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# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**NOVEMBER 2018**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 9 pages.**

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

1.1	1.1.1	B ✓✓		
	1.1.2	B ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	D ✓✓		
	1.1.8	A ✓✓		
	1.1.9	A ✓✓		
	1.1.10	D ✓✓	(10 x 2)	(20)
1.2	1.2.1	A only ✓✓		
	1.2.2	None ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	Both A and B ✓✓		
	1.2.5	B only ✓✓	(5 x 2)	(10)
1.3	1.3.1	Parakeratosis ✓✓		
	1.3.2	Nipple/nipple drinker ✓✓		
	1.3.3	Ejaculation ✓✓		
	1.3.4	Meiosis ✓✓		
	1.3.5	Spermatozoon/sperm cell ✓✓	(5 x 2)	(10)
1.4	1.4.1	Pearson ✓		
	1.4.2	Free range/back yard/semi intensive ✓		
	1.4.3	Infectious/contagious/pathogenic ✓		
	1.4.4	Dystocia ✓		
	1.4.5	Mesoderm ✓	(5 x 1)	(5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 Schematic images of the internal parts in the alimentary canal of ruminants****2.1.1 Identification of parts**

- B** Omasum ✓ (1)  
**C** Reticulum ✓ (1)

**2.1.2 The function of PART B**

- Traps hard and indigestible substances/separate coarse and fine food materials ✓
- Grinding of food particles ✓
- Sends large substances back to the rumen ✓
- Absorption of water ✓
- Absorption of some volatile fatty acids ✓ (Any 1) (1)

**2.1.3 Structures in Part A responsible for the production of heat**

- Heating rods/papillae ✓ (1)

**2.1.4 ONE requirement of rumen microbes in ruminants**

- Easily digestible carbohydrates/regular intake of feed ✓
- Sufficient mineral nutrients ✓
- Sufficient nitrogen ✓
- Anaerobic/oxygen free conditions ✓
- Neutral environment/suitable pH/slightly acidic/pH 5,5 - 6,5 ✓
- Presence of carbon dioxide/CO<sub>2</sub> ✓
- Temperature of 38 - 42 °C/warm conditions ✓
- Continual removal of waste ✓
- Presence of volatile fatty acids ✓
- Adequate moisture conditions ✓ (Any 1) (1)

**2.2 Digestibility trial with ruminant animals****2.2.1 The digestibility coefficient**

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

$$\text{DM} = \frac{10}{100} \times 12\text{kg} = 1,2\text{kg (moisture content)}$$

**OR**

$$\text{DM} = \frac{90}{100} \times 12\text{kg} = 10,8\text{kg (dry matter)} \quad \checkmark$$

$$= \frac{(12\text{kg} - 1,2\text{kg}) - 7\text{kg}}{10,8\text{kg}} \times 100$$

**OR**

$$= \frac{10,8 - 7\text{kg}}{10,8\text{kg}} \times 100 \quad \checkmark$$

$$= 35,19/35,2 \quad \checkmark \quad \% \quad \checkmark \quad (5)$$

**2.2.2 Implication of calculated DC**

- More (64,8%) of the feed was excreted ✓
- Less (35,2%) of the feed was digested and absorbed ✓
- High crude fibre content ✓

(Any 1) (1)

**2.2.3 Classification of the feed**

Roughage ✓

(1)

**2.3 Animal feeds****2.3.1 Feed suitable for young growing animals**

Feed A ✓

(1)

**2.3.2 Reason for the answer in QUESTION 2.3.1**

- It has a narrow nutritive ratio/NR of 1:3,4 ✓
- High protein content/DP of 18% ✓

(Any 1) (1)

**2.3.3 FEED B not recommended as a main feed for non- ruminants**

It has a high crude fibre content/CF of 17% ✓ and a resultant low TDN/55% which is less than 60% ✓

(2)

**2.3.4 Relationship between total digestible nutrient and crude fibre content of FEED A.**

The lower the crude fibre content ✓ the higher the total digestible nutrients ✓

(2)

