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# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**FEBRUARY/MARCH 2017**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 9 pages.**

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

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	A/B ✓✓		
	1.1.4	B ✓✓		
	1.1.5	B ✓✓		
	1.1.6	C ✓✓		
	1.1.7	D ✓✓		
	1.1.8	D ✓✓		
	1.1.9	C ✓✓		
	1.1.10	A ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	B only ✓✓		
	1.2.3	None ✓✓		
	1.2.4	B only ✓✓		
	1.2.5	A only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Amylase/ptyalin ✓✓		
	1.3.2	Commercial farmer ✓✓		
	1.3.3	Superovulation ✓✓		
	1.3.4	Ejaculation ✓✓		
	1.3.5	Courtship ✓✓	(5 x 2)	(10)
1.4	1.4.1	Cardiac ✓		
	1.4.2	Deep litter ✓		
	1.4.3	Dry ✓		
	1.4.4	Cloning/nuclear transfer✓		
	1.4.5	Ovum/egg/female/reproductive sex cell/gamete✓	(5 x 1)	(5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 A representation of the alimentary canal of a farm animal.**

- 2.1.1 **Farm animal represented by the alimentary canal**  
Pig ✓ (1)
- 2.1.2 **Importance of parts A and C**  
**A** – Assists in chemical digestion of food ✓ (1)  
**C** – Assists in chemical digestion and absorption of food ✓ (1)
- 2.1.3 **Explanation of mechanical digestion**  
• Breaking down of the complex food particles into smaller, simpler particles ✓  
• through physical objects/teeth ✓ (2)

**2.2 The absorption of nutrients from the small intestines**

- 2.2.1 **Identification of transport**  
**A** – Active absorption/carrier molecule theory ✓ (1)  
**B** – Passive absorption/osmosis/diffusion ✓ (1)
- 2.2.2 **Reason**  
**Active absorption**  
• Nutrients move from a lower concentrated area to a higher concentrated area/against the concentration gradient through an energy carrier (ATP) ✓  
**Passive absorption**  
• Nutrients move from a higher concentrated area to a lower concentrated area/along the concentration gradient ✓ (2)
- 2.2.3 **Identification of the structure labelled C**  
Differential permeable/partially/semi-permeable membrane ✓ (1)
- 2.2.4 **Nutrient absorbed through**  
(a) **Blood capillaries** – Digested protein/carbohydrates/ amino acids /glucose/vitamins/minerals ✓ (1)  
(b) **Lacteal** – Digested fats/glycerol and fatty acids ✓ (1)

**2.3 The various feed components of a ration**

- 2.3.1 **Example of an energy rich concentrate**  
Maize meal ✓ (1)
- 2.3.2 **Feed supplement acting as a source of energy in licks**  
Molasses ✓ (1)

**2.3.3 Suitability of urea for pigs**

- Not suitable ✓

**Reason**

- It cannot be digested by pigs/pigs are monogastric/only ruminant animals can utilise ✓

(2)

**2.3.4 Tabulation of rations**

SOURCE OF PROTEIN	EXAMPLE
Natural protein	Lucerne hay ✓
NPN protein	Urea ✓

Table ✓

(3)

**2.4 Fodder flow programme****2.4.1 Completion of the table**

$$(a) \quad 600 \times 120 = \frac{72\,000}{1000} \checkmark = 72 \text{ tons } \checkmark$$

$$(b) \quad 200 \times 120 = \frac{24\,000}{1000} \checkmark = 24 \text{ tons } \checkmark$$

(4)

**2.4.2 Determining the average cost to feed ONE animal for ONE day**

- R114 277,80 ÷ 113 animals ✓
- = R1011,31 ÷ 120 days ✓
- = R8,43 ✓ **OR**
- R114 277,80 ÷ 120 days ✓
- = R952,32 ÷ 113 animals ✓
- = R8,43 ✓

(3)

**2.5 Composition of two animal feeds****2.5.1 Calculating nutritive ration (NR) of FEED B**

- NR = 1:  $\frac{\% \text{ digestible non-nitrogen nutrients}}{\% \text{ digestible protein}}$  ✓
- = 1:  $\frac{58}{12}$  ✓
- NR = 1: 4,831:5 ✓
- OR**
- NR =  $\frac{\text{TDN}-\text{DP}}{\text{DP}}$  ✓
- = 1 :  $\frac{70\% - 12\%}{12\%}$  ✓
- NR = 1: 4,83/1:5 ✓

