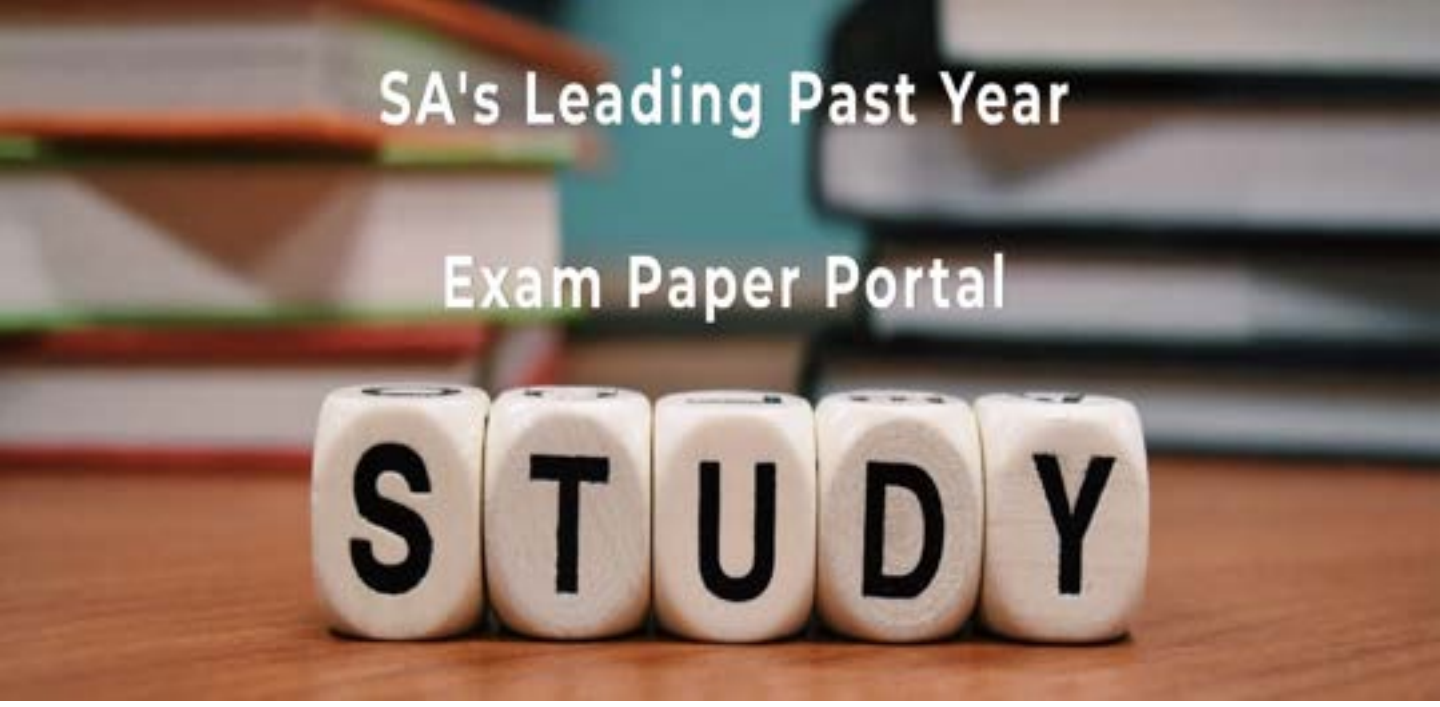

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GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2012

MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

SECTION A

QUESTION 1.1

1.1.1	A	B	C	✓✓
1.1.2	A	B	✓✓	D
1.1.3	✓✓	B	C	D
1.1.4	A	✓✓	C	D
1.1.5	A	✓✓	C	D
1.1.6	A	✓✓	C	D
1.1.7	✓✓	B	C	D
1.1.8	A	✓✓	C	D
1.1.9	A	B	C	✓✓
1.1.10	A	C	C	✓✓

(10 x 2) (20)

QUESTION 1.2

	A only	B only	A and B	None
1.2.1			✓✓	
1.2.2			✓✓	
1.2.3				✓✓
1.2.4	✓✓			
1.2.5	✓✓			

(5 x 2) (10)

QUESTION 1.3

1.3.1 Vitamin D/Calciferol✓✓

1.3.2 Papillae✓✓

1.3.3 Pelleting/granulation✓✓

1.3.4 Pistolette/insemination gun/pipette✓✓

1.3.5 Isolation/quarantine/ separation/removal✓✓

(5 x 2) (10)

