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Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2023

AGRICULTURAL SCIENCES P1 MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 11 pages.

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SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓		
	1.1.2	A ✓✓		
	1.1.3	D ✓✓		
	1.1.4	B ✓✓		
	1.1.5	C ✓✓		
	1.1.6	B ✓✓		
	1.1.7	C ✓✓		
	1.1.8	A ✓✓		
	1.1.9	C ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	A only ✓✓		
	1.2.3	B only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Biological value ✓✓		
	1.3.2	Subsistence ✓✓		
	1.3.3	Dystocia ✓✓		
	1.3.4	Lymphatic system ✓✓		
	1.3.5	Lack of libido ✓✓	(5 x 2)	(10)
1.4	1.4.1	Fodder flow ✓		
	1.4.2	Chronic ✓		
	1.4.3	Scrotum ✓		
	1.4.4	Placenta ✓		
	1.4.5	Implantation ✓	(5 x 1)	(5)
			TOTAL SECTION A:	**45**

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SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Alimentary canal of farm animals

2.1.1 Name of the part
Small intestines ✓ (1)

2.1.2 TWO visible adaptation features
- Presence of micro-villi ✓
- Presence of blood capillaries ✓
- Presence of lymph vessels ✓ (Any 2 x 1) (2)

2.1.3 Indication of nutrients absorbed in:
(a) **Lymph** – Digested fats ✓ (1)
(b) **Blood capillaries** – Digested carbohydrates ✓ (1)

2.1.4 Explanation of how folds assist in absorption
Folds increase the surface area ✓ for absorption ✓ (2)

2.2 Feed components

2.2.1 Identification of
(a) **Energy – rich concentrate** – Maize meal ✓ (1)
(b) **Protein – rich roughage** – Lucerne hay ✓ (1)

2.2.2 Type of an animal
Ruminant ✓ (1)

2.2.3 Reason
- The ruminant animal has micro-organisms ✓which are able to digest a ration containing roughage and urea ✓
- The ruminant animal is able to regurgitate ✓ the feed for re-chewing of roughage ✓
- The ruminant animal has four compartments ✓ in its stomach adapted to digest roughages ✓ (Any 1) (2)

2.2.4 Component of the ration that can improve palatability and digestibility of oat hay
Molasses ✓ (1)

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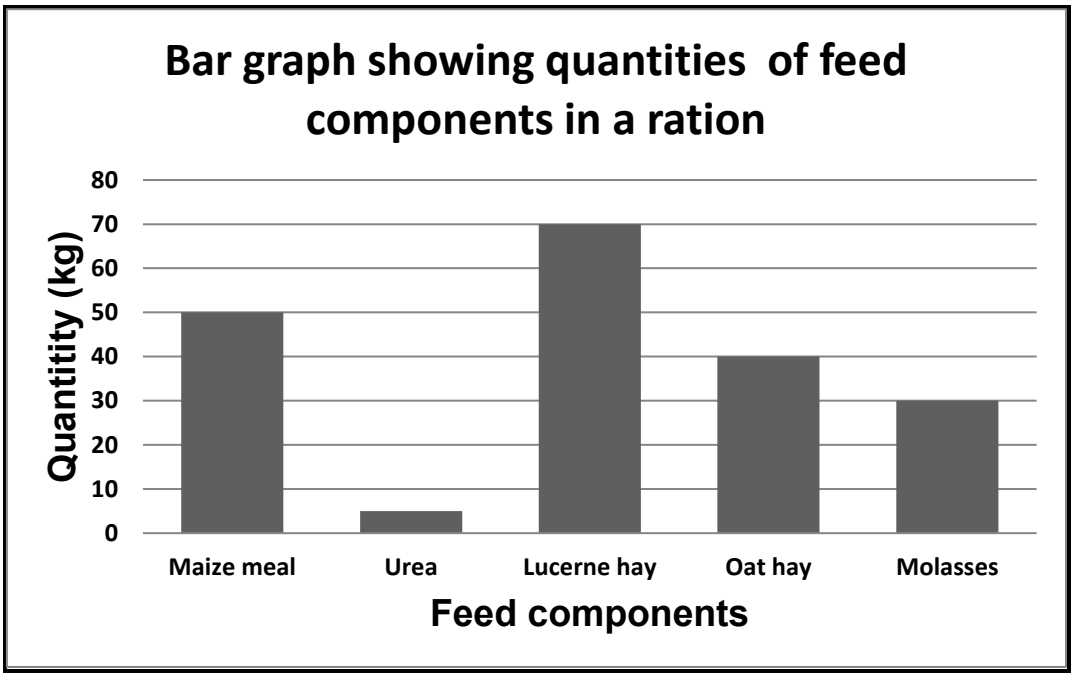
2.2.5 **Bar graph**



CRITERIA/RUBRIC/MARKING GUIDELINE

- Correct heading ✓
- Bar graph ✓
- x-axis: Correctly calibrated and labelled (Feed components) ✓
- y-axis : Correctly calibrated and labelled (Quantities) ✓
- Correct unit (kg) ✓
- Accuracy (80% + correctly plotted) ✓ (6)

