk production/anaemia/cardiac failure/infertility ✓ (1)
- (d) Vitamin K ✓ (1)
- (e) Iron/Fe/Copper/Cu/vitamin B<sub>6</sub> ✓ (1)

**2.5 Suitable components of feeds**

- 2.5.1 Water ✓ (1)
- 2.5.2 Carbohydrates ✓ (1)
- 2.5.3 Fats/Oils/Lipids ✓ (1)

**2.6 Types of feeds****2.6.1 Classification of feed types A and B**

- Feed types A - Concentrates ✓ (1)
- Feed types B - Roughages ✓ (1)

**2.6.2 Identification of C**

Carbohydrate-rich concentrates ✓ (1)

**2.6.3 TWO functions of roughages(B)**

- Enhance the development of rumen in young animals ✓
  - Stimulate milk production ✓
  - Provide bulkiness to the ration ✓
  - Prevent bloating in ruminants ✓
  - Improve digestion ✓
  - Providing energy ✓
- (Any 2) (2)

**2.6.4 TWO feed examples of succulent roughages (D)**

- Silage ✓
- Green fodder/pastures/soilage ✓
- Green lucerne ✓

(Any 2)

(2)

**[35]****QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 Animal production systems****3.1.1 Animal production system**

- **FARM A** - Intensive production system ✓
- **FARM B** - Extensive production system ✓

(1)

(1)

**3.1.2 Reason for extensive production system**

- **Space** - Large space ✓
- **Number of animals** - Fewer animals ✓

(1)

(1)

**3.1.3 Indication of the high inputs**

- 30 labourers ✓
- 3 x big tractors ✓
- Abattoir with equipment ✓

(Any 1)

(1)

**3.1.4 TWO ways of increasing animal productivity on farm B**

- Correct feeding/nutrition/diet ✓
- Improving environment/provision of shelter ✓
- Breeding disease resistant animals ✓
- General production enterprise management ✓

(Any 2)

(2)

**3.2 Examples of intensive production systems****3.2.1 Matching the pictures**

- (a) Picture C ✓
- (b) Picture A ✓
- (c) Picture B ✓

(1)

(1)

(1)

**3.2.2 TWO important reasons for shelter in farm animals**

- To reduce effects of extreme weather conditions ✓
- Protect against predators/theft ✓
- Easy management ✓
- Improved production ✓

(Any 2)

(2)

**3.3 Broiler facility****3.3.1 Purpose of the curtains in the facility**

- Control light intensity ✓
- Regulate the temperature inside the house/ventilation ✓

(Any 1)

(1)

**3.3.2 TWO other equipment used to control temperature for chicks**

- Insulators/bedding ✓
- Heating equipment when it is cold ✓
- Cooling equipment/ventilators when it is hot ✓

(Any 2)

(2)

**3.3.3 TWO factors to consider when building broiler facility**

- Orientation of the building ✓
- Should allow air flow/ventilation ✓
- Slope to allow good drainage/prevent run-off water entering ✓
- Side walls should be insulated ✓
- Cost effective ✓
- Durability/strength ✓
- Insulated roofing material ✓

(Any 2) (2)

**3.4 Animal diseases and parasites in farm animals****3.4.1 Completing the table**

- **A** - Virus ✓ (1)
- **B**
  - Chronic cough ✓
  - Squeaky breathing ✓
  - Dyspnea/enlarge lymph nodes ✓ (Any 1) (1)
- **C** - Protozoa ✓ (1)
- **D** - Ringworm ✓ (1)

**3.4.2 Indication of the vector****E** - Bont tick/3-host tick ✓ (1)**3.4.3 TWO financial implications of animal diseases**

- Decreased production/income/profit ✓
- Banning of exports/international trade decreases ✓
- Have negative impact on food security ✓
- High cost to control/prevention ✓ (Any 2) (2)

**3.4.4 Identification of the disease transmitted from animals to humans**

Tuberculosis/TB/ringworm ✓ (1)

**3.5 Medication of farm animals****3.5.1 Method to administer medication**

Intramuscular injection ✓ (1)

