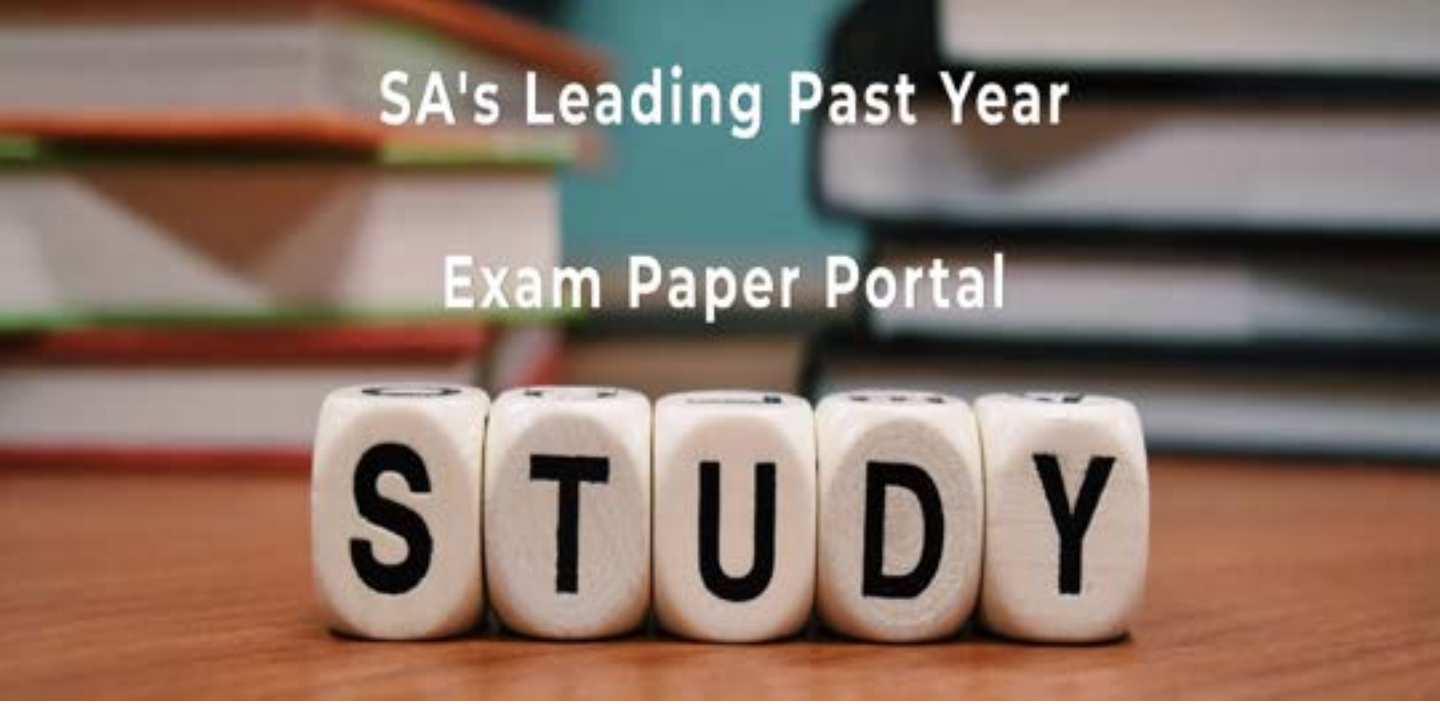

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GRADE 12

AGRICULTURALSCIENCES P1

NOVEMBER 2014

MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

SECTION A

QUESTION 1

1.1	1.1.1	C ✓✓		
	1.1.2	D ✓✓		
	1.1.3	B ✓✓		
	1.1.4	B ✓✓		
	1.1.5	D ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	D ✓✓		
	1.1.9	C ✓✓		
	1.1.10	A ✓✓	(10 x 2)	(20)
1.2	1.2.1	None ✓✓		
	1.2.2	A only ✓✓		
	1.2.3	Both A and B ✓✓		
	1.2.4	B only ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Fodder/feed flow ✓✓		
	1.3.2	Neck/head clamp ✓✓		
	1.3.3	Seminal vesicle/vesicular glands ✓✓		
	1.3.4	Oogenesis/ovigenesis ✓✓		
	1.3.5	Mastitis ✓✓	(5 x 2)	(10)
1.4	1.4.1	Mechanical/physical ✓		
	1.4.2	Cafeteria style/ad lib/free choice ✓		
	1.4.3	Isolation/separation ✓		
	1.4.4	Iron/Fe/ferrous sulphate ✓		
	1.4.5	Synchronisation ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMALNUTRITION

