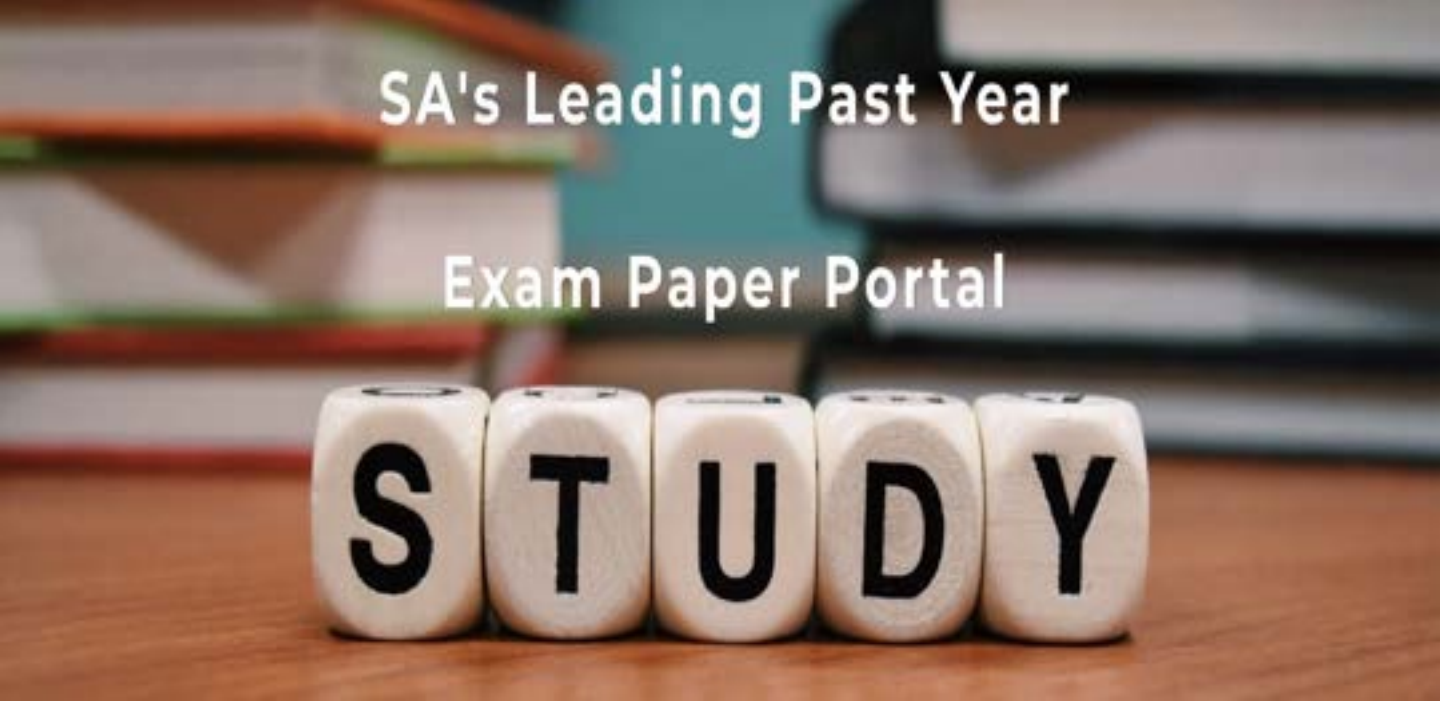


basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

FEBRUARY/MARCH 2018

MARKING GUIDELINES

These marking guidelines consist of 10 pages.

SECTION A

QUESTION 1

1.1	1.1.1	D ✓✓		
	1.1.2	D ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	C ✓✓		
	1.1.6	C ✓✓		
	1.1.7	A ✓✓		
	1.1.8	A ✓✓		
	1.1.9	B ✓✓		
	1.1.10	A/B ✓✓	(10 x 2)	(20)
1.2	1.2.1	B only ✓✓		
	1.2.2	Both A and B ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Ptyalin/amylase ✓✓		
	1.3.2	External/ecto- parasites ✓✓		
	1.3.3	Bedding/litter ✓✓		
	1.3.4	Superovulation ✓✓		
	1.3.5	Mitochondria ✓✓	(5 x 2)	(10)
1.4	1.4.1	Nitrogen/Protein ✓		
	1.4.2	Removal Certificate/Permit ✓		
	1.4.3	Splitting ✓		
	1.4.4	Mesoderm ✓		
	1.4.5	Testosterone ✓	(5 x 1)	(5)
			TOTAL SECTION A:	**45**

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Alimentary canal of a farm animal