(3)

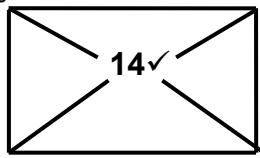
**2.5.2 Justification for not recommending feed A**

- Wide nutritive ratio ✓
- It has more carbohydrates and fats than proteins/fewer proteins than carbohydrates and fats ✓

(2)

**2.6 Pearson square method****Calculating Pearson square**

Oats meal 9% 24 parts ✓



Sunflower 38% 5 parts ✓

Ratio of oats : sunflower is 24:5 ✓

(4)  
[35]**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 Scenario on the optimising of production****3.1.1 Natural resources**

- Lower production outputs ✓ due to animals fending for themselves (2)

**3.1.2 Feeding**

- Enough feed (pastures) ✓ will lead to good production ✓  
OR  
Less feed (pastures) ✓ will lead to poor production. ✓ (2)

**3.1.3 Exploitative practices**

- Where the natural balance/equilibrium is disturbed ✓/due to poor veld management ✓
- Utilise the natural resources to such an extent that it is permanently damaged ✓ and impossible to recover ✓
- More is taken out and nothing is put back in return ✓
- Maximum production no matter what the cost ✓
- Deliberate actions to damage the environment ✓ (Any 2) (6)

**3.2 Management practices conducted on piglets****3.2.1 Identification of management practices**

- A** – Injection/inoculation/vaccination ✓ (1)  
**B** – Tail docking ✓ (1)

**3.2.2 Reason for the management practices**

- A** – To administer iron/Fe to piglets/supplementing/medication/immunisation ✓ (1)  
**B** – Prevent tail biting/cannibalism ✓ (1)

**3.2.3 Mineral administered to piglets**

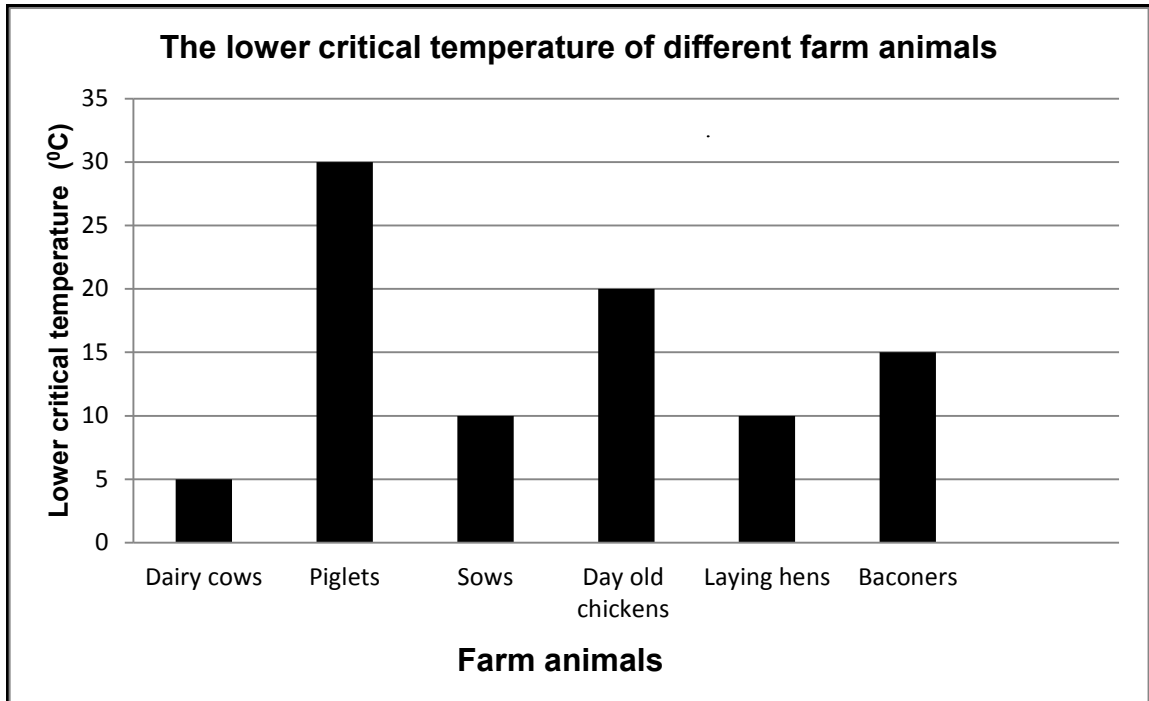
- Iron/Fe ✓ (1)

