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GRADE 12

AGRICULTURAL SCIENCES P1

FEBRUARY/MARCH 2015

MEMORANDUM

MARKS: 150

This memorandum consists of 9 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	D ✓✓		
	1.1.2	B ✓✓		
	1.1.3	D ✓✓		
	1.1.4	A ✓✓		
	1.1.5	A ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	C ✓✓		
	1.1.9	A ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	B only ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	None ✓✓		
	1.2.5	B only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Biological value/BV ✓✓		
	1.3.2	Zinc/Zn ✓✓		
	1.3.3	Plywood ✓✓		
	1.3.4	Oogenesis/ovigenesis ✓✓		
	1.3.5	Reproductive ✓✓	(5 x 2)	(10)
1.4	1.4.1	Pearson ✓		
	1.4.2	Maintenance ✓		
	1.4.3	Rectum ✓		
	1.4.4	Acrosome ✓		
	1.4.5	Embryo transfer ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canals of two farm animals****2.1.1 Type of digestive systems represented by:**

- (a) Ruminant✓
- (b) Cattle/cows/sheep/goat/game✓
- (c) Non-ruminant/monogastric animal✓
- (d) Pig✓

(4)

2.1.2 Letter and name where hydrochloric acid is secreted in diagram A

- D✓
- Abomasum/true stomach/milk stomach✓

(2)

2.2 Planning fodder flow feed flow and fodder flow production**2.2.1 Definition of fodder flow**

- A strategic plan✓
- To ensure enough fodder✓
- To meet the requirements of all the animals✓
- Throughout the year✓
- In terms of quality and quantity✓

(Any 2) (2)

2.2.2 Aspects in planning for a fodder flow**(a) Economic viability:**

- The farmer to take measures of ensuring that the fodder✓ is cost effective/cheap✓

(b) Sustainability:

- Planning to ensure that the fodder✓ is always available to livestock✓

(4)

2.3 Digestibility co-efficiency**2.3.1 Calculation of digestibility co-efficiency**

$$DC = \frac{\text{Dry matter intake (kg)} - \text{dry mass of manure (kg)}}{\text{Dry matter intake (kg)}} \times \frac{100}{1} \checkmark$$

$$25 \text{ kg} \times \frac{15}{100} = 3,75 \text{ kg}$$

$$25 \text{ kg} - 3,75 \text{ kg} = 21,25 \text{ kg} \checkmark$$

$$\frac{21,25 \text{ kg} - 8 \text{ kg}}{21,25 \text{ kg}} \times \frac{100}{1} \checkmark$$

$$= 62,35 \text{ OR } 62,4\% \checkmark$$

(5)

2.3.2 Implication of the answer in QUESTION 2.3.1

- The bulk of the feed (62,35%) ✓ is digested and absorbed by the heifer ✓

OR

- The lesser percentage of the feed (37,65%) ✓ was not digested hence not absorbed by the heifer ✓ (2)

2.4 A table on the nutritive ratio (NR)**2.4.1 The ration most suitable for the following:**

- (a) Fattening of old ewes – A ✓
- (b) Ewes in the last 4 weeks of pregnancy – B ✓
- (c) Young growing animals – B ✓ (3)

2.4.2 Reason for the ration in 2.4.1(a)

- Ratio is wide ✓
- Feed has higher lipid/carbohydrate/energy content ✓
- Feed has lower protein content ✓
- Ewes need more energy than protein ✓ (Any 1) (1)

2.4.3 Ration with high levels of:

- (a) Maize – A ✓
- (b) Fish meal – B ✓ (2)

2.4.4 The implication of the nutritive ratio of ration B

- Ration has higher protein content ✓
- Recommended for growth, production and reproduction ✓
- Ration has lower lipid/carbohydrate/energy content ✓ (Any 2) (2)

2.5 Diagram on mineral supplements**2.5.1 Method of mineral supplement**

- Mineral lick ✓ (1)

2.5.2 TWO minerals that could be supplemented

- Calcium ✓
- Sodium ✓
- Phosphorus ✓
- Nitrogen ✓ (Any 2) (2)

2.5.3 The partial protein substitute

- Non-protein nitrogenous substance (NPN)/biuret/urea ✓ (1)

2.5.4 Role of growth regulators

- (a) **Hormones** – will stimulate metabolic reactions ✓ that will lead in increased growth rate ✓
- (b) **Antibiotics** – will provide immunity ✓ thereby increasing resistance to diseases ✓ (4)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Animal production systems****3.1.1 Identification of animal production systems.**

- A: Extensive production system✓
B: Intensive production system✓

(2)