2.1 Path of food in the stomach of a ruminant

2.1.1 Identification of the type of animal

- Ruminant/cattle/sheep/goats ✓ (1)

2.1.2 Identification of the processes illustrated by A, B and C

A. Swallowing/peristalsis/ingestion/intake of food ✓
B. Regurgitation/retro-peristalsis ✓
C. Re-swallowing/peristalsis ✓ (3)

2.1.3 Justification of the advantages of process B

- Food broken down mechanically into finer particles ✓
- Increases surface area of food ✓
- Stimulates secretion of saliva to maintain rumen pH levels ✓
- Improves the mixing of food ✓
- The forming of bolus ✓ (Any 3) (3)

2.2 The quality of pastures and nutritional values over three seasons

2.2.1 Description of the size of micro-organism population

(a) Increase/high in population of amylolytic bacteria ✓✓
(due to high energy in pasture) (2)

(b) Decrease/low in population of proteolytic bacteria ✓✓
(due to low quality protein in pasture) (2)

2.2.2 Quality of supplementary feed in winter

- Supplement high/rich in proteins/nitrogen/NPN ✓✓
- Rich in carbohydrates/energy ✓✓
- Supplementing with feed rich in minerals/vitamins ✓✓ (Any 1) (2)

2.2.3 The vitamin that is likely to be deficient in winter

Vitamin A/retinol ✓ (1)

2.3 Coefficient of digestibility of hay

2.3.1 Coefficient of digestibility

DM of hay: 24kg x $\frac{12}{100}$ = 2,88kg or 24kg x 0,88 = 21,1kg

24kg – 2,88kg = 21,1kg ✓

CD = $\frac{\text{Dry matter intake (kg) – dry mass of manure (kg)}}{\text{Dry matter intake (kg)}} \times \frac{100}{1}$ ✓

= $\frac{21,1\text{kg} - 7,3\text{kg}}{21,1\text{kg}} \times \frac{100}{1}$ ✓

= 65,4 ✓% ✓ (5)

2.3.2 **Justification for not recommending the hay**
- Digestibility is 65,4% ✓
- therefore it needs supplementation to improve digestibility ✓ (2)

2.4 **Composition of animal feeds**

2.4.1 **Feed most likely to be fed to non-ruminant animals**
Feed A ✓ (1)

2.4.2 **Motivation for Feed A**
- Contains a low percentage of crude fibre/6% ✓
- High percentage of TDN/80% ✓
- Higher DP/8% ✓
- Therefore it is easily digestible ✓ (Any 2) (2)

2.4.3 **Calculation of nutritive ratio of Feed B**

$$NR = 1: \frac{TDN - DP}{DP} \checkmark$$

$$= 1: \frac{50\% - 4\%}{4\%} \checkmark$$

Or

$$= 1: \frac{46\%}{4\%} \checkmark$$

$$= 1: 11.5/1:12 \checkmark$$ (3)

2.5 **Fodder flow programme**

2.5.1 **Months in which there will be more feed**
2/two months ✓ (1)

2.5.2 **Month in which the feed will be most insufficient**
September/Sep. ✓ (1)

2.5.3 **Calculate the shortage of feed during the month of October**
- 120 tons – 80 tons = 40 tons ✓
- 40 tons x 1000 kg ✓ **or** $\frac{40 \text{ tons} \times 1000 \text{ kg}}{1 \text{ ton}}$ ✓
- = 40 000 kg ✓ (3)

2.5.4 **THREE cost-effective measures of using feed for Jan and Feb**
- Cutting fodder ✓
- Baling/making hay/ensiling (making silage) ✓
- Storage ✓ (3)

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QUESTION 3: ANIMALPRODUCTION, PROTECTION AND CONTROL

3.1 System of farming

3.1.1 Identification of a production system
Back yard/free-range/subsistence ✓ (1)

3.1.2 THREE advantages of back yard system to rural communities
- Less expensive/cheaper ✓
- Easy to manage ✓
- No special equipment needed ✓
- No specialised/expert knowledge needed ✓
- More environmental friendly ✓ (Any 3) (3)

3.1.3 THREE problems of backyard system
- Easy to contact disease ✓
- Poor feeding/feeding on less nutritious food ✓
- High risk towards predators ✓
- More feed energy is utilised for non-production purpose/low production output/slow growth rate ✓
- High risk towards theft of animals ✓
- Expose to extreme environmental conditions ✓ (Any 3) (3)

