



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**FEBRUARY/MARCH 2016**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 9 pages.**

**SECTION A****QUESTION 1**

1.1	1.1.1	B ✓✓	(10 x 2)	(20)
	1.1.2	A ✓✓		
	1.1.3	D ✓✓		
	1.1.4	C ✓✓		
	1.1.5	C ✓✓		
	1.1.6	C ✓✓		
	1.1.7	B ✓✓		
	1.1.8	A ✓✓		
	1.1.9	D ✓✓		
	1.1.10	D ✓✓		
1.2	1.2.1	B only ✓✓	(5 x 2)	(10)
	1.2.2	Both A and B ✓✓		
	1.2.3	None ✓✓		
	1.2.4	Both A and B ✓✓		
	1.2.5	A only ✓✓		
1.3	1.3.1	Vitamin K/phyloquinone ✓✓	(5 x 2)	(10)
	1.3.2	Rabies ✓✓		
	1.3.3	Vaccination ✓✓		
	1.3.4	Embryonic ✓✓		
	1.3.5	Oxytocin ✓✓		
1.4	1.4.1	Silage ✓	(5 x 1)	(5)
	1.4.2	Zinc/Zn ✓		
	1.4.3	Pearson square ✓		
	1.4.4	Fluke worm/liver fluke ✓		
	1.4.5	Monozygotic/identical ✓		

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canal of fowls****2.1.1 Identify****A – Crop** ✓**B – Duodenum/small intestine** ✓**E – Pancreas** ✓

(3)

**2.1.2 Ways in which structure C is adapted**

• Thick, muscular walls for grinding feed ✓

• Presence of small stones for grinding feed ✓

(2)

**2.1.3 Identification of structure B and estimation of pH**

• Proventriculus/true stomach/glandular stomach ✓

• pH less than 7/acidic ✓

(2)

**2.2 A schematic representation of the components of feeds****2.2.1 Identification of substances****A – Dry matter/DM** ✓**B – Inorganic matter/minerals/elements/ash components** ✓**C – Vitamins** ✓

(3)

**2.2.2 Distinction between oil and fat****Oil – Unsaturated/liquid at room temperature/plant origin** ✓**Fat – Saturated/solid at room temperature/animal origin** ✓

(2)

**2.2.3 End-products of digestion****(a) Carbohydrate – Glucose/energy** ✓**(b) Protein – Amino acids** ✓

(2)

**2.3 Fodder flow programme****2.3.1 Difference in feed requirement against the available feed for September**

Feed requirement 66 tons – feed available 54 tons

= 12 tons deficit/shortage ✓

(1)

**January**

Feed requirement 49 tons – feed available 78 tons

= 29 tons surplus/excess ✓

(1)

**2.3.2 Calculation of the total DM available for B**

40 + 35 + 54 + 46 + 17 + 30 + 20 + 10 + 10 + 32 ✓

= 294 tons ✓

(2)

**2.3.3 The month when the veld supplied 15 tons of fodder**

February ✓

(1)

**2.4 Co-efficient of digestibility of green lucerne****2.4.1 Determination of the co-efficient of digestibility of the green lucerne**

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

$$= \text{DM intake } 2,5 \text{ kg} \times 0,6 = 1,5 \text{ kg moisture}$$

$$2,5 \text{ kg} - 1,5 \text{ kg} = 1,0 \text{ kg DM} \quad \checkmark$$

**OR**

$$\text{DM intake } 2,5 \text{ kg} \times 0,4 = 1,0 \text{ kg DM}$$

$$= \frac{1,0 \text{ kg} - 0,255 \text{ kg}}{1,0 \text{ kg}} \times \frac{100}{1} \quad \checkmark$$

$$= 74,5 \quad \checkmark \quad \% \quad \checkmark$$

(5)

**2.4.2 Specific nutrient which fits each of the following descriptions:**

- (a) Iron/Fe  $\checkmark$
- (b) Cobalt/Co  $\checkmark$
- (c) Vitamin B<sub>2</sub>/riboflavin  $\checkmark$
- (d) Calcium/Ca  $\checkmark$

(4)

**2.5 Data representing the laboratory results of THREE feed****2.5.1 Calculation of the NR for feed 2**

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

$$= 1: \frac{75\% - 15\%}{15\%} \quad \checkmark \quad \text{OR} \quad = 1: \frac{60\%}{15\%} \quad \checkmark$$

$$NR = 1: 4 \quad \checkmark$$

(3)

**2.5.2 Identification of the feed (1, 2 or 3) recommended**

- Feed 2  $\checkmark$

(1)