**2.4 Energy value and the energy losses (per kg)****2.4.1 Energy loss in manure if the farm animal consuming 5kg of feed**  
42,5J ✓

(1)

**2.4.2 Identification of the gas with the highest energy loss**

Methane ✓

(1)

**2.4.3 Calculation of the energy available for growth and production**

$$NE = GE - (\text{energy lost in manure} + \text{in urine} + \text{as heat} + \text{methane})$$

$$= 18,5J - 14J / (8,5J + 1,2J + 1,8J + 2,5J) \checkmark$$

NE = 4,5 ✓ J ✓

(3)

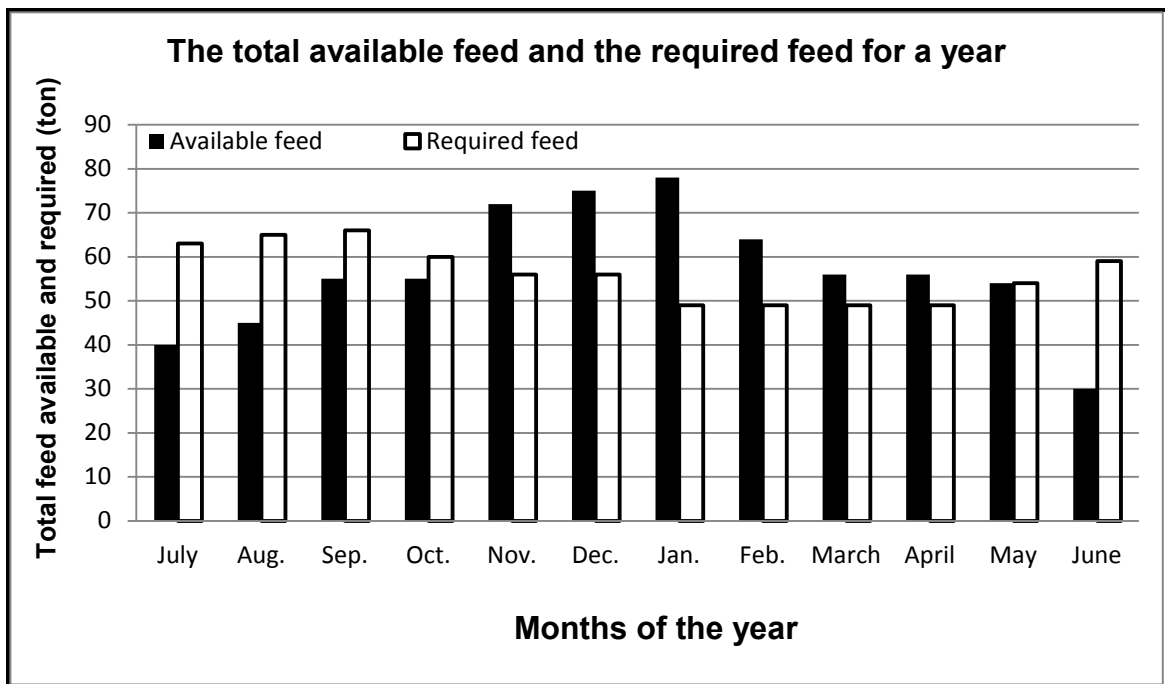
**2.5 Feed flow programme****2.5.1 Calculation of deficit for September**

(66 – 55) tons ✓

= 11 tons ✓

(2)

### 2.5.2 Bar graph of the available feed and the requirement of animals for a year



#### CRITERIA/RUBRIC/MARKING GUIDELINES

- Correct heading ✓
- X axis: Correctly calibrated with label (Months of the year) ✓
- Y axis: Correctly calibrated with label (Total feed available and required) ✓
- Correct units (ton) ✓
- Bar graph ✓
- Accuracy ✓

(6)

