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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

2021

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 pages.

SECTION A**QUESTION 1**

1.1	1.1.1	B ✓✓	(10 x 2)	(20)
	1.1.2	C ✓✓		
	1.1.3	A ✓✓		
	1.1.4	D ✓✓		
	1.1.5	D ✓✓		
	1.1.6	B ✓✓		
	1.1.7	B ✓✓		
	1.1.8	C ✓✓		
	1.1.9	C ✓✓		
	1.1.10	A ✓✓		
1.2	1.2.1	B only ✓✓	(5 x 2)	(10)
	1.2.2	A only ✓✓		
	1.2.3	Both A and B ✓✓		
	1.2.4	None ✓✓		
	1.2.5	B only ✓✓		
1.3	1.3.1	Concentrate ✓✓	(5 x 2)	(10)
	1.3.2	Crush/crush pen/race ✓✓		
	1.3.3	Milk let down/milk ejection ✓✓		
	1.3.4	Sperm cell/spermatozoon/male gamete/male sex cell ✓✓		
	1.3.5	Embryo transfer/transplant/ET ✓✓		
1.4	1.4.1	Thyroid regulators ✓	(5 x 1)	(5)
	1.4.2	Disinfecting/sanitising ✓		
	1.4.3	Embryonic ✓		
	1.4.4	Synchronisation of oestrus ✓		
	1.4.5	Testis ✓		

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canal of a farm animal****2.1.1 Name farm animal**

Pig ✓

(1)

2.1.2 Motivation

The animal has a simple/single/monogastric stomach ✓

(1)

2.1.3 Justification of the digestion in the mouth of a pig**Physical** - Food is broken down by the teeth into smaller particles ✓

(1)

Chemical - Salivary amylase in the mouth breaks down starch in food into maltose ✓

(1)

2.1.4 Identification of the part by indicating the letter

(a) B ✓

(1)

(b) D ✓

(1)

(c) A ✓

(1)

2.1.5 Indication of the part in ruminant animals corresponding to part D in terms of functioning

Abomasum ✓

(1)

2.2 Components of feed**2.2.1 TWO roles of water/moisture in digestion**

- Acts as a solvent for dissolving substances in the body ✓
- Softens/moistens food ✓
- Facilitating enzymatic digestion ✓
- Medium through which waste products are excreted ✓
- Transports nutrients through the digestive tract ✓

(Any 2) (2)

2.2.2 Identification of the component

(a) Zinc ✓

(1)

(b) Vitamin K ✓

(1)

(c) Phosphorus ✓

(1)

2.2.3 Indication of the component that is(a) **Fat soluble** - Vitamin K ✓

(1)

(b) **Water soluble** - Vitamin B₁ ✓

(1)

2.3 Digestibility of feed**2.3.1 Calculation of the digestibility coefficient of feed in animal B**

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

$$= \frac{12 \text{ kg} - 7 \text{ kg}}{12 \text{ kg}} \times \frac{100}{1} \quad \checkmark$$

$$= 41,6/42 \quad \checkmark \% \quad \checkmark \quad (4)$$

2.3.2 **TWO animal related factors having an influenced on the digestibility of the feed given to ANIMAL A and ANIMAL B**

- Individuality ✓
- Age of animal ✓
- Production ✓

(Any 2) (2)

2.3.3 **TWO methods to increase digestibility of feed in ANIMAL B**

- Grinding/milling ✓
- Pelleting ✓
- Boiling ✓
- Crushing ✓
- Soaking ✓
- Popping and micronizing ✓
- Dry rolling and cracking ✓
- Roasting ✓
- Mixing with molasses ✓
- Cutting hay at an early stage ✓

(Any 2) (2)

2.4 **Nutritive ratio**

2.4.1 **Calculation of the Nutritive Ratio**

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

$$= 1 : \frac{50\% - 5\%}{5\%} \quad \checkmark$$

$$= 1 : 9 \quad \checkmark$$

$$\text{OR NR} = 1 : \frac{\%DNNS}{\%DP} \quad \checkmark$$

$$= 1 : \frac{45\%}{5\%} \quad \checkmark$$

$$= 1 : 9 \quad \checkmark$$

(3)