QUESTION 1.4

1.4.1 rumen/forestomachs/ reticulum/reticulo-rumen/large stomach✓

1.4.2 maintenance✓

1.4.3 di-oestrus✓

1.4.4 antibodies/immunoglobulin✓

1.4.5 anaemia✓

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 The digestive system of ruminants

2.1.1 **THREE labelled parts**
A /reticulum/honeycomb/net stomach✓
B /rumen/large stomach✓
F/omasum/leaf stomach✓ (3)

2.1.2 **TWO ideal conditions for microbial activity**
- suitable/optimal/moderate/favourable temperature/ ≤ 38 ˚C to 42 ˚C✓
- sufficient mineral nutrients/phosphorus/cobalt✓
- sufficient nitrogen✓
- easily digestible carbohydrates✓
- a slightly acid medium/suitable pH(5,5 to 6,5)✓
- moist✓
- anaerobic✓
- regular intake of food/nutrients✓
- removal of waste products✓ (Any 2) (2)

2.1.3 **TWO functions of micro-organisms in the digestive system of ruminants**
- digest cellulose/crude fibre into volatile fatty acids and gases✓
- synthesise amino acids from any nitrogenous substances/source✓
- hydrolyse proteins from the feed to form amino acids✓
- synthesis of vitamins(vitamin K and B-complex)✓ (Any 2) (2)

2.1.4 **A reason for enzymatic digestion in stomach**
Secretes digestive (gastric) juice✓✓
OR
Secretes enzymes responsible for enzymatic digestion✓✓ (2)

2.1.5 **Adapted part in a fowl**
Proventriculus/glandular stomach✓ (1)

2.2 Cross section of a villus

2.2.1 Small intestines/duodenum/ileum/jejunum✓ (1)

2.2.2 **Main nutrients absorbed**
A – absorption of digested carbohydrates/glucose/digested proteins/amino acids/vitamins/minerals✓
B – absorption of digested fats/fatty acids/glycerol✓ (2)

2.2.3 **Suitability of villus for its function**

- The villus has numerous microvilli that increase the absorption surface/large surface area✓
- It also contains blood capillaries and the lacteal for absorption of digested nutrients✓
- It allows constant mixing motion necessary for absorption✓

It has a single layer of epithelial tissue ✓ (Any 2) (2)

2.3 **Supplements**

2.3.1 **Season for supplementing and reason**

- Winter/dry season✓
- Green fodder (grass) that contain pigment (carotene) that can be transformed to vitamin A is not available in winter/dry season hence it is advisable to supplement this vitamin during winter✓ (2)

2.3.2 **TWO methods of supplementing**

- Injection✓
- Dosing/drenching✓
- Feed concentrates/rations✓
- Drinking water✓
- Mineral licks✓ (Any 2) (2)

2.4 **Digestibility coefficient**

2.4.1 $\frac{\text{Dry material intake (kg) – Dry material of manure (kg)}}{\text{Dry material intake (kg)}} \times \frac{100}{1}$ ✓

$= \frac{(30\text{ kg} - 10/100 \times 30\text{ kg}) \checkmark - (16\text{ kg} - 35/100 \times 16\text{ kg}) \checkmark}{(30\text{ kg} - 10/100 \times 30\text{ kg})} \times \frac{100}{1}$

OR

$= \frac{27\text{ kg} \checkmark - 10{,}4\text{ kg} \checkmark}{27\text{ kg}} \times \frac{100}{1}$

OR

$= \frac{16{,}6\text{ kg} \checkmark}{27\text{ kg} \checkmark} \times \frac{100}{1}$

= 61,48% **or** 61,5% **or** 61✓%✓ (Any 5) (5)

2.4.2 **Factor determining digestibility**

The higher the quantity/volume of feed taken in,✓ the lesser the time for digestion/the lower the digestibility/less time of contact with digestive enzymes✓ (2)

2.5 **Nutritive ratio**

2.5.1 75% – 20% = 55%✓ (1)

2.5.2 NR = 1: $\frac{\%\text{ digestible non-nitrogen substances}}{\%\text{ digestible protein}}$✓

or

1: $\frac{75\% - 20\%}{20\%}$✓

or

1: $\frac{55\%}{20\%}$✓ (2)

1 : 2,75 **or** 1 : 3✓

2.6 **Pearson square**

2.6.1 **Feed A:** 14 **5**✓

16

Feed B: 21 **2**✓

Mix 5 **part s** of feed A with 2 **parts** of feed B **or** 5 : 2 ✓ (3)