**3.2.4 Justification with TWO reasons**

- Sow milk contains a limited quantity of iron/not enough ✓
- Most effective way to administer iron/Fe ✓
- Initial feed intake of piglets is low/inadequate to support their iron requirements ✓ (Any 2) (2)

### 3.3 Body temperature and the lower critical temperature

#### 3.3.1 Bar graph showing the lower critical temperatures of the different farm animals



#### Criteria/rubric/marking guidelines

- Correct heading ✓
- X-axis – correctly calibrated with label (Farm animals) ✓
- Y-axis – correctly calibrated with label (Lower critical temperature) ✓
- Correct units (°C) ✓
- Bar graph ✓
- Accuracy ✓

(6)

#### 3.3.2 Identification of the animal inefficiently using feed Piglets ✓

(1)

#### 3.3.3 Reason for dairy cows producing milk at 6°C. Their critical temperature is lower than 6°C ✓

(1)

### 3.4 Life cycle of a parasite

#### 3.4.1 Classification and name the parasite above

- Internal parasite ✓
- Liver fluke ✓

(2)

#### 3.4.2 Letter representing

- (a) An intermediate host - D ✓
- (b) Eggs hatch into larva - C ✓

(1)

(1)

**3.4.3 Precautionary measure**

- Keep animals away from moist/wet places/camping off infested ✓
- Control intermediate host (snails) burn infested areas✓
- Keep areas around drinking places dry✓
- Breed resistant animals✓
- Graze animals on clean pastures/apply hygienic measures/use of feeders✓
- Zero grazing/ rotational grazing✓
- Provision of clean drinking water✓
- Provision of good nutrition✓
- Deworming animals at certain intervals✓
- Isolation/separation of animals✓

(Any1)

(1)

**3.4.4 THREE economic implications of the parasite**

- Decrease/poor/degradation of products/loss of production✓
- Higher production costs/labour/time/medicines/ decreased profits/income ✓
- Poor reproduction outputs ✓
- Poor food conversion rate✓
- Negative impact on economy/no export✓

(Any3)

(3)

**3.5 Passage on chicken housing****3.5.1 TWO purposes of housing**

- To protect chickens from predators ✓
- To create an environment for growth and development ✓

(2)

**3.5.2 TWO to consider when building a chicken house**

- Building to be cost effective ✓
- Orientation of the building to be east to west ✓
- Building site to be well drained and aerated✓
- Roofing material should be insulated and be reflective✓
- Enough ventilation✓
- Even distribution of light✓
- Should provide the right amount of heat✓

(Any 2)

(2)

**3.5.3 TWO examples of equipment in a poultry house**

- Feed troughs ✓
- Water drinkers/troughs ✓
- Lighting ✓
- Nesting boxes ✓
- Roosts ✓
- Bedding ✓
- Foot baths ✓
- Air conditioning/fans/heaters✓
- Incubators✓
- Thermometer✓
- Egg trays✓
- Egg scales✓

(Any 2)

(2)

**[35]**



**QUESTION 4: ANIMAL REPRODUCTION****4.1 Embryo and foetus development****4.1.1 Identification of the structures**

- (a) **B** – Allantois ✓
- (b) **E** – Foetus ✓
- (c) **F** – Umbilical cord/placenta ✓

(3)

**4.1.2 Provision of the following :****(a) ONE function**

- Protection of the foetus against shock/shock absorber ✓
- Prevents desiccation of the foetus/dehydration/drying of foetus ✓
- Lubrication of birth canal ✓
- Regulates temperature around the foetus ✓

(Any 1)

(1)

**(b) ONE constituent of D**

- Amniotic fluid/water/liquid ✓

(1)

**(c) Place where D occurs**

- Inside amnion/C ✓

(1)

**4.1.3 Time to detect rectal pregnancy**

3–4 months into pregnancy/gestation ✓

(1)

