basic education

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 ✓✓		
	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 ✓✓	(10 x 2)	(20)
1.2	1.2.1	B only ✓✓		
	1.2.2	B only ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Digestibility coefficiency ✓✓		
	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 ✓✓	(5 x 2)	(10)
1.4	1.4.1	Biological value/BV ✓		
	1.4.2	Drenching/dosing gun/syringe ✓		
	1.4.3	Natural mating/copulation ✓		
	1.4.4	Ectoderm ✓		
	1.4.5	Ejection/delivery/expulsion ✓	(5 x 1)	(5)

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 oesophogal 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)

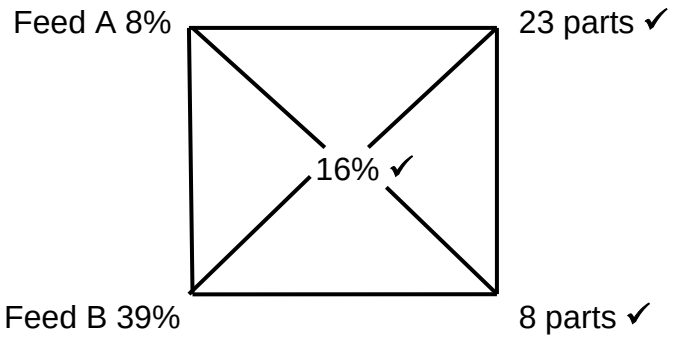
2.2.4 TWO aims of calculating energy value of the feed
- To determine animal diet ✓
- To determine feeding standards ✓
- To determine ration formulation ✓ (Any 2) (2)

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_6 ✓ (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)

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QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Animal production systems

3.1.1 **Animal production system**
- **FARM A** - Intensive production system ✓ (1)
- **FARM B** - Extensive production system ✓ (1)

3.1.2 **Reason for extensive production system**
- **Space -** Large space ✓ (1)
- **Number of animals -** Fewer animals ✓ (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 ✓ (1)
- **(b)** Picture A ✓ (1)
- **(c)** Picture B ✓ (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)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 **The reproductive system of a bull**

4.1.1 **Identification of**
- **B -** Scrotum ✓ (1)
- **C -** Epididymis ✓ (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/ovigenesis ✓ (1)

4.3.2 **Type of cell divisions**

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

4.3.3 **Purpose of meiosis**

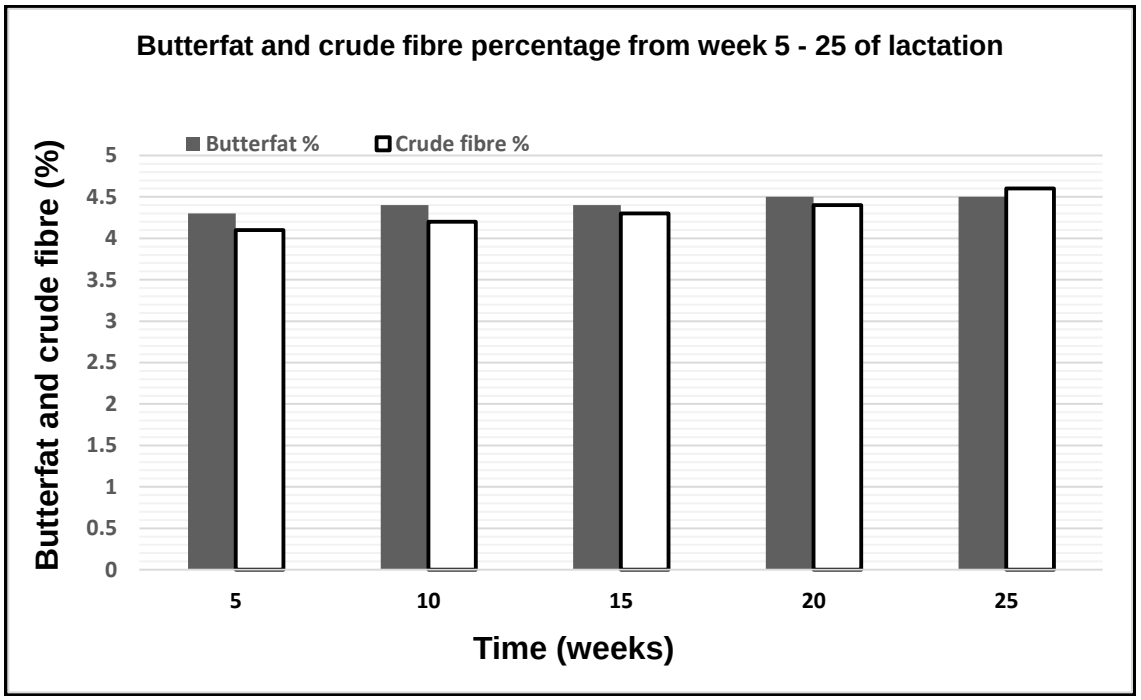
- Reduce the number of chromosomes from diploid (2n) to haploid (n) ✓
- To form gametes ✓ (Any 1) (1)

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)

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TOTAL SECTION B: 105
GRAND TOTAL: 150