3.2 Structures, apparatus and appliances used in the handling of farm animals in an animal production system

3.2.1 Barbed wire fence to divide area of farmland ✓ (1)

3.2.2 Kraal made from branches and sticks ✓ (1)

3.2.3 A shed made from wooden poles and canvas ✓ (1)

3.2.4 Red flags with warning signs ✓ (1)

3.3 Production systems

3.3.1 Farming system by FARMER A
Extensive system ✓ (1)

3.3.2 TWO reasons
- Fewer workers/2 workers ✓
- Limited facilities/1 cattle handling facility/1 farm shed/8 wind pumps/1 dipping station ✓
- Fewer/smaller number of animals over a large area/400 cattle on 4800 ha ✓
- Cattle kept on natural pasture ✓ (Any 2) (2)

3.3.3 Difference in feeding strategies
- FARMER A is feeding livestock on natural pasture ✓
- FARMER B is feeding livestock through a feedlot ✓ (2)

3.3.4 **TWO measures to increase production for FARMER A**
- Supplementary feeding/nutrition ✓
- Control adverse environmental conditions through shelter ✓
- Control of pests and diseases ✓
- Correct breeding methods ✓
- More effective grazing system/rotational grazing ✓ (Any 2) (2)

3.4 **The health of an animal**

3.4.1 **Part of an animal body in which the thermometer is inserted**
Rectum/anus ✓ (1)

3.4.2 **Health indicators of acute condition**
(a) Increased/high body temperature ✓ (1)
(b) Faster/rapid respiratory rate ✓ (1)
(c) Faster heart beat ✓ (1)

3.5 **Ticks and control**

3.5.1 **Type and name of tick**
- One-host tick ✓
- Blue tick ✓ (2)

3.5.2 **Disease transmitted**
- Red water ✓
- Anaplasmosis/gall sickness ✓ (Any 1) (1)

3.5.3 **Justification of chemical considered eco-friendly**
- Residual action ✓
- Non-systemic ✓
- Ox-pecker compatible ✓ (Any 2) (2)

3.5.4 **Method of applying the chemical**
Pour-on ✓ (1)

3.5.5 **Evidence of the role of state in controlling remedies and medicines**
- Registration number/Reg. No. G2837/Act 36/1947 ✓
- Active ingredients and their quantities/Deltrametrin 0.50% m/v, Amitraz 2,0% m/v, Piperonyl Butoxide 2,0% m/v ✓ (2)

3.6 Plant poisoning

3.6.1 TWO plants that are poisonous

- Poison bulb/leaf ✓
- Thorn apple ✓
- Datura *spp* ✓
- *Lantana camara* ✓
- Drimia species (Slangkop) ✓
- Tulp ✓
- Seneciosis spp.✓
- Pachystriga pygmaeum (Gousiektebossie) ✓
- Diplodiosis ✓
- Geeldikkop ✓
- Vermeersiekte ✓
- Vuursiektebossie ✓
- Lupins ✓
- Blue-green algae ✓
- Buffalo grass ✓
- Devil's thorn ✓ (Any 2) (2)

3.6.2 THREE measures of preventing plant poisoning

- Remove poisonous plants from pastures/burn the infested areas/application of herbicides/chemicals ✓
- Remove animals from camps infested with poisonous plants ✓
- Feed/water animals well/provide proper nutrition ✓
- Avoid overgrazing ✓
- Practice rotational grazing ✓
- Inspect hay kept in stables ✓
- Knowledge on poisonous plants ✓
- Do not feed animals moulded hay/cut from areas with poisonous plants ✓ (Any 3) (3)

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QUESTION 4: ANIMALREPRODUCTION