2.6.2 **Feed B** = $\frac{2}{7}$✓ x $\frac{100}{1}$✓

= 28,57% or 28,6% or 29%✓ (3)

[35]

QUESTION 3: ANIMAL PRODUCTION

3.1 **Animal shelter**

3.1.1 **Production system**

- Extensive farming✓✓

Reason

- Exposure to adverse weather conditions (cold, wet and windy) ✓

OR

- Farmers did not have shelter for Angora goats and were subsidised to build one✓ (3)

3.1.2 **Reasons for the recommendations by the extension officer for the production system**

(a) Shelter

- Has sides✓ for protection against cold winds/will reduce the wind chill✓
- Has a roof✓ for protection against rain✓
- Has an enclosed area✓ that keeps heat within/insulation✓ (Any 1) (2)

(b) Insulation material

- Heat can be retained/protection against bitter cold ✓for a longer period of time✓ (2)

(c) Heaters

Assist in increasing✓ and maintaining/regulating temperature/reduce temperature fluctuations✓ (2)

3.1.3 **Reasons for the government grant/funding**

- Help the farmers to build/purchase high tech equipment✓
- To prevent job losses on the farms✓
- To ensure that foreign exchange is earned/economic stability✓
- To prevent shortage/losses of meat and mohair/to ensure sustainability✓ (Any 2) (2)

3.2 **Farm animals and products**

3.2.1 **TWO primary products of farm animals**

- Milk✓
- Meat(beef/fish/pork/bacon/chicken/mutton)✓
- Eggs✓
- Honey✓
- Wool ✓
- Hides✓ (Any 2) (2)

3.2.2 **Optimising poultry production**

(a) Space requirements

- Not overcrowded/enough space/eliminate competition✓
- Housing/production system✓
- Sufficient light✓
- Fresh air/good ventilation✓
- Cleanliness✓
- Constant optimal temperature✓ (Any 2) (2)

(b) Feeding facilities

- Functional feeding facility/allows for easy feeding/refilling✓
- Provision of clean water and feeds/access to water✓
- Feed accessible to animal/easy for animal to reach feed✓
- Limits wastage✓ (Any 2) (2)

3.2.3 **Handling**

- **Farm animal B** – Bigger/higher gates and fences/sides✓
- These facilities are more expensive✓
- More sophisticated handling facilities required/stronger structures needed (cables/bigger poles/pipes)✓ (Any 2)
- **Farm animal D** – small/less structures needed/easier to handle✓ Structures not so high/not so strong/normal fences✓
- These facilities are less expensive✓ (Any 2) (4)

3.3 Animal behaviour

3.3.1 **TWO behavioural patterns of cattle**

- Nervous✓
- Wild/aggressive✓
- Stressed✓ (Any 2) (2)

3.3.2 **TWO economic benefits of good cattle management**

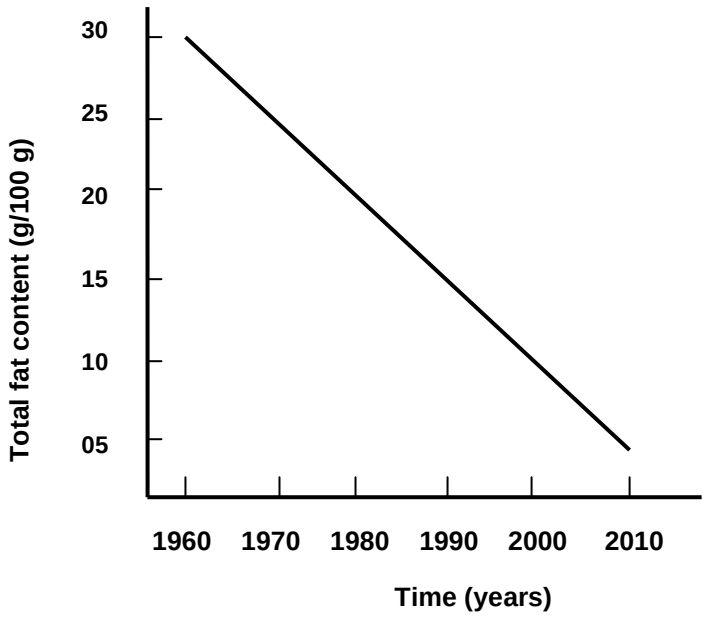
- Better performance/production (better feed conversion ratio)✓
- Improved reproduction rate✓
- Improved health condition✓
- Improved growth rate✓
- Good quality carcass/milk/hides ✓ (Any 2) (2)