**3.5.2 Identification of the role of the state**

Registration of the medication/Reg. No. F 2144/ACT 36/1947 ✓ (1)

**3.5.3 Justification**

The medication is retained in the body for four weeks ✓ (1)

**3.5.4 TWO other methods to administer medication through injection**

- Intravenous injection ✓
- Subcutaneous/hypodermic injection ✓
- Intradermal injection ✓
- Intraperitoneal injection ✓
- Intraruminal injection ✓
- Intramammary injection ✓ (Any 2) (2)

**3.6 Plant poisoning****3.6.1 Identification of the poisonous plant**

Thorn apple/devil's apple/Jamestown weed/Jimson weed/stinkweed/  
devil's trumpet/Datura stramonium ✓

(1)

**3.6.2 TWO measures to prevent plant poisoning**

- Remove the poisonous plant ✓
- Remove animals from camps infested with poisonous plant ✓
- Avoid overgrazing/practice rotational grazing ✓
- Feed animals well ✓
- Inspection of hay provided to farm animals ✓

(Any 2)

(2)

**3.6.3 TWO ways to treat animals with plant poisoning**

- Keep affected animal away from drinking water for two days, thereafter allow only small quantities of water ✓
- Administer activated charcoal/strong tea/tannic acid/remedies that will neutralise the plant poison ✓
- Provide large doses of purgative to expel poison ✓
- Dose the animal with sugar/glucose ✓

(Any 2)

(2)

**[35]****QUESTION 4: ANIMAL REPRODUCTION****4.1 The reproductive system of a bull****4.1.1 Identification of**

- **B** - Scrotum ✓
- **C** - Epididymis ✓

(1)

(1)

**4.1.2 The hormone secreted by the testis**

Testosterone ✓

(1)

**4.1.3 Condition when the testis remains in the body cavity**

Cryptorchidism ✓

(1)

**4.1.4 Role of the scrotum in regulating the temperature**

In hot conditions the scrotum relaxes moving the testes away from the body ✓ in cooler conditions the scrotum contracts pulling the testes closer to the body ✓

(2)

**4.2 Semen collection, dilution and preservation****4.2.1 TWO methods of collecting semen**

- Artificial vagina ✓
- Electrical stimulation/electro-ejaculator ✓

(2)

**4.2.2 TWO requirements for semen collection**

- All equipment that will be used should be readily available ✓
- Equipment must be hygienic/clean/sterilized ✓
- Floor area must not be slippery ✓
- Personnel must be trained/skilled with experience/expertise ✓

- Vial must be kept warm before and after collection ✓
- Enough handlers should be available ✓
- Teaser cow should be available ✓
- Semen must not be exposed to direct sunlight ✓ (Any 2) (2)

4.2.3 **TWO functions of semen dilutants**

- Provide nutrients/energy to the sperm cells ✓
- Prevent contamination by micro organisms ✓
- Protect sperm cells against pH changes ✓
- Protect sperm cells during freezing and thawing ✓
- Increase the volume of semen ✓
- Maintain proper osmotic/electrolyte pressure ✓
- Increase the viability of the sperm cells ✓ (Any 2) (2)

4.2.4 **Temperature requirement for semen storage**

–196 °C ✓ (1)

4.3 **Oogenesis**

4.3.1 **Identification of the process**

Oogenesis/ovogenesis ✓ (1)

4.3.2 **Type of cell divisions**

- (a) B - Meiosis ✓ (1)
- (b) A - Mitosis ✓ (1)