3.1.2 Comparison of the TWO production systems

- (a) **Capital investment** – Low capital/technology input in extensive production system✓ and large capital/technology input in intensive production system✓
(b) **Area/space of land occupied** – Low animal concentration in a large area in extensive production system✓ and high animal concentration in a small area in intensive production system ✓

(4)

3.1.3 TWO examples of intensive production system

- Cage✓
- Battery (layers/broilers) ✓
- Deep litter system ✓

(Any 2) (2)

3.2 Structures/practices for handling animals

3.2.1 A single strand of movable electrical wire✓

(1)

3.2.2 A rope with a halter to tie animals to a pole✓

(1)

3.2.3 A separate crush✓

(1)

3.2.4 Single strand of movable electric wire✓

(1)

3.3 Scenario on solar radiation**3.3.1 THREE measures to reduce heat stress under intensive conditions**

- Spray/Fogger with water✓
- Insulation✓
- Fans/conditioners/ventilators✓
- Housing systems/orientation✓

(Any 3) (3)

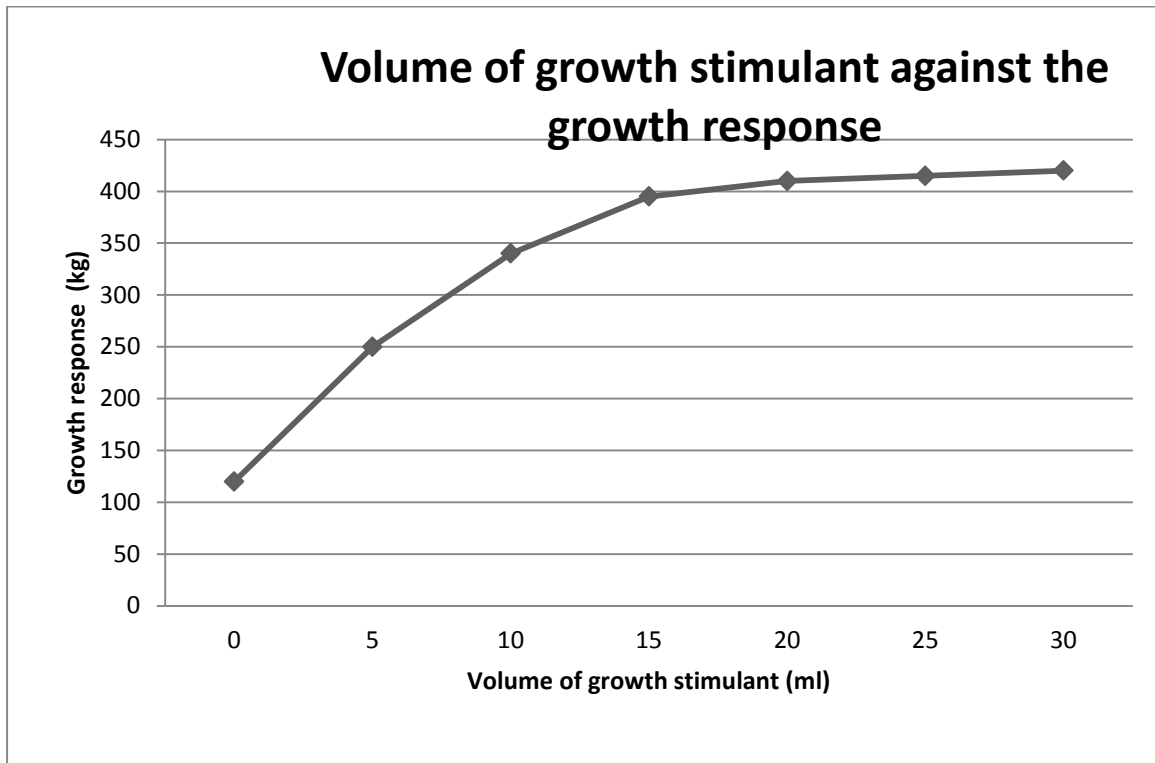
3.3.2 Correlation between high environmental temperature and feed consumption

- The higher the temperature ✓
- the less the feed intake✓

(2)

3.4 Data on average body temperature and pulse rate in dairy cows

3.4.1 Line graph on the volume of stimulant and the growth response



Line graph of growth stimulants against growth response Criteria/marking guidelines

- Correct heading✓
- Y-axis – correct labelling (growth response)✓
- X-axis – correct labelling (volume of growth stimulants)✓
- Correct units✓
- Accuracy/correct plotting✓
- Line graph✓

(6)

3.4.2 TWO growth stimulants used in animal production systems

- Thyroid regulators✓
- Hormones✓
- Antibiotics✓
- Tranquilisers✓

(Any 2) (2)