2.4.2 **The suitability of the feed**

Suitable for fattening/not suitable for growth/production ✓

(1)

2.4.3 **Reason**

- Less protein ✓
- NR is wide/more carbohydrates than protein ✓

(Any 1) (1)

2.4.4 **Classification of the feed**

Roughage ✓

(1)

2.4.5 **ONE advantage of feeding the lamb with the feed**

- To stimulate the development of the rumen ✓
- Adds volume required for ruminant digestion ✓

(Any 1) (1)

2.5 **Fodder flow programme**

2.5.1 **Calculation of the total feed required by animals in month 6 (tons)**

$$\text{Total feed required} = 9,5 \text{ kg} \times 50 \times 30 = 14\,250 \text{ kg} \quad \checkmark$$

$$= \frac{14\,250 \text{ kg}}{1\,000} \quad \checkmark$$

$$= 14,25 \text{ tons} \quad \checkmark$$

(3)

- 2.5.2 **Deduction of the problem of fodder flow programme**
Shortage/deficit of feed during month 5/6 ✓ (1)
- 2.5.3 **Reason**
Supply is 12 tons in month 5 and 4 tons in month 6 while the requirement is 13,5 and 14,25 tons respectively/feed available is less than feed required ✓ (1)
- [35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

- 3.1 **Production system in cattle**
- 3.1.1 **Production system**
Extensive ✓ (1)
- 3.1.2 **TWO reasons to justify the answer in Question 3.1.1**
- Kept on a natural veld ✓
 - Unit area is vast per animal/large space fewer animals ✓
 - Lack of shelter/protection ✓
 - Animals fend for themselves ✓ (2)
- 3.1.3 **Comparison between the TWO production systems**
- (a) **Production output per unit area**
- Intensive: High ✓ (1)
 - Extensive: Low ✓ (1)
- (b) **Disease transmission**
- Intensive: High ✓ (1)
 - Extensive: Less ✓ (1)
- 3.2 **Equipment and techniques in the handling of farm animals**
- 3.2.1 **Association of tools A - E with the techniques (a) – (e)**
- (a) C ✓ (1)
 - (b) D ✓ (1)
 - (c) A ✓ (1)
 - (d) E ✓ (1)
 - (e) B ✓ (1)

3.2.2 TWO other reasons for handling animals

- Transportation ✓
- General examination ✓
- Pregnancy diagnosis ✓
- Weighing ✓
- Control external parasites/dipping/foot bathing ✓
- Age determination ✓
- Dehorning ✓
- Hoof trimming ✓
- Artificial insemination ✓
- Production purposes ✓
- Slaughtering ✓
- Selection ✓
- Weaning ✓
- Feeding ✓
- Docking ✓
- Evaluation and classification ✓
- Generation of data ✓

(Any 2) (2)

3.3 Farm animal behaviour**3.3.1 Identification of the behaviour by farm animals**

Fright/frightened/animals scared/aggression/pushing ✓ (1)

3.3.2 Cause of the behaviour by animals

- (a) Poor depth perception ✓ (1)
- (b) Heat stress ✓ (1)
- (c) Flocking habit ✓ (1)

3.4 Parasites in livestock**3.4.1 Classification of the type of parasite**

Ecto/external parasites ✓ (1)

3.4.2 Month with the highest infestation

September ✓ (1)

3.4.3 Deduction on the rate of infestation by the blowfly on both ewes and lambs during

(a) **May** - Ewes are more infested than lambs/
4 000 ewes and 1 000 lambs ✓ (1)

(b) **August** - Ewes are less infested than lambs/
6 000 ewes and 8 000 lambs ✓ (1)

3.4.4 Financial implication to the farmer

- Loss of production/stock ✓
- Loss of profit/income/high costs of treatment ✓

(Any 1) (1)