2.1.1 Letter of the structure of cellulose digestion
A ✓ (1)

2.1.2 Cellulose digesting enzyme
Cellulase ✓ (1)

2.1.3 TWO requirements of the organisms in the part A
- Easily digestible carbohydrates
- Regular intake of food for fermentation ✓
- Sufficient mineral nutrients(Na/Cu/Co/P) ✓
- Anaerobic/oxygen free environment ✓
- Presence of CO_2 ✓
- Sufficient nitrogen ✓
- Suitable pH/slightly acidic pH/pH of 5,5 to 6,5 ✓
- Warm environment/temperature of 38-42^{0}c ✓
- Continual elimination of end products ✓
- Osmotic condition/moist environment ✓ (Any 2) (2)

2.1.4 The type of digestion in part D
Chemical/enzymatic digestion ✓ (1)

2.1.5 Reason for the answer
Part **D** secrets digestive juices/enzymes ✓ (1)

2.2 Available animal feeds

2.2.1 Classification of FEED A and FEED C
Feed A - Concentrate ✓ (1)
Feed C - Roughage ✓ (1)

2.2.2 Letters recommended for each situation
(a) B ✓ (1)
(b) D ✓ (1)
(c) A ✓ (1)
(d) C ✓ (1)

2.2.3 Justification of better digestion of feed B when ground
- Ground feed/maize has smaller particles with an increased surface area ✓
- for more exposure to enzymes and better digestion ✓ (2)

2.3 **Feed trial**

2.3.1 **Calculation of the digestibility co-efficient of hay**

$= \frac{11,5kg}{24kg} \times 100$ ✓

= 47,9 ✓ % ✓ (3)

2.3.2 **Stage the hay was cut**

It was cut later in the season when it was old/matured ✓ (1)

2.3.3 **Reason based on the calculated value**

- Only 47,9% of the hay was digested and absorbed ✓
- The hay was hard/lignified/with a high crude fibre content/less/poorly/difficult to digest ✓ (2)

2.3.4 **TWO supplementary substances to improve digestibility of hay**

- Non-protein nitrogen/NPN/urea/biuret ✓
- Molasses ✓
- Caustic soda ✓ (Any 2) (2)

2.4 **Fodder flow plan**

2.4.1 **TWO months when feed was insufficient**

- April ✓
- May ✓
- June ✓ (Any 2) (2)

2.4.2 **TWO reasons**

- The need is higher than the supply/there is a shortage ✓
- Supplementary feeding is provided ✓ (2)

2.4.3 **Total quantity of the supplementary feed in May**

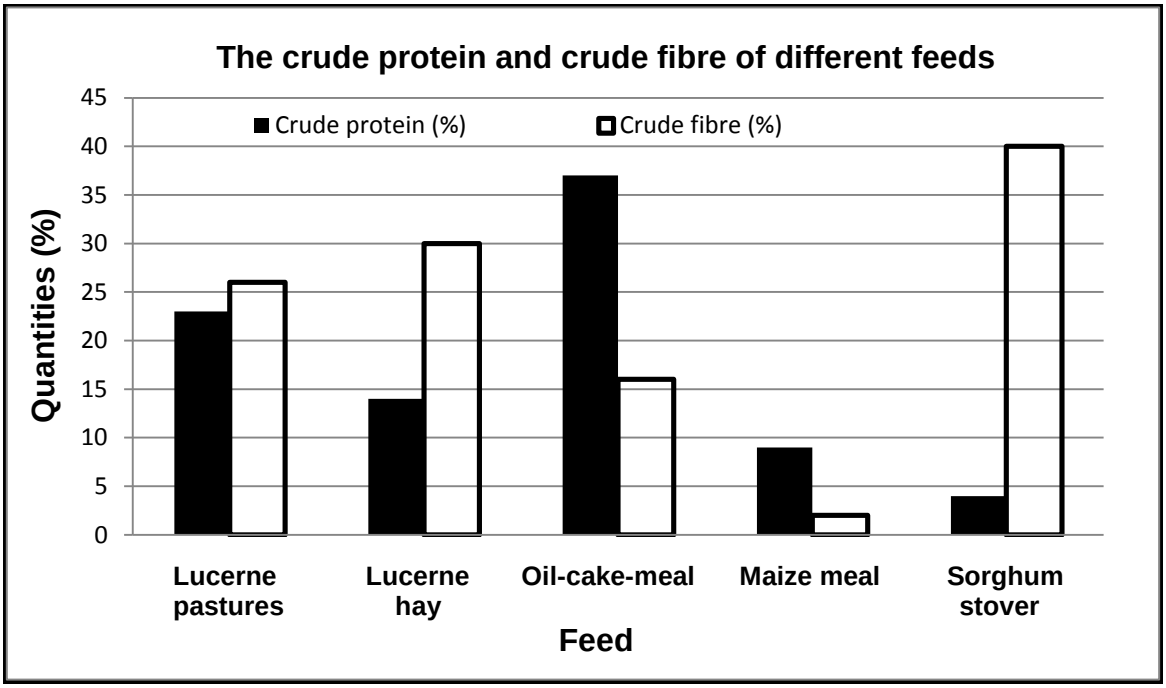
Supplementary feed(kg/animal) x number of days in May x number of animals

