



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2024

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 pages.

SECTION A**QUESTION 1****1.1**

1.1.1	D ✓✓		
1.1.2	C ✓✓		
1.1.3	B ✓✓		
1.1.4	D ✓✓		
1.1.5	A ✓✓		
1.1.6	C ✓✓		
1.1.7	A ✓✓		
1.1.8	D ✓✓		
1.1.9	C ✓✓		
1.1.10	B ✓✓	(10 x 2)	(20)

1.2

1.2.1	B only ✓✓		
1.2.2	A only ✓✓		
1.2.3	None ✓✓		
1.2.4	Both A and B ✓✓		
1.2.5	None ✓✓	(5 x 2)	(10)

1.3

1.3.1	Papillae ✓✓		
1.3.2	Subsistence ✓✓		
1.3.3	Therapeutic ✓✓		
1.3.4	Morula ✓✓		
1.3.5	Vas deferens/sperm duct/ductus deferens ✓✓	(5 x 2)	(10)

1.4

1.4.1	Absorption ✓		
1.4.2	Bont ✓		
1.4.3	Placenta ✓		
1.4.4	Nuclear transfer/cloning ✓		
1.4.5	Corpus luteum ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 The alimentary canal of a farm animal****2.1.1 Identification of the structures****A - Liver ✓****(1)****B - Pancreas ✓****(1)****2.1.2 TWO functions of an alkaline substance secreted in the liver**

- Activates the enzyme lipase to break down fats ✓
- Emulsifies fats ✓
- Improves absorption of fatty acids and glycerol ✓
- Helps with the absorption of fat-soluble vitamins A, D, K and E ✓
- Antiseptic and therefore counteracts putrefaction
- Neutralises the chyme from the stomach ✓

(Any 2) (2)**2.1.3 ONE intestinal gland located in small intestine**

- Gland/crypts of Lieberkühn ✓
- Brunner's glands/duodenal glands ✓

(Any 1) (1)**2.2 Micro-organisms in ruminant farm animals****2.2.1 TWO requirements for the normal functioning of the micro-organisms**

- Anaerobic conditions/oxygen free environment ✓
- Presence of carbon dioxide ✓
- pH of 5,5–6,5/slightly acidic ✓
- Temperature of 38–42°C/warm environment ✓
- Regular intake of food ✓
- Removal of waste products ✓
- Osmotic conditions/presence of moisture ✓
- Presence of volatile fatty acids ✓
- Sufficient nutrients/minerals ✓
- Easy digestible carbohydrates ✓

(Any 2) (2)**2.2.2 ONE function of the micro-organisms in the rumen of cattle**

- Digestion of cellulose/hemicellulose ✓
- Hydrolysis of proteins ✓
- Synthesis of vitamins ✓
- Synthesis of amino acids ✓

(Any 1) (1)**2.2.3 The micro-organism in the minority in the rumen of cattle**

- Fungi ✓
- Viruses ✓
- Archaea ✓

(Any 1) (1)

2.3 Food absorption into the bloodstream of farm animals

2.3.1 The process of food absorption in

- (a) Passive absorption/diffusion/osmosis ✓ (1)
 (b) Active absorption ✓ (1)

2.3.2 Identification of a diagram for absorption of glucose and amino acids - Diagram B ✓ (1)

2.3.3 Explanation of active absorption

Absorption of nutrients from a low to a high concentration/against concentration gradient ✓ with the aid of ATP as a source of energy ✓ (2)

2.4 Types of feeds

2.4.1 Classification of feeds

- (a) Roughages ✓ (1)
 (b) Concentrates ✓ (1)

2.4.2 Justification

- It has a high protein content/16% ✓
- It has high Total Digestible Nutrients/TDN/82% ✓
- It has low crude fibre content/8% ✓ (Any 1) (1)

2.4.3 Animal that cannot feed on FEED A

Pig/fowl/poultry ✓ (1)

2.4.4 Suitability of feed

- (a) Improves the functioning of digestive system - Feed A ✓ (1)
 (b) Stimulates butterfat production of milk - Feed A ✓ (1)