- 3.4.5 **ONE preventative measure to reduce blowfly strike**
- Shear whilst still cool for the blowfly not to survive/correct time of shearing ✓
 - Docking of the tails ✓
 - Treat diarrhoea ✓
 - Avoid/treat open wounds ✓
 - Separate rams to avoid fighting ✓
 - Crouching of wet soiled areas ✓
 - Controlling of flies ✓
 - Breeding resistant animals ✓
- (Any 1) (1)

3.5 Animal diseases

- 3.5.1 **Identification of the pathogen A and B**
- A - Bacteria ✓ (1)
- B - Protozoon ✓ (1)
- 3.5.2 **Transmission mode of the virus in D**
- Infected saliva through biting ✓ (1)
- 3.5.3 **Vector for the viral disease in E**
- Mosquitoes ✓ (1)
- 3.5.4 **Advice to the farmer to control the spread of the disease in E**
- Destroy the vector at the breeding place/spraying/
 - Destroy infected animals ✓
 - Vaccination ✓
 - Isolation ✓
 - Awareness campaigns ✓
- (Any 1) (1)
- 3.5.5 **TWO control measures by the state**
- Culling/killing of infected animals ✓
 - Eradication programs set into place ✓
 - Quarantining/isolation ✓
 - Import and export bans ✓
- (Any 2) (2)

3.6 Animal poisoning

- 3.6.1 **Type of poisoning**
- Salt poisoning ✓ (1)
- 3.6.2 **Identification of the source of poisoning**
- Sodium chloride/NaCl ✓ (1)
- 3.6.3 **ONE treatment measure if animals get the form of poisoning**
- Removal of the source of salts ✓
 - Provision of fresh clean water in smaller quantities ✓
 - Supplying water through a stomach tube for severe cases ✓
 - Treating animals with hypertonic dextrose/isotonic/saline solution ✓
- (Any 1) (1)

3.6.4 Preventative measure of this form of poisoning

- Supply clean fresh water ✓
 - Do not deprive animals of salt for too long/ avoid craving for salt ✓
 - Supply acceptable quantities of salt/ no free access to abundant supply of salt ✓
- (Any 1)

(1)
[35]**QUESTION 4: ANIMAL REPRODUCTION****4.1 Reproductive systems of animals****4.1.1 Identification of the diagram**

Diagram A ✓

(1)

4.1.2 ONE reason visible from the DIAGRAM A

- Presence of an ovary ✓
- Presence of uterus ✓
- Presence of Cervix ✓
- Presence of vagina ✓
- Presence of fallopian tube ✓

(Any 1) (1)

4.1.3 Naming of the parts**C** - Cervix ✓

(1)

G - Cowper's/bulbo-urethral glands ✓

(1)

4.1.4 Function of part B and F**B** - Where the zygote is implanted and develops ✓

(1)

F -

- Fluid provides nutrients to the sperm cells ✓
- Protect semen against pH changes ✓
- Helps to keep semen fertile and healthy ✓
- Improves mobility of the spermatozoa ✓

(Any 1) (1)

4.1.5 Identification of part where gametes are formed in diagram B

E ✓

(1)

4.2 Mating**4.2.1 Stages of mating in their chronological order**

- A bull shows interest in cow ✓
- Bull stands on his rear leg, rests on the rear end of the cow ✓
- A bull gains intromission into the vagina ✓
- Semen is released into the vagina ✓

(4)

4.2.2 Indication of the stage not listed

Dismounting ✓

(1)

4.2.3 Hormone regulating mating behaviour in bulls

Testosterone ✓

(1)

4.3 Levels of hormones in a pregnant cow

4.3.1 Identification of the letter representing hormones

(a) B ✓

(1)

(b) A ✓

(1)

4.3.2 Indication of oestrus stage

(a) Between day 2 and 6 - Pro-oestrus ✓

(1)

(b) At day 14 - Oestrus ✓

(1)

4.3.3 Reason to justify that the cow is pregnant

Oestrogen level dropped ✓ progesterone level is increasing and maintained ✓

(2)