3.4.3 Growth response of the heifers at a volume of 15 ml

- 395 kg✓

(1)

3.5 Internal parasites**3.5.1 Identification of the type of a parasite**

- Internal parasite✓ (1)

3.5.2 TWO negative impacts of an internal parasite

- Depriving host of nutrients✓
- Sucks host's blood/causes anaemia✓
- Lesions/cysts inside host✓
- Decreases host's productivity✓
- Progressive weakness✓
- Death✓ (Any 2) (2)

3.5.3 How the animal is infected

- The animal will ingest ✓
- Metacercaria through grazing✓ (2)

3.5.4 Intermediate host

- Snail✓ (1)

3.5.5 THREE pasture management measures of controlling Internal parasite

- Rotational grazing✓
 - Resting of infected pastures✓
 - Allowing animals that are resistant to specific internal parasites✓
 - Avoid wet places✓
 - Use of zero grazing✓
 - Removal of manure/hygienic measures✓ (Any 3) (3)
- [35]**

QUESTION 4: ANIMAL REPRODUCTION**4.1 The diagram below represents the reproductive canal of a farm animal****4.1.1 Process in part D**

- Spermatogenesis✓ (1)

4.1.2 Identify parts A, B and E

- **Label A** – Seminal vesicles/vesicular glands✓
- **Label B** – Vas deferens/sperm duct✓
- **Label E** – Scrotum/scrotal sac✓ (3)

- 4.1.3 **TWO congenital defects of part D**
- **Cryptorchidism**✓ – the condition whereby the testes remain in the abdominal cavity and do not descend into the scrotum✓
 - **Hypoplasia**✓ – the condition whereby the testes are underdeveloped✓ (4)
- 4.1.4 **TWO functions of the part C**
- Storage of semen✓
 - Maturation of sperms✓
 - Secretion of buffer✓
 - Transportation of semen✓
 - Concentration of semen✓ (Any 2) (2)
- 4.2 **Oestrus**
- 4.2.1 **Oestrus**
- It is a period when non pregnant female animals✓
 - are receptive to male animals/allow mating✓ (2)
- 4.2.2 **THREE signs of oestrus**
- Vulva is swollen/reddish✓
 - Mucous discharge✓
 - Cow is restless and bellows often✓
 - Mounting other cows✓
 - Isolation✓
 - Decrease in food intake/loss of appetite✓
 - Legs and flanks are muddy✓
 - Allows mating✓ (Any 3) (3)
- 4.2.3 **THREE practical methods to identify cows on heat**
- Observation of animal behaviour✓
 - Place a bull in pen near the cows✓
 - Bulls marked with a chin ball marker✓
 - Tail paint on tail head/tail paint markers✓
 - Heat mount detectors✓ (Any 3) (3)
- 4.3 **Graph of Oestrogen/Progesterone levels in a cow over 22 days**
- 4.3.1 **Day cow will mate with a bull**
- Day 4–6✓ (1)
- 4.3.2 **Motivation**
- Highest level of oestrogen✓
 - Cow will be on heat✓ (2)
- 4.3.3 **Day of ovulation**
- Day 4–5✓ (1)

- 4.3.4 **Stage when progesterone is highest**
 • Met-oestrus✓ (1)
- 4.3.5 **Whether cow became pregnant**
 • Cow did not become pregnant✓ (1)
Motivation
 • Progesterone levels declined/decreased✓ (2)
 • after day 16✓
- 4.4 **Modern technologies: artificial insemination (AI), synchronization, etc.**
- 4.4.1 **Description of synchronisation of oestrus**
 • Making the oestrus cycle of a number of female animals✓
 • to occur approximately at the same time✓ (2)
- 4.4.2 **THREE advantages of AI in dairy cows**
 • Improving the genetic quality of the offspring✓
 • No need to buy/manage expensive bulls✓
 • Can use semen of one bull to inseminate many cows✓
 • Prevents the spread of sexually transmitted diseases✓
 • Inferior sires can be detected✓
 • Can use semen from a bull after injury or death✓
 • Animals of different size can be mated without injury✓
 • Semen can be frozen for many years✓
 • Semen can be transported and used worldwide✓
 • An ejaculation of one bull can be used for many cows✓
 • Higher conception rate can be achieved✓ (Any 3) (3)
- 4.4.3 **FOUR sequential stages used in ET**
 • Synchronisation of oestrus in donor and recipient cows✓
 • Superovulation of donor cows✓
 • Insemination of donor cows✓
 • Washing of the embryo from the uterus✓
 • Transfer embryo into the uterus of recipient cows✓ (Any 4) (4)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150