2.5 Components of feeds

2.5.1 Labelling C

Organic component ✓ (1)

2.5.2 The value of A

5 kg ✓ (1)

2.5.3 Calculation of the digestibility coefficient

$$DC = \frac{\text{Dry material intake (kg)} - \text{Dry material excreted (kg)}}{\text{Dry material intake (kg)}} \times 100 \checkmark$$

$$= \frac{25 \text{ kg} - 6 \text{ kg}}{25 \text{ kg}} \times 100 \checkmark$$

$$= 76 \checkmark \% \checkmark (4)$$

2.6 Energy flow

2.6.1 Definition of energy at A

Digestible energy is the gross energy minus energy lost in faeces ✓✓ (2)

2.6.2 **Label for B**
Urine ✓ (1)

2.6.3 **ONE function of E**
For maintenance/production/reproduction/growth/work ✓ (1)

2.6.4 **Calculation of C**
Metabolic energy = 37,2 MJ – 9,8 MJ – 4 MJ ✓
= 23,4 MJ ✓ (2)

2.7 **Mixing of FEED A and B**
Calculation of the quantity of FEED B in a 750 kg ration

- 15 parts + 5 parts = 20 parts ✓
- **FEED B** (kg) = $\frac{5}{20} \times 750$ kg ✓
- = 187,5 kg ✓ (3)

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QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Intensive cattle production system

3.1.1 **The production system**
Intensive productive system ✓ (1)

3.1.2 **TWO reasons**

- Large number of animals on a small area of land/high density ✓
- Presence of housing structures/facilities/silos ✓
- More capital invested ✓ (Any 2) (2)

3.2 Shelters/housing facilities

3.2.1 **Identification of the shelter/housing facility**

(a) **Very cold windy conditions - PICTURE B** ✓ (1)

(b) **Hot summer conditions - PICTURE A** ✓ (1)

3.2.2 **Term for the material covering the floor**
Bedding ✓ (1)

3.3 Structures, apparatus and appliances used in the handling and management of farm animals

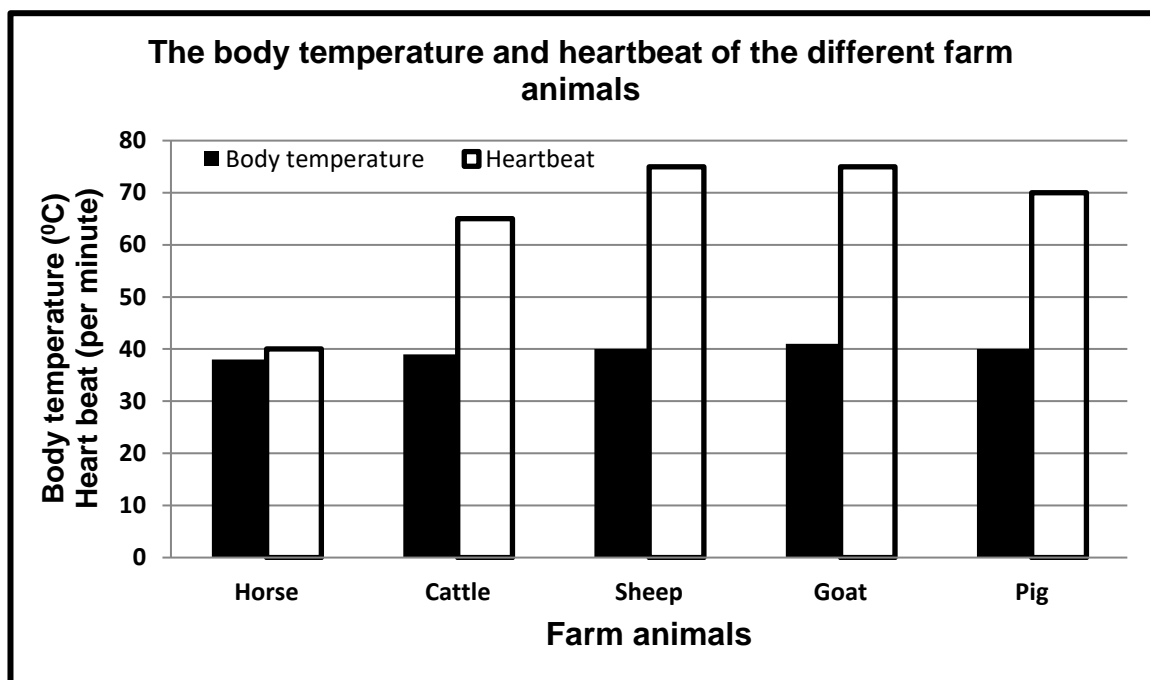
3.3.1 A ✓ (1)