2.3 **Sow and its litter housed in a farrowing pen with a cement floor**

2.3.1 **Mineral element deficient in sow**
Iron/Fe ✓ (1)

2.3.2 **ONE deficiency symptom of iron**

- Anaemia ✓
- Paleness of the mucous membrane ✓
- Listlessness/laziness/fatigue ✓ (Any 1 x 1) (1)

2.3.3 **Method of supplementing iron**

- Injection ✓
- Soil sods placed in pig's concrete pen ✓
- Feeding with green forage ✓ (Any 1 x 1) (1)

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2.4 **Pearson square**

2.4.1 **Ratio representing sunflower oilcake meal**
8 ✓ (1)

2.4.2 **Reason**
A feed high in protein ✓constitutes a small part of the ratio in the mixture. ✓ (2)

2.4.3 **Calculation of the percentage of a carbohydrate-rich feed in the mixture.**
8 + 20 = 28 ✓
$= \frac{20}{28} \times 100$ ✓
= 71,43% ✓ (3)

2.5 **Energy values of a feed**

2.5.1 **Identify the energy loss in B**
Energy lost as body heat ✓ (1)

2.5.2 **Justification of the importance of net energy**
- Needed for production/growth/reproduction ✓
- Needed for maintenance ✓ (2)

2.5.3 **Calculation of metabolic energy**
Metabolic energy/ME =
= Gross energy – energy loss in faeces – energy loss in urine and fermentation gases
= 24J – 9J – 5J ✓
= 10J ✓

OR

= Digestible energy – energy loss in urine and fermentation gases
= 15J – 5J ✓
= 10J ✓ (2)

2.5.4 **TWO aims of calculating energy value of the feed**
- To determine the animal's diet ✓
- To determine feeding standards ✓
- To determine ration formulation ✓ (Any 2 x 1) (2)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Handling facilities

3.1.1 Identification of the facility

Loading ramp ✓ (1)

3.1.2 Purpose of facility labelled A/crush

- To restrain farm animals/ ✓
- To guide farm animals to the vehicle for transportation ✓ (1)

3.1.3 Design feature of a crush to ensure safety

- Has high solid/strong/solid sides to prevent animals from seeing out ✓
- It has curves that are not sharp ✓
- There is nothing that can harm/hurt animals ✓
- Angles are not too steep ✓ (Any 2 x 1) (2)

3.1.4 TWO reasons for handling farm animals using crush

- For animal health programmes ✓
- Normal management programme/dehorning/castration/marking/docking ✓
- Treatment of parasites ✓
- Determination of animal's age ✓
- Generation of data ✓
- Transportation of animals ✓ (Any 2 x 1) (2)

3.2. Animal handling

3.2.1 Indication of the letter

(a) A ✓ (1)
(b) D ✓ (1)
(c) C ✓ (1)

3.2.2 Behaviour when approached at blind spot

- It will kick
- It will be restless/uncomfortable ✓ (1)

3.2.3 TWO common behaviours displayed by cattle under stress

- Pinned or raised ears ✓
- Rapid tail movement ✓
- Raised hair on the back of the neck ✓
- Pawing ✓
- Snorting ✓
- Feigned charging movements ✓ (Any 2 x 1) (2)

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3.3 Shelter and housing farm animals

3.3.1 Purpose of using the structures

(a) **Holding pen** – For keeping animals temporarily prior to handling ✓

(b) **Farrowing pen** – Keeping sows and piglets ✓

(c) **Holding shed** – Keeping animals for a long period of time to protect them against temperature changes ✓ (3)

3.3.2 THREE reasons for shelter/housing in animal production

- To protect animals against extreme temperature changes ✓
- To protect animals from predators/thieves ✓
- For easy handling ✓ (3)

3.4 Animal diseases

3.4.1 Labelling

A – Rabies ✓
B – Bacteria ✓
C – Swollen udder ✓
– Milk is thick, flaky with clots ✓ (Any 1)
D – Coccidiosis ✓
E – Hygiene ✓ (5)

3.4.2 Identification of the role of

(a) The famer – Good hygienic principles ✓ (1)
(b) The state – Provision of immunisation/vaccination ✓ (1)

3.5 Methods of administering medicine to animals

3.5.1 Identification of methods to apply medicine

A – Topical ✓
B – Vaginal insertion ✓
D – Plunge dipping/Dipping ✓ (3)

3.5.2 Letter representing the method used to treat parasites

(a) **Roundworm** – C ✓ (1)
(b) **Blue ticks** – D ✓ (1)

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3.5.3 **TWO ways of using medication sustainably**

- Medicine is safe to use for the specific animal ✓
- Check the expiry date ✓
- Ensure proper storage ✓
- Administer correct dose ✓
- Administer according to the instructions ✓
- Administer medicine for the correct period to ensure its effectiveness ✓
- Allow for proper withdrawal period before it is consumed ✓
- Medicine be kept away from children ✓ (Any 2 x 1) (2)