### 2.6 Ways of supplementing feeds

- |       |                    |             |
|-------|--------------------|-------------|
| 2.6.1 | Soil sods ✓        | (1)         |
| 2.6.2 | Urea ✓             | (1)         |
| 2.6.3 | Implants ✓         | (1)         |
| 2.6.4 | Drinking troughs ✓ | (1)         |
|       |                    | <b>[35]</b> |

## QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

### 3.1 Animal production systems

#### 3.1.1 Identification of production systems

- |          |                               |     |
|----------|-------------------------------|-----|
| <b>A</b> | Extensive production system ✓ | (1) |
| <b>B</b> | Intensive production system ✓ | (1) |

- 3.1.2 **Comparison of the two production systems with reference to capital investment**
- A Less capital invested ✓ (1)
- B More capital invested ✓ (1)
- 3.2 **Feeding programme for broiler production**
- 3.2.1 **Comparison of the nutritional requirement of broilers in growth stages**
- A Broilers need a high protein diet ✓ (1)
- B Broilers need a high energy diet ✓ (1)
- 3.2.2 **Reason for nutritional requirements for growth stage A**  
For growth ✓ (1)
- 3.2.3 **TWO other factors to increase production in broilers**
- Controlled environment/proper housing ✓
  - Breeding ✓
  - Good health/hygienic conditions ✓
  - General enterprise management
  - Enterprise technical skills/skilled labour ✓ (Any 2) (2)
- 3.3 **Housing facilities for breeding pigs**
- 3.3.1 **Indication of facility**  
Farrowing pen/crate ✓ (1)
- 3.3.2 **Design feature of the facility**  
Partitioned to accommodate the sow to lay on her side/  
structured to separate the sow from the piglets ✓ (1)
- 3.3.3 **Equipment/material found in the facility, to regulate temperature**
- (a) Air conditioners/heaters/infra-red lamps/heated flooring ✓ (1)
- (b) Bedding/litter materials ✓ (1)
- 3.4 **Farm animal productivity**
- 3.4.1 **Key condition that impacts negatively to production**  
Adverse weather conditions/excessive hot/cold conditions ✓ (1)
- 3.4.2 **TWO economic impacts of this condition to the farmer**
- More money spent on feeding during cold weather ✓
  - Loss of production/income due to uncontrolled conditions ✓ (2)
- 3.4.3 **Measures the farmer can take to reduce the impact of varying temperatures in**
- (a) Provision of shade/cooling/provide enough water ✓ (1)
- (b) Provision of shelter/move livestock closer to home ✓ (1)
- 3.5 **Handling facilities in an intensive production system**
- 3.5.1 **Identification of the facilities**
- A Holding pen ✓ (1)
- C Crush ✓ (1)

3.5.2 **Main purpose of a head clamp**  
To restrain/contain animals to stand still ✓ (1)

3.5.3 **TWO design features of a crush**

- Must be strong/durable ✓
- High/wide enough for specific type of animal ✓
- No sharp curves ✓
- Safe for animals/handlers ✓
- Clean ✓

(Any 2) (2)

### 3.6 Diseases in farm animals

#### The missing information

**A** Rabies ✓ (1)  
**B** Biting by infected animals/Saliva/Body fluids ✓ (1)  
**C** Bacteria ✓ (1)  
**D** Red water ✓ (1)  
**E** Blue tick bite ✓ (1)  
**F** Hair loss/scally/itchy ring like lesions/crusty grey/white scabs ✓ (1)

### 3.7 Life cycle of a parasite in farm animals

3.7.1 **The parasite**  
Tape worm ✓ (1)

3.7.2 **Indication of hosts**  
Two hosts ✓ (1)

3.7.3 **TWO economic implications of the parasite to farmers**

- Loss of production ✓
- Infected carcasses are degraded at the abattoir ✓
- Loss of income/profit ✓
- High cost of treatment ✓

(Any 2) (2)

3.7.4 **TWO roles of the state in controlling the spread of internal parasites**

- Meat testing/inspection/hygiene ✓
- Research/outreach to farmers ✓
- Legislation on the duties/roles/responsibilities of owners ✓
- Impose product bans ✓