3.3.2 D ✓ (1)

3.3.3 C ✓ (1)

3.4 The body temperature, number of breaths and heartbeats per minute of different farm animals

Combined bar graph



Criteria/rubric/marketing guidelines

- Correct heading (with both variables) ✓
- X-axis: Correctly calibrated with label (Farm animals) ✓
- Y-axis: Correctly calibrated with label (Body temperature and heartbeat) ✓
- Correct units (°C and per minute) ✓
- Combined bar graph ✓
- Accuracy (80% + correctly plotted) ✓

(6)

3.5 Methods to administer medication

3.5.1 Liquid medicine given to an farm animal orally

Dosing/drenching ✓

(1)

3.5.2 Applying medication into the muscle of farm animals

Injecting ✓

(1)

3.6 Animal diseases, pathogens and symptoms

Identification of letters

- A** Fungus ✓ (1)
- B** African Swine Fever/swine flu ✓ (1)
- C** Inflammation of the udder/milk is thick/watery and flaky/
drop in milk production/reduced mobility due to limping ✓ (1)
- D** Protozoa ✓ (1)
- E** Anthrax ✓ (1)

3.7 Life cycle of parasites

- 3.7.1 **Classification of the parasites**
Internal parasites/endoparasites ✓ (1)
- 3.7.2 **Name of the parasite**
Tapeworm ✓ (1)
- 3.7.3 **Classification of parasite B according to the number of hosts**
Two host parasite ✓ (1)
- 3.7.4 **TWO costs aligned with the control of parasites**
- Treatment costs/cost of anthelmintics ✓
 - Labour costs at the time of treatment ✓ (2)

3.8 External parasites

- 3.8.1 **Identification of the letter**
- (a) Parasite B ✓ (1)
- (b) Parasite A ✓ (1)
- 3.8.2 **TWO symptoms of PARASITE B/mites infestation**
- Skin irritation ✓
 - Dermatitis/inflammation of the skin ✓
 - Hair loss ✓
 - Restlessness ✓
 - Biting/rubbing/kicking/wagging of tails to relieve discomfort ✓
 - Skin breaks ✓ (Any 2) (2)
- 3.8.3 **TWO precautionary measure to prevent blowfly infestation**
- Correct timing of shearing and crutching ✓
 - Lambing time should be after shearing ✓
 - Clipping and cleaning of coat ✓
 - Breeding resistant animals ✓
 - Tail docking ✓
 - Sanitation/hygienic practises ✓
 - Proper treatment of wounds ✓ (Any 2) (2)

3.9 Type of a parasite

- 3.9.1 Internal parasite/endoparasites ✓ (1)
- 3.9.2 External parasite/ectoparasite ✓ (1)
- [35]**

QUESTION 4: ANIMAL REPRODUCTION**4.1 Reproductive process in farm animals****4.1.1 Labelling for**

- A** Egg cell/ovum/female gamete ✓ (1)
B Sperm cell/male gamete/spermatozoon ✓ (1)

4.1.2 Name of the process

Spermatogenesis ✓ (1)

4.1.3 ONE example of a secondary female reproductive organ visible

- Uterus ✓
- Fallopian tube/oviduct ✓
- Infundibulum ✓ (Any 1) (1)

4.1.4 Identification of the processes

- 1** Ovulation ✓ (1)
2 Fertilisation ✓ (1)