= 2 kg x 31 x 50 ✓

$= \frac{3\,100\ kg}{1\,000}$ ✓

= 3,1 tons ✓ (3)

2.5 **Bar graph showing the crude fibre and crude protein of the different feeds**



Criteria/rubric/marking guidelines

- Correct heading ✓
- Y axis - correctly calibrated and labelled (Quantities) ✓
- X axis - correctly calibrated and labelled (Feed) ✓
- Correct unit (%) ✓
- Bar graph ✓
- Accuracy ✓ (6)

[35]

QUESTION 3 ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 **Production systems**

3.1.1 **Identification of the TWO production systems represented by A and**

A - Intensive production system ✓ (1)
B - Extensive production system ✓ (1)

3.1.2 **Comparison of the TWO production systems**

(a) Method of feeding

- **Intensive production system -** feed is provided to animals ✓
- **Extensive production system -** animals graze/look for food ✓ (2)

(b) Space per production output

- **Intensive production system -** more production per area ✓
- **Extensive production system -** less production per area ✓ (2)

3.2 **The feeding and temperature requirements at different stages**

3.2.1 **Main nutrient for broilers**
Proteins ✓ (1)

3.2.2 **Importance of the nutrient element**
- Need protein for muscle and tissue growth ✓
- Act as antibodies that provide immunity ✓
- Collagens support tendons, ligaments and a beak ✓
- Controls body fluid balance and muscle contraction ✓
- Repair worn out tissues ✓ (Any 1) (1)

3.2.3 **Reason for the inclusion of carbohydrates in a finisher mash**
Need carbohydrates for fattening/rounding off ✓ (1)

3.2.4 **The relationship between protein level, temperature requirements and the age**
The younger the broilers ✓ the higher the protein level of the feed ✓ and the higher the temperature requirement ✓
OR
The older the broilers ✓ the lower the protein level of the feed ✓ and the lower the temperature requirement ✓ (3)

3.3 **Tools used for animal identification purposes**

3.3.1 Branding iron ✓ (1)

3.3.2 Ear tag ✓ (1)

3.3.3 Smart neck band ✓ (1)

3.3.4 Tattoo pliers ✓ (1)

3.4 **Handling facilities for specified operations**

3.4.1 **Identification of the facility**
Loading/off- loading ramp ✓ (1)

3.4.2 **Use of the facility**
For loading/off-loading animals ✓ (1)

3.4.3 **TWO design features of the facility**
- High and strong walls ✓
- Width according to the type of animal ✓
- Angle not too steep ✓
- Not slippery ✓ (Any 2) (2)

3.4.4 **TWO forms of harm to an animal during the handling process**
- Physical/injuries ✓
- Stress/emotional ✓ (2)

3.5 Parasites in farm animals

3.5.1 The TWO parasites

A - External parasite/ecto-parasite ✓ (1)
B - Internal/endo-parasite ✓ (1)

3.5.2 Motivation from the diagram

A - Larvae attaches itself onto the skin ✓ (1)
B - Worms are swallowed and bore through the intestines into the liver ✓ (1)

3.5.3 Preventative measure against parasite B

- Avoid grazing in swampy areas/fencing off affected areas/removal of dung ✓
- Drinking spots should be kept dry ✓
- Rotational grazing ✓
- Breeding genetically resistant animals ✓
- Treat affected areas ✓
- Veld burning ✓
- Use of feeders ✓
- Provision of clean drinking water ✓
- Provision of good nutrition ✓
- Proper management of the breeding season/calving ✓

(Any 1) (1)

3.6 Animal diseases

3.6.1 Scientific term for animal health conditions

(a) Contagious/infectious diseases ✓ (1)
(b) Vector ✓ (1)

3.6.2 ONE bacterial disease that can be transmitted to the next animal

- Tuberculosis ✓
- Anthrax ✓

(Any 1) (1)