**4.2 Role of hormones****4.2.1 Explanation of hormone**

- The chemical substance secreted by endocrine glands/ovaries/uterus transported in the blood ✓ to specific parts/target organ of the body performing specialised functions ✓

(2)

**4.2.2 Primary function of hormones****(a) Testosterone**

- Development of the secondary male characteristics ✓
- Enhances sexual desires ✓
- Stimulate sperm production ✓

(1)

**(b) Luteinising hormone (LH)**

- Rapture the membrane of the follicle during ovulation ✓
- Tightening the infundibulum around the ovary ✓
- Stimulates secretion of progesterone ✓
- Maturation of the oocytes ✓
- Formation of the corpus luteum ✓

(Any 1)

(1)

**(c) Oestrogen**

- Develop the functions of the secondary sex organs ✓
- Responsible for the onset of oestrus/behaviour changes ✓
- Signs of oestrus ✓
- Contraction of the uterus ✓
- Promote growth of the mammary duct system ✓
- Stimulates Graafian follicle ✓
- Stimulates secretion of LH ✓
- Delays/inhibits secretion of FSH ✓
- Increases blood supply to the uterus ✓
- Prevents bacterial infection of the uterus ✓

(Any 1)

(1)

- 4.2.3 **Hormone responsible for :**  
(a) **Maintaining the Corpus luteum – Progesterone** ✓ (1)  
(b) **Growth and development of the Graafian follicle – FSH** ✓ (1)
- 4.3 **Oestrus cycle of dairy cattle**
- 4.3.1 **Determination of the number of cows on oestrus**  
10 ✓ (1)
- 4.3.2 **Indication of time 20 cows will be in oestrus**  
18:00 to 00:00 ✓ (1)
- 4.3.3 **Tendency of cows in oestrus from 12:00 to 06:00**  
Increase/higher/more/from 10 to 45 cows ✓ (1)
- 4.3.4 **The number of cows in oestrus from 18:00 to 06:00**  
20 + 45 cows ✓  
= 65 cows ✓ (2)
- 4.3.5 **Best time to inseminate**  
12:00 to 18:00/in the afternoon ✓ (1)
- 4.3.6 **Reason**  
Time when most (45 cows) are in oestrus/in heat ✓ (1)
- 4.4 **The udder of a dairy cow**
- 4.4.1 **Identification of the parts**  
• **A – Alveolus** ✓ (1)  
• **B – Lobe** ✓ (1)  
• **C – Teat** ✓ (1)
- 4.4.2 **Definition of lactation**  
• Period of milk production by female animals/cows ✓  
• Starting soon after parturition for an average of 305 days ✓  
• Involves the hormones prolactin and oxytocin ✓ (Any 2) (2)
- 4.4.3 **Comparison of milk and butterfat production**  
• Milk production increases until peak production thereafter it decreases ✓  
• Butterfat production decreases until peak production thereafter it increases ✓ (2)
- 4.5 **Difficult births**
- 4.5.1 **Scientific term for difficult births** (1)  
Dystocia ✓

- 4.5.2      **Reason for difficult births in heifers**
- Heifers are physically smaller✓and less developed (younger)/age ✓
  - Incorrect presentation/position/posture✓
  - Too large foetus/hydrocephalus✓
  - Deformities of the foetus✓
  - Torsion/twisting of the foetus✓
  - Prolapsed uterus✓
  - Multiple births/twins✓
  - Size of pelvic area✓
  - Weak/ ineffective labour✓
  - Cervix failing to dilate✓
  - Prolonged gestation/pregnancy period✓
  - Malnutrition✓
  - Diseases✓
- (Any 2)      (2)
- 4.5.3      **TWO managerial measures to reduce difficult births**
- Use bulls renowned for small calves/low birth weight ✓
  - Mate heifers at the ideal age/mass/not too early ✓
  - Use a controlled/well-planned breeding season ✓
  - Well planned feeding programme/avoid overfeeding✓
  - Planned health programme ✓
- (Any 2)      (2)
- 4.5.4      **Definition of placenta retention**
- The failure to expel the placenta/membranes ✓
  - within 12 hours after parturition/birth ✓
  - with negative effects/complications ✓
- (Any 2)      (2)
- [35]**
- TOTAL SECTION B:      105**
- GRAND TOTAL:      150**