3.6 **Poisonous plants**

3.6.1 **ONE poisonous plant found in pastures**

- Thorn apple ✓
- Poisonous bulb ✓
- Lantana ✓
- Devil's thorn ✓
- Lupines ✓
- Buffalo grass ✓
- Poisonous leaf ✓ (Any 1 x 1) (1)

3.6.2 **TWO measures to control plant poison in pastures**

- Remove animals from an infested camp ✓
- Remove poisonous plants from the pastures ✓
- Feed animal well as they will be less likely to eat poisonous plants ✓
- Avoid overgrazing/overstocking ✓
- Practise rotational grazing ✓
- Provide animals with feed and water when transported by rail/when introducing them to a new place with unfamiliar plants ✓
- Control poisonous plants by applying chemicals in infested pastures ✓ (Any 2) (2)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 Reproductive system

4.1.1 Identification of the letter

(a) B ✓ (1)
(b) D ✓ (1)
(c) E ✓ (1)

4.1.2 TWO congenital defects in part B/testis leading to loss of fertility

- Hypoplasia ✓
- Cryptorchidism ✓
- Sperm defect ✓ (Any 2 x 1) (2)

4.1.3 Role played by part labelled C/penis in reproduction

It deposits semen into the vagina during mating ✓ (1)

4.2 Hormones controlling oestrus cycle

4.2.1 Duration of the oestrus

28 days ✓ (1)

4.2.2 Name of the hormones

A – Oestrogen ✓
B – Progesterone ✓ (2)

4.2.3 Indication of what is happening during the follicular phase

(a) Stage of oestrus cycle – Pro-oestrus ✓
(b) Hormone responsible – FSH ✓ (2)

4.2.4 TWO functions of hormone B/progesterone if the cow can be pregnant.

- Delays secretion of FSH ✓
- Prevents the cow from coming to heat ✓
- Prepares the uterus to receive the fertilised egg ✓
- Maintains proper uterine environment to maintain pregnancy ✓
- Stimulating uterine milk secretions ✓ (Any 2 x 1) (2)

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4.3 Artificial insemination

4.3.1 Purpose of using the pistolette

To deposit semen during artificial insemination ✓ (1)

4.3.2 TWO basic requirements for storage

- Semen to be stored at 5°C if sored for a short period ✓
- Semen be kept frozen in liquid nitrogen at -196°C if stored for a longer time ✓
- Must be stored in polyvinyl straws ✓
- The ends of straws are sealed to prevent liquid nitrogen from entering ✓
- Straws should be labelled for identification ✓ (Any 2 x 1) (2)

4.3.3 Identification of the letter

(a) A ✓ (1)
(b) E ✓ (1)

4.3.4 ONE disadvantage of using the equipment for the farmer

It is expensive ✓ (1)

4.3.5 TWO advantages of artificial insemination

- Decreases the occurrence of sexually transmitted diseases ✓
- More female animals can be fertilised by superior male animals ✓
- It is a quick and economical way to improve the herd ✓
- Semen from males in other countries can be used ✓
- Semen of superior bulls can be used even after death ✓
- It improves the commercial value of the herd ✓
- Semen of multiple sires can be used without keeping and maintaining expensive bulls ✓ (Any 2 x 1) (2)

4.4 Embryo harvesting/flushing

4.4.1 Identification of the procedure

Embryo harvesting/flushing ✓ (1)

4.4.2 Type of a cow where the procedure is performed

Donor/superior cow ✓ (1)

4.4.3 Reason

It possesses genetically superior desirable characteristics ✓ (1)

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4.4.4 **ONE aim of embryo transplant/ET**

- To prevent extinction of valuable animals / increase the number of endangered species ✓
- To improve disease resistance by using embryos of superior animals that are resistant to certain diseases ✓
- To improve the growth rate and production yields ✓ (Any 1 x 1) (1)

4.4.5 **TWO disadvantages of the technique for the farmer**

- More expensive/labour intensive ✓
- Needs considerable skill and experience ✓
- Synchronisation of the recipient and donor can be difficult ✓
- Recipient cow may not become pregnant/abortion may occur ✓
- Recipients may not have a strong enough heat cycle to accept the insemination ✓
- There is a danger that recipients could abort the embryos ✓
- Time consuming

(Any 2 x 1) (2)

4.5 **Flow of milk**

4.5.1 **Rearrangement of the steps with which the milk will flow**

- Alveolus ✓
- Milk ducts ✓
- Gland cistern ✓
- Teat cistern ✓
- Teat canal ✓ (5)

4.5.2 **Milk let down process**

(a) **TWO stimuli that initiate the process**

- Washing of the udder ✓
- Massage of the udder ✓
- Milking action ✓
- Appearance and sound of the milker ✓
- Seeing the calf ✓ (Any 2 x 1) (2)

(b) **Hormone involved**

Oxytocin ✓ (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

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