4.1.5 ONE function for each of the organs**(a) Fallopian tube**

- Site for fertilisation ✓
- Transportation of sperm cells and egg cells to opposite directions ✓
- Transportation of the zygote to the uterine body ✓ (Any 1) (1)

(b) Uterus

- For implantation of the developing embryo ✓
- Protects and nourishes the embryo ✓
- Contraction of the uterine walls to facilitate fertilization and expulsion of the foetus ✓
- Housing the embryo ✓ (Any 1) (1)

4.2 The procedure of manipulating the female farm animal**4.2.1 Term for the procedure**

Oestrus synchronisation ✓ (1)

4.2.2 ONE method to synchronise oestrus

- Injecting prostaglandin/administering of FSH/LH ✓
- Implants containing progesterone ✓
- Injecting stilboestrol/oestrogen ✓
- Mixing MGA/PG in feed ✓
- Inserting controlled internal drug release (CIDR) into the vagina ✓
- Administering of gonadotropin-releasing hormone/GnR ✓ (Any 1) (1)

4.2.3 Factor causing sterility and infertility in bulls associated with

- (a) Bull has an unbalanced ration - Malnutrition** ✓ (1)
(b) Young bull is raised in isolation - Inexperience/immaturity ✓ (1)

4.3 Oestrus cycle**4.3.1 Identification of the process**

Oestrus cycle ✓ (1)

4.3.2 Stages of oestrus

C Pro-oestrus ✓ (1)

D Oestrus ✓ (1)

4.3.3 ONE practical method to identify cows on heat

- Use of pedometer ✓
- Use of tail chalking ✓
- Use of chin-ball markers ✓
- Use of heat mount detectors/kamar heat detectors ✓
- Use of teaser animals ✓
- Regular observation/close monitoring of heat behaviour ✓ (Any 1) (1)

4.4 Reproductive technique to increase animal production**4.4.1 Identification of the reproductive technique**

Artificial Insemination/AI ✓ (1)

4.4.2 Name of the method to collect semen

Use of an artificial vagina ✓ (1)

4.4.3 The role of the substance in a dilutant

(a) Antibiotics - Prevent bacterial growth/infections ✓ (1)

(b) Buffers - Protection against changes in pH ✓ (1)

(c) Egg yolk - Provides nutrients for the sperm cell/
prevents cold shock ✓ (1)

4.5 Embryo transfer/transplant**4.5.1 Definition of the embryo transfer**

A technique where the embryos are harvested from the donor cow ✓
and transferred to the recipient cows ✓ (2)

4.5.2 Term for

(a) Female 1 - Donor/superior cow ✓ (1)

(b) Female 2, 3 and 4 - Recipient/inferior/surrogate cows ✓ (1)

4.5.3 Importance of female 1/donor

It provides genetically superior characteristics/embryos ✓ (1)

4.5.4 ONE disadvantage of embryo transfer/transplant

- It is expensive ✓
- Requires skills and experience ✓
- Synchronisation of the recipient and donor is difficult ✓
- Donor cow may not become pregnant after being artificially inseminated ✓
- Time consuming and labour intensive ✓
- Recipient cows may not become pregnant/abortion may occur ✓
- Embryo from the superior cow does not necessarily guarantee a superior calf ✓

(Any 1) (1)

4.6 Parturition**Letters of the steps when the cow is giving birth**

D ✓

(1)

B ✓

(1)

C ✓

(1)

A ✓

(1)

4.7 Milk synthesis and ejection**4.7.1 ONE method the milker can stimulate the milk let down process**

- Washing of the udder with warm water ✓
- Massaging the udder ✓
- Bringing the calf closer to the cow ✓
- Making sounds (whistling) ✓

(Any 1) (1)

4.7.2 Indication of how oxytocin stimulate milk let down process

Causes contractions of the myoepithelial cells surrounding alveolus ✓

(1)

4.7.3 Importance of a dry period

To give time for the glandular tissues of the udder to recover ✓

(1)

4.7.4 Substance in the colostrum giving calf immunity

Antibodies/immunoglobulins ✓

(1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150