(Any 2) (2)  
[35]

## QUESTION 4: ANIMAL REPRODUCTION

### 4.1 The male reproductive system

4.1.1 **Identification of parts**

**A** Vas deferens/ampulla ✓ (1)  
**B** Urethra ✓ (1)



- 4.1.2 **TWO functions of the secretion of vesicular gland**
- Provide nutrition/nourishing/energy to the sperm cells ✓
  - Transportation of sperm cells ✓
  - Protects the sperm cells against changes in pH/buffer ✓ (Any 2) (2)
- 4.1.3 **Congenital defect of part D**
- Under-development/hypoplasia ✓
  - Penis too short/too long ✓
  - Abnormal openings ✓
  - Short retractor penis muscle ✓ (Any 1) (1)
- 4.1.4 **Indication of the effect on the fertility of the bull**
- (a) Affects spermatogenesis/low sperm count/sperm denaturing/infertility ✓ (1)
- (b) No sperm will be produced/sterile ✓ (1)
- 4.2 **Hormonal control during the oestrus cycle**
- 4.2.1 **Identification of the hormones**
- A Oestrogen ✓
- C Progesterone ✓ (2)
- 4.2.2 **Explanation of the process in B**
- Release of the ovum/egg cell ✓ from a mature Graafian follicle ✓ (2)
- 4.2.3 **TWO visible signs displayed when oestrus is in its peak**
- Mounts other cows ✓
  - Restlessness ✓
  - Swelling of the vulva ✓
  - Excessive mucus secretion from the vulva ✓
  - Mucus membranes of the vagina appears red and moist ✓
  - Scratches, manure and mud on the rear end ✓
  - Allows mating ✓
  - Tail head is in a raised position ✓
  - Tail head and hair is fluffed up ✓ (Any 2) (2)
- 4.2.4 **Function of FSH**
- Stimulates the formation of follicles ✓
  - Facilitates/stimulates growth/development and function of the Graafian follicle ✓ (Any 1) (1)
- 4.3 **Reproductive processes in sheep**
- 4.3.1 **The correct chronological order**
- C ✓ (1)
- A ✓ (1)
- D ✓ (1)
- E ✓ (1)
- B ✓ (1)
- 4.3.2 **Definition of synchronisation**
- Changing the oestrus cycle in a group of ewes/female animals ✓ so that they come to oestrus approximately at the same time ✓ (2)

**4.4 The reproduction cycle of a dairy cow**

- 4.4.1 **A month in which artificial insemination should take place**  
May ✓ (1)
- 4.4.2 **TWO possible causes for the cow not conceiving**
- Improper handling of semen/poor quality semen ✓
  - Use of inexperienced technician ✓
  - Diseases/infections ✓
  - Malnutrition ✓
  - Congenital factors ✓
  - Incorrect timing ✓
- (Any 2) (2)
- 4.4.3 **THREE causes of abortion in dairy cows**
- Infections/diseases ✓
  - Malnutrition ✓
  - Injuries ✓
  - Maltreatment/stress ✓
  - Environmental factors ✓
  - Genetic/congenital factors ✓
  - Strong laxatives ✓
  - Toxic elements in feed ✓
  - Vaccination/immunisation ✓
  - Twinning ✓
- (Any 3) (3)
- 4.4.4 **The last process coming just before the start of milk production**  
Calving/parturition/giving birth ✓ (1)

**4.5 The graph indicating milk production, fat content and crude fibre content of a dairy cow for 10 months**

- 4.5.1 Month 6 ✓ (1)
- 4.5.2 45 litres ✓ (1)
- 4.5.3 **THREE reasons for the drop in milk production**
- Illness/sickness/diseases ✓
  - Malnutrition/improper feeding ✓
  - Extreme environmental conditions ✓
- (3)
- 4.5.4 **Relationship between crude fibre and fat content from month 6 to 10**  
As the crude fibre content increases ✓ the fat content will also increase ✓ (2)

**[35]**

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