3.4 Animal fat content research

3.4.1

- Improve the carcass quality✓
- Higher prices for their product/higher income✓
- Meat becomes lean/most consumers prefer lean meat (lean meat is healthier)✓ (Any 2) (2)

3.4.2 **Total fat content over a period of 50 years**



Marking graph with the following checklist:

Criteria	Yes: 1 Mark	No: 0 Mark
1. Line graph	1	
2. X-axis correctly labelled	1	
3. Y-axis correctly labelled	1	
4. Points are plotted correctly	1	
5. Correct heading	1	
6. Units are indicated on both axes	1	

(6)

3.4.3

- Fat content decreased✓✓
- Fat content changed from 30 g/100 g to 5 g/100 g✓✓
- An even decrease/rate of decrease was constant✓✓ (Any 1) (2)

[35]

QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

4.1 Reproductive organs of a bull

4.1.1 Reproductive parts

A – Seminal vesicle/vesicular gland✓
B – Prostate gland✓
C – Cowper/bulbo-urethral gland✓
H – Testis✓ (4)

4.1.2 Process that occurs in K

Spermatogenesis/ sperm formation/gametogenesis✓ (1)

4.1.3 Functions

D - Transports spermatozoa/enhances ejaculation✓
L - Facilitates penetration of ovum/releases an enzyme (hyaluronidase) that allows spermatozoa to penetrate the ovum/acrosome reaction✓ (2)

4.1.4 Influence of congenital defects

- Negatively affects sperm formation/spermatogenesis**/w**ill not allow optimum spermatogenesis to take place/sperm defects✓✓ (2)

4.1.5 Reason for part H to be situated outside the abdominal cavity

Sperm production occurs at the temperature slightly (1 to 3˚C) lower than that of the body/to regulate the temperature for more effective spermatogenesis✓ (1)

4.2 Progesterone and oestrogen

4.2.1 Day 7✓ & day 17✓ (2)

4.2.2 30 – 33 units ✓ (1)

4.2.3 Progesterone

Sharp increase in the level of progesterone✓
Sharp decrease in levels of oestrogen✓ (2)

4.2.4 **TWO effects of oestrogen on the animal at peak period**
- Thickens the lining of the uterus prepares the uterus for the implantation of the fertilised ovum/increases blood supply to the uterus✓
- Relaxes the muscles of the cervix✓
- Delays the secretion of FSH at the end of oestrus✓
- Stimulates the gland in the brain to release LH✓
- Stimulates the process of ovulation through the release of LH✓
- Leads to the display of signs of oestrus✓
- Prevents bacterial infection of the uterus✓ (Any 2) (2)

4.2.5 The corpus luteum will degenerate/burst/be resorbed/be broken down✓ (1)

4.3 **Ticks as animal parasites**

4.3.1 **TWO economic significance of ticks**
- Transmit diseases/entry point of pathogens✓
- Production losses/skin damage ✓
- Underperformance of farm animals✓
- Loss of teat function/ear lobes/tail tips✓
- Death of farm animals✓ (Any 2) (2)

4.3.2 Three-host tick✓
Reason: Completes every stage of its life cycle on three different hosts✓ (2)

4.3.3 **Reason for tick outbreak in the coastal region**
Humid✓ and favourable climatic conditions✓ (2)

4.3.4 **Fly specie attacking sheep**
- Blowfly✓ (1)

4.3.5 **Biological ways of controlling ticks**
- Providing herbs✓
- Use of natural enemies/predators (ox-pecker)✓
- Breeding adaptable animals✓ (Any 2) (2)

4.4 **Sheep vaccination plan**

4.4.1 Weaners✓ (1)

4.4.2 3–5 months ✓ (1)

4.4.3 Protects the ewes at critical and delicate stage of gestation✓ against the enzootic abortion✓ (2)

4.4.4 **Role of the state**

(a) Quarantine services:

- To prevent diseases or pests being brought into the country✓
- Strict import control measures are adopted/impose control measures on proclaimed diseases/ use law enforcement agencies (statutory measures, state vets stock inspectors) to control the movement of animals ✓ (2)

(b) Veterinary research:

- To develop better methods to diagnose and control diseases✓
- Train veterinarians✓
- Operate research stations✓
- Stock inspectors✓
- Extension services✓ (Any 2) (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150