



# basic education

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

**SENIOR CERTIFICATE/  
NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**NOVEMBER 2020**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 11 pages.**

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

1.1	1.1.1	C ✓✓		
	1.1.2	B ✓✓		
	1.1.3	A ✓✓		
	1.1.4	D ✓✓		
	1.1.5	A ✓✓		
	1.1.6	C ✓✓		
	1.1.7	B ✓✓		
	1.1.8	C ✓✓		
	1.1.9	C/D ✓✓		
	1.1.10	B ✓✓	(10 x 2)	(20)
1.2	1.2.1	Both A and B ✓✓		
	1.2.2	None ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	B only ✓✓		
	1.2.5	Both A and B ✓✓	(5 x 2)	(10)
1.3	1.3.1	Digestibility co-efficiency ✓✓		
	1.3.2	Dosing/drenching ✓✓		
	1.3.3	Artificial Insemination/AI ✓✓		
	1.3.4	Sterility ✓✓		
	1.3.5	Progesterone ✓✓	(5 x 2)	(10)
1.4	1.4.1	Sublingual ✓		
	1.4.2	Free range ✓		
	1.4.3	Hypoplasia ✓		
	1.4.4	Prostate ✓		
	1.4.5	Flushing/harvesting ✓	(5 x 1)	(5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canal**

- 2.1.1 **Naming of the animal in**  
**DIAGRAM 1** - Chicken/fowl/poultry ✓ (1)  
**DIAGRAM 2** - Cattle/sheep/goats ✓ (1)
- 2.1.2 **Identification of the letters**
- (a) B ✓ (1)  
(b) C ✓ (1)  
(c) A ✓ (1)
- 2.1.3 **TWO adaptations of the rumen to digest feed rich in fibre**
- Presence of micro-organisms/rumen micro-flora ✓
  - Presence of papillae/heat rods for the provision of heat ✓
  - Contractions mix the food and bring it onto contact with micro-organisms ✓
  - It has a large fermentation vessel ✓ (Any 2) (2)

**2.2 Components of feed**

- 2.2.1 **Identification of the components**  
**A** - Minerals/elements ✓ (1)  
**B** - Proteins ✓ (1)
- 2.2.2 **TWO ways of supplementing minerals to animals**
- Mineral lick ✓
  - Drinking water/mixing it with water ✓
  - Soil sods ✓
  - Dosing/drenching ✓
  - Injection ✓
  - Cafeteria- style mineral provision/free -choice ✓
  - Supplementing rations ✓ (Any 2) (2)
- 2.2.3 **Indication of the component**
- (a) Proteins/B ✓ (1)  
(b) Carbohydrates ✓ (1)

## 2.3 Digestibility co-efficiency

### 2.3.1 Calculation of the digestibility co-efficiency

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

$$\text{Moisture content in feed: } 15 \text{ kg} \times \frac{10}{100} = 1,5 \text{ kg}$$

$$\text{Dry material in feed: } 15 \text{ kg} - 1,5 \text{ kg} = 13,5 \text{ kg} \checkmark$$

OR

$$\frac{90}{100} \times 15 \text{ kg} = 13,5 \text{ kg} \checkmark$$

$$= \frac{13,5 \text{ kg} - 3,5 \text{ kg}}{13,5 \text{ kg}} \times \frac{100}{1} \checkmark$$

$$= 74,07 \checkmark \% \checkmark \quad (5)$$

### 2.3.2 Implication of the calculated value

- The feed was highly digested  $\checkmark$
- 74,07% of feed is digested  $\checkmark$
- 25,93% is excreted  $\checkmark$

(Any 1) (1)

### 2.3.3 TWO factors contributed to the digestibility of the feed used during the trial

- Composition of the feed/ration  $\checkmark$
- Preparation of the feed/ration  $\checkmark$
- Individuality/animal factor  $\checkmark$
- Type of the animal  $\checkmark$
- Age of the animal  $\checkmark$
- Feed additives/supplements NPN/molasses  $\checkmark$
- Palatability of the feed  $\checkmark$
- Water intake  $\checkmark$
- Age of the plant  $\checkmark$
- Level of feeding  $\checkmark$

(Any 2) (2)

## 2.4 Energy value of feeds

### 2.4.1 Energy important for production and maintenance

Net energy/NE  $\checkmark$  (1)

### 2.4.2 TWO reasons for knowledge of the energy value of the feed

- To determine the type of animal diet  $\checkmark$
- To determine feeding standards  $\checkmark$
- Meet animal requirements at different stages of production  $\checkmark$
- To determine ration formulation  $\checkmark$

(Any 2) (2)

**2.5 Nutritive ratio****2.5.1 Calculation of the nutritive ratio (NR)**

$$\text{Nutritive Ratio} = 1 : \frac{\%DNNE}{\%DP} \quad \checkmark$$

$$1 : \frac{62}{13} \quad \checkmark$$

$$1 : 4,77 \quad \checkmark$$

**OR**

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

$$1 : \frac{75\% - 13\%}{13\%} \quad \checkmark$$

$$1 : 4,77 \quad \checkmark$$

(3)

**2.5.2 Indication of the age group that will benefit most from the feed**Young/growing/producing animal  $\checkmark$ 

(1)

**2.5.3 TWO reasons for using the feed to feed young animals**

- Ration has a narrow nutritive ratio/less than 1:6  $\checkmark$
- Has more protein needed by growing animals  $\checkmark$
- Low crude fibre content  $\checkmark$

(Any 2)

(2)

**2.6 Planning and managing of the feed****2.6.1 Appropriate term**Feed/fodder flow programme  $\checkmark$ 

(1)

**2.6.2 TWO importance of planning fodder production**

- To ensure safe use of resources  $\checkmark$
- To meet the animal feed requirements throughout the year  $\checkmark$
- To marginalise feed costs  $\checkmark$
- To manage for production/animal feed  $\checkmark$

(Any 2)

(2)

**2.6.3 TWO aspects to be considered when planning fodder production**

- The number of livestock  $\checkmark$
- Nutrient content of the feed  $\checkmark$
- Possible feeds available  $\checkmark$
- Requirements of the herd  $\checkmark$
- Cost of buying the feed  $\checkmark$
- Timing of production season  $\checkmark$
- Carrying capacity of the veld  $\checkmark$

(Any 2)