3.6.3 Role of the farmer

- Quarantine/isolation of sick animals ✓
- Regular inspections/monitoring for the presence of disease
- Vaccination/inoculation ✓
- Treatment of sick animals ✓
- Burning/burying carcass of infected animals ✓
- Report to the authorities ✓

(Any 1) (1)

3.6.4 TWO measures how farm workers can be exposed to animal diseases

- Exposure to/contact with infected animals ✓
- Use of unsterilized equipment ✓ (2)

3.6.5 **TWO roles of the state in controlling the spread of infectious diseases**

- Production of vaccines ✓
- Setting up quarantine areas/zones ✓
- Research ✓
- Publications ✓
- Import/export bans/control measures/movement permits ✓
- Veterinary services ✓ (Any 2) (2)

[35]

QUESTION 4: ANIMAL REPRODUCTION

4.1 The diagram of a sperm cell

4.1.1 **Identification of part A**
Acrosome ✓ (1)

4.1.2 **The function of the part**
(a) **A -** Facilitate penetration of the sperm cell into the ovum/protects the head of the sperm cell ✓ (1)
(b) **B -** Transmission of DNA/genetic material/information ✓ (1)
(c) **D -** Mobility/movement of the sperm cell ✓ (1)

4.1.3 **Distinction between sperm cell and semen**
Sperm cell - Male gamete/reproductive cell for fertilisation ✓ (1)
Semen - Mixture of sperm cells and the fluids from the accessory glands ✓ (1)

4.1.4 **The female reproductive cell**
Ovum/egg cell/female gamete ✓ (1)

4.2 Foetus development in cattle

4.2.1 **Identification of parts B and F**
B - Allantois ✓ (1)
F - Umbilical cord ✓ (1)

4.2.2 **The function of part D**

- Protection for the foetus/shock absorber ✓
- Lubricates the birth canal ✓
- Regulates temperature around foetus✓
- Prevents dehydration✓ (Any 1) (1)

4.2.3 **Conditions associated with pregnancy**
(a) Mummification ✓ (1)
(b) Maceration ✓ (1)
(c) Abortion ✓ (1)
(d) Placenta retention ✓ (1)

4.3 **Dairy farmer with 100 cows and one bull**

4.3.1 **Identification of the problem in this enterprise**

- Bull: cow ratio not proportional/1 bull to 100 cows ✓
- The calving percentage is too low/conception rate problems ✓

(Any 1) (1)

4.3.2 **Scientific technique that will result in a higher calving percentage**

Artificial insemination/AI ✓ (1)

4.3.3 **Other method to improve the calving percentage**

Make use of more bulls/3–5 bulls ✓ (1)

4.3.4 **Impact of nutrition on the fertility of bulls**

- Underfeeding impacts negatively on spermatogenesis/sperm formation/volume/quality of semen ✓
- Overfeeding causes bulls to become fat/heavy/lazy reducing the ability to service cows(libido) ✓ (2)

4.3.5 **TWO other reasons for this bull performing poorly**
- Over exertion/exhaustion ✓
- Old age ✓
- Lack of libido ✓
- Conformational abnormalities ✓
- Inability to fertilise/low sperm count ✓ (Any 2) (2)

4.4 **Milk production of a dairy cow for one year**

4.4.1 **Term for the graph illustrated**
Lactation curve ✓ (1)

. 4.4.2 **Indication of the letter**
(a) H ✓ (1)
(b) A ✓ (1)
(c) B ✓ (1)
(d) D ✓ (1)

4.4.3 **Reasons for the drop in the milk production between point F and point G**
- Illness/the cow was sick/disease ✓
- Injury ✓
- Adverse/bad environmental conditions ✓
- Malnutrition/over/under feeding ✓
- The cow is about to dry off ✓ (Any 2) (2)

4.5 **Oestrus in dairy cows**

4.5.1 **Definition of oestrus in dairy cows**
- Period when non-pregnant cows show visible signs of oestrus ✓
- and will allow mating to take place ✓ (2)

4.5.2 **Visible signs of oestrus in dairy cattle**
- Mucus discharge from the vulva ✓
- Vulva is red/moist/swollen ✓
- Restless/bellows/excited ✓
- Feed/saliva on the back/hair is fluffed up ✓
- Feed intake decreases/loss of appetite ✓
- Milk production decreases ✓
- Sniffs the genitalia of other cows ✓
- Raises her head and curls her lips ✓
- Cows goes to the bull and allows mating✓ (Any 2) (2)

4.5.3 **Cow in oestrus**
Cow A/B ✓ (1)

4.5.4 **Oestrus**
(a) Oestrogen ✓ (1)
(b) 21 days ✓ (1)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150