**2.5.3 Reason to justify the answer in QUESTION 2.5.2**

- It has a narrower nutritive ratio  $\checkmark$
- Suggesting a comparatively higher protein necessary for milk production  $\checkmark$

(Any 1)

(1)

**2.5.4 The cheapest feed**Feed 3  $\checkmark$ 

(1)

**2.5.5 Reason for the answer in QUESTION 2.5.4**

- This feed has a lower protein content  $\checkmark$
- Feed with lower protein is cheap  $\checkmark$

(Any 1)

(1)

**[35]**

**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 An illustration of a proper housing structure for keeping broilers****3.1.1 Requirements of the roofing material to regulate temperature**

- Have a reflective surface on the outside ✓
  - Help to reduce conduction of heat ✓
- (2)

**3.1.2 TWO other ways in which temperature can be regulated**

- Heat lamps/heaters in cold weather ✓
  - Ventilation systems ✓
  - Air conditioning ✓
- (Any 2) (2)

**3.1.3 Best orientation for a broiler house**

- East ✓
- Reason**
- To reduce the effect of direct sunlight ✓
- (2)

**3.1.4 TWO purposes of the part labelled A**

- To allow ventilation/air flow ✓
  - To allow diffused sunlight ✓
- (2)

**3.2 The role of shelter in animal production****3.2.1 Forms of shelter**

- Planting trees ✓
  - Building kraals ✓
  - Erecting concrete walls ✓
- (Any 2) (2)

**3.2.2 Consequences of lack of shelter**

- Lower/slower growth/production ✓
  - Exposure to predators ✓
  - Exposure to pests ✓
  - Stock theft ✓
  - Higher feed intake when it is cold ✓
  - lower feed intake when it is hot ✓
- (Any 3) (3)

**3.2.3 Reason to use up more energy**

- To provide energy to sustain their body temperature ✓
- (1)

**3.3 The life cycles of two external parasites (ticks A and B)****3.3.1 Length for hatching of tick A's eggs**

- 1 month ✓
- (1)

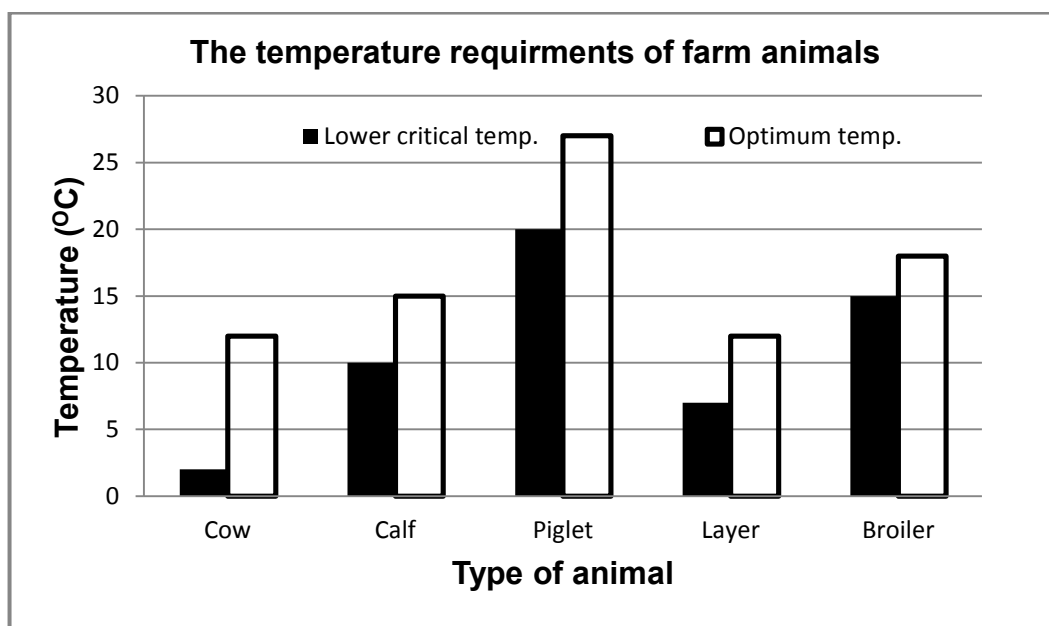
**3.3.2 Disadvantage to cattle**

- Open wounds form ✓
  - Through which blowflies can attack animals ✓
  - This can cause diseases ✓
- (Any 2) (2)