4.1 Female reproductive organs

4.1.1 Identification of parts of a female animal

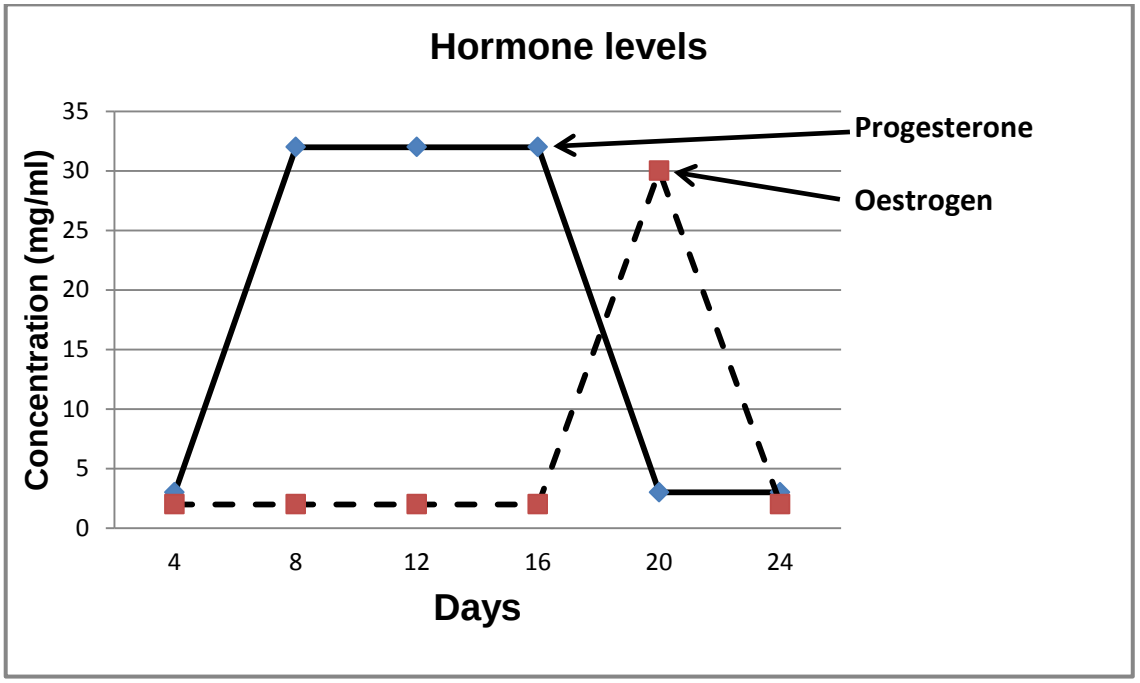
- A - Uterine horn ✓
- B - Fallopian tube/oviduct ✓
- C - Ovary ✓
- F - Vagina ✓ (4)

4.1.2 Letter and name with alkaline plug

- G ✓
- Cervix ✓ (2)

4.2 Levels of hormones during oestrus cycle

4.2.1 Graph of the hormone levels



Criteria/rubric/marking guidelines

- Correct heading ✓
- Y-axis – correct calibrations and labelled (Concentration) ✓
- X-axis – correct calibrations and labelled (Days) ✓
- Correct unit ✓
- Accuracy ✓
- Line graph ✓ (6)

4.2.2 Role of progesterone

Inhibits/suppresses the secretion/functioning of oestrogen ✓ (1)

4.2.3 Day when follicles will be fully developed

Day 20 ✓ (1)

4.2.4 Motivation

Oestrogen is at its highest level/30mg/ml ✓
Or
Progesterone is at its lowest levels/3mg/ml ✓ (1)

4.3 Schematic representation of a sperm cell

4.3.1 Identification of part B

Nucleus ✓ (1)

4.3.2 Part representing acrosome

A ✓ (1)

4.3.3 **The function of part labelled E**

Movement/mobility/motility of the sperm cell ✓ (1)

4.3.4 **Distinction between a sperm cell and semen**

- **Sperm -** Male gamete/reproductive cell ✓
- **Semen -** Mixture of sperm cells and fluids produced by accessory glands ✓ (2)

4.3.5 **TWO methods of collecting semen**

- Artificial vagina ✓
- Electrical stimulator/electrojaculator ✓ (2)

4.4 **Artificial insemination in farm animals**

4.4.1 **Definition of AI**

- A technique whereby semen is artificially collected from bulls ✓
- and artificially placed into the reproductive tract of a female ✓ (2)

4.4.2 **THREE requirements for successful AI**

- Correct detection of heat/oestrus ✓
- Correct timing ✓
- Use of viable semen ✓
- Correct technique ✓
- Experienced and knowledgeable inseminator ✓
- Observation of hygiene ✓ (Any 3) (3)

4.5 **Stages of embryo transfer**

4.5.1 **Identification of technique**

Embryo transfer/ET ✓ (1)

4.5.2 **Correct order of embryo transfer**

- E/Synchronisation of both donor and recipient cows ✓
- C/Super ovulation of the donor cow ✓
- B/Artificial insemination of the donor cow ✓
- A/Flushing the embryo from the donor cow ✓
- D/Placement of the embryo in the recipient cow ✓ (5)

4.5.3 **TWO benefits of ET**

- More progeny are produced from the best cows ✓
- Profits are made from sales of quality genetics ✓
- Fast cost effective method to improve genetic make-up of the herd ✓
- Extended reproductive life of older and incapable cows ✓
- Genetics in the herd conserved ✓
- Animals can be bred for improved diseases resistance/ milk/meat production (Any 2) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150