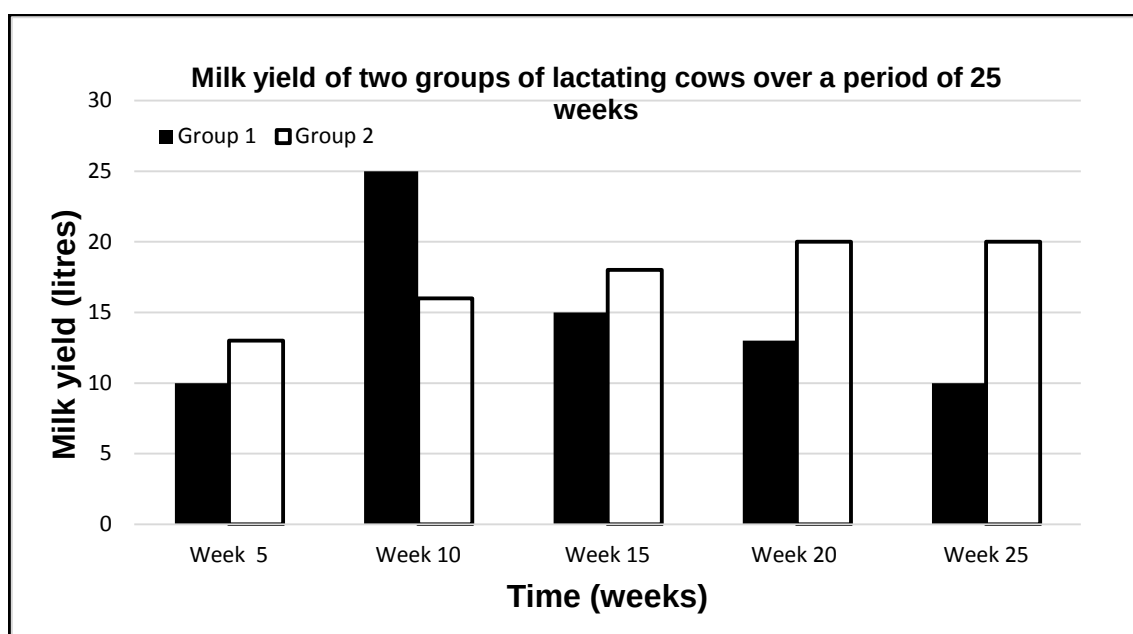
4.3.4 Stage in the reproductive cycle after 282 days after insemination

Parturition/calving ✓

(1)

4.4 Milk yield in lactating cows

4.4.1 Bar graph on milk yield in lactating cows



Criteria/rubric/marketing guidelines

- Correct heading ✓
- X-axis: Correctly calibrated with label (Time) ✓
- Y-axis: Correctly calibrated with label (Milk yield) ✓
- Correct units (litres and weeks) ✓
- Combined bar graph ✓
- Accuracy ✓

(6)

4.4.2 Comparison of the milk yield in both groups over the weeks

- Group 1 - Milk yield increased and then it decreased ✓
- Group 2 - Milk yield increased and then it stabilised ✓

(1)

(1)

4.5 Artificial Insemination**4.5.1 Indication of the function of the equipment****Picture A** - Depositing semen into the reproductive tracts of a cow ✓**Picture B** - Storage of semen ✓ (2)**4.5.2 Indication of where the equipment is placed during AI**

Cervix/uterus ✓ (1)

4.5.3 TWO basic requirements for storage of semen

- Semen be stored at 5 °C for shorter periods ✓
- Semen stored for longer periods must be frozen in liquid nitrogen at –196 °C ✓
- Semen must be stored in polyvinyl straws ✓
- End of straws be sealed to prevent entering of liquid nitrogen ✓
- Straws be labelled for identification ✓ (Any 2) (2)

4.5.4 TWO challenges of using the equipment

- Expensive ✓
 - Needs expert knowledge on how to handle ✓
 - Correct handling and maintenance ✓ (Any 2) (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150