- 3.3.3 **TWO reasons for preventing parasite infestation**
- Infected animals may die/Loss of production/income ✓
  - Medication/treatment is expensive/higher production cost ✓ (2)
- 3.3.4 **Reasons why is it difficult to control the numbers of tick B**
- The adult stage is only found in birds ✓
  - Which is difficult to catch/control/treat ✓ (2)
- 3.4 **The role of the state in regulating farming practises**
- 3.4.1 **Type of research done by the state at the Veterinary Institute**
- Veterinary research to improve vaccines/diagnostic/new products ✓
  - Surveillance/control/preventing diseases ✓
  - Producing disease/blood vaccines ✓ (3)
- 3.4.2 **Purpose of a quarantine station**
- To isolate/detain animals and ✓
  - prevent diseases/pests entering/spreading in the country ✓ (2)
- 3.4.3 **Other roles the state play to protect the animal industry**
- Animal health schemes ✓
  - Duties of owners of animals ✓
  - Import bans ✓
  - Importation of vaccines ✓
  - Movement permits ✓ (Any 2) (2)

3.5 **The temperature required by farm animals**

3.5.1 **Bar graph**



**Criteria/rubric/marketing guidelines**

Correct heading ✓

X axis – correctly calibrated and labelled (Type of animal) ✓

Y axis – correctly calibrated and labelled (Temperature) ✓

Correct units (°C) ✓

Accuracy ✓

Bar graph ✓

(6)

**3.5.2 Deduction of farm animal with highest optimum temperature**

Piglet ✓

(1)

**[35]****QUESTION 4: ANIMAL REPRODUCTION****4.1 The stages of the oestrus cycle in a cow****4.1.1 Indication of oestrus cycle stages:****(a)** C ✓

(1)

**(b)** B ✓

(1)

**(c)** A ✓

(1)

**4.1.2 Hormones during stage C****(a)** Oestrogen ✓

(1)

**(b)** Luteinising hormone ✓

(1)

**4.1.3 The role of the hormone**

- Responsible for the rupturing of the membrane of the Graafian follicle ✓
- It initiates ovulation ✓

(Any 1) (1)

**4.1.4 Identification of the stage of the oestrus cycle labelled B**

Pro-oestrus ✓

(1)

**4.2 The female reproductive tract****4.2.1 Deposition of semen:****(a)** G ✓

(1)

**(b)** F/E ✓

(1)

**4.2.2 Identification of the structure collecting the ripe follicle:****(a)** A ✓ Infundibulum ✓

(2)

**(b)** B ✓ Ampulla ✓

(2)

**4.2.3 Concept of ovulation**

- Process whereby the membrane containing the ripe follicle bursts with the help of LH and ✓
- the ripe ovum is released into the infundibulum ✓

(2)

**4.3 The process of spermatogenesis**

- 4.3.1 **Deduction on the type of cell division:**  
Meiosis ✓ **Reason** - genetic material is reduced into half/diploid(2n)  
changed into haploid (n)/reduction division ✓ (2)
- 4.3.2 **The stages of spermatogenesis:**  
**C** – Formation of the spermatids ✓  
**D** – Formation of sperm cells/spermatozoa ✓ (2)
- 4.3.3 **Part of the testes where spermatogenesis takes place**  
• Tubules seminiferous ✓ (1)
- 4.3.4 **The organ where the spermatozoa achieve mobility**  
• Epididymis ✓ (1)
- 4.3.5 **Similarity between spermatogenesis and oogenesis**  
• Both occur through meiosis to produce haploid cells ✓  
• Both produce gametes/sex cells ✓ (Any 1) (1)

**4.4 Mating during oestrus**

- 4.4.1 **Devices to detect oestrus in the cow**  
• Pedometer ✓  
• Chin-ball marker ✓  
• Tail-chalking ✓  
• Kamar heatmount detector ✓ (Any 3) (3)
- 4.4.2 **Sequential order of FOUR reproductive hormones that are produced by a cow**  
• Progesterone ✓  
• Lutetrophic hormone/LTH/prolactin ✓  
• Relaxin ✓  
• Oxytocin ✓ (Any 4) (4)



**4.5 Embryo transfer (ET) and superovulation****4.5.1 Definition of superovulation**

- The production of a larger number of ova ✓
  - at one ovulation ✓
- (2)

**4.5.2 THREE advantages of embryo transfer (ET)**

- More progeny can be produced ✓
  - Higher profits due to increase in sales ✓
  - Productive lives of cows are increased ✓
  - Genetics of the herd is conserved ✓
  - Superior genes are introduced into the herd ✓
- (Any 3) (3)

**4.5.3 Reason for using proven bulls**

- To introduce superior/desirable genes into the herd rapidly and economically ✓
- (1)  
**[35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**