4.3.3 **Purpose of meiosis**

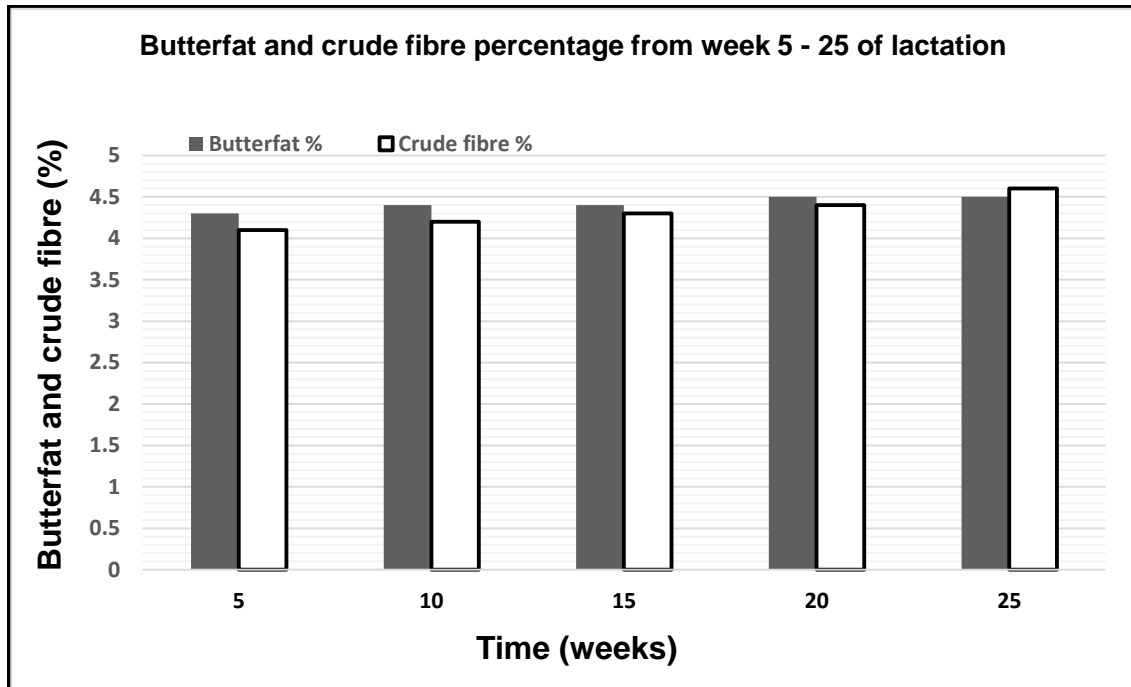
- Reduce the number of chromosomes from diploid (2n) to haploid (n) ✓
- To form gametes ✓ (Any 1) (1)

4.3.4 **Organ where the following cells can be found**

- (a) Spermatogonium - Testis ✓ (1)
- (b) Oögonia - Ovary ✓ (1)

#### 4.4 Bar graph

##### 4.4.1 Bar graph representing butterfat and crude fibre percentage from week 5–25 of lactation



#### CRITERIA/RUBRIC/MARKING GUIDELINES

- Correct heading ✓
- X-axis: correct calibrations and labelled (Time) ✓
- Y-axis: correct calibrations and labelled (Butterfat and crude fibre) ✓
- Correct units (% and weeks) ✓
- Bar graph ✓
- Accuracy (80%+ correctly plotted) ✓ (6)

##### 4.4.2 Deduction of the trend of crude fibre

Increases from 4,6 to 5,0 ✓ (1)

#### 4.5 Development of the embryo in the uterus of a cow

##### 4.5.1 Letters of parts

- (a) F ✓ (1)
- (b) B ✓ (1)
- (c) C ✓ (1)

**4.5.2 TWO functions of the amniotic fluid**

- Shock absorber/prevents injuries ✓
- Allow movement of the foetus ✓
- Regulates temperature of the foetus ✓
- Lubricates birth canal ✓
- Prevents dehydration/desiccation of foetus ✓

(Any 2) (2)

**4.6 Milk production****4.6.1 Name of the milk produced during the first three days**

Colostrum/beestings ✓

(1)

**4.6.2 TWO reasons for the importance of colostrum**

- Antibodies increase disease resistance in calf ✓
- Calcium and Phosphorus required for strong bone development ✓
- Contain growth factors ✓
- Assists in the maturation of the alimentary canal ✓
- Richer in nutrients ✓
- Serves as a laxative ✓
- Higher in energy ✓

(Any 2) (2)

**4.6.3 Term for highest milk production point**

Peak period/peak production ✓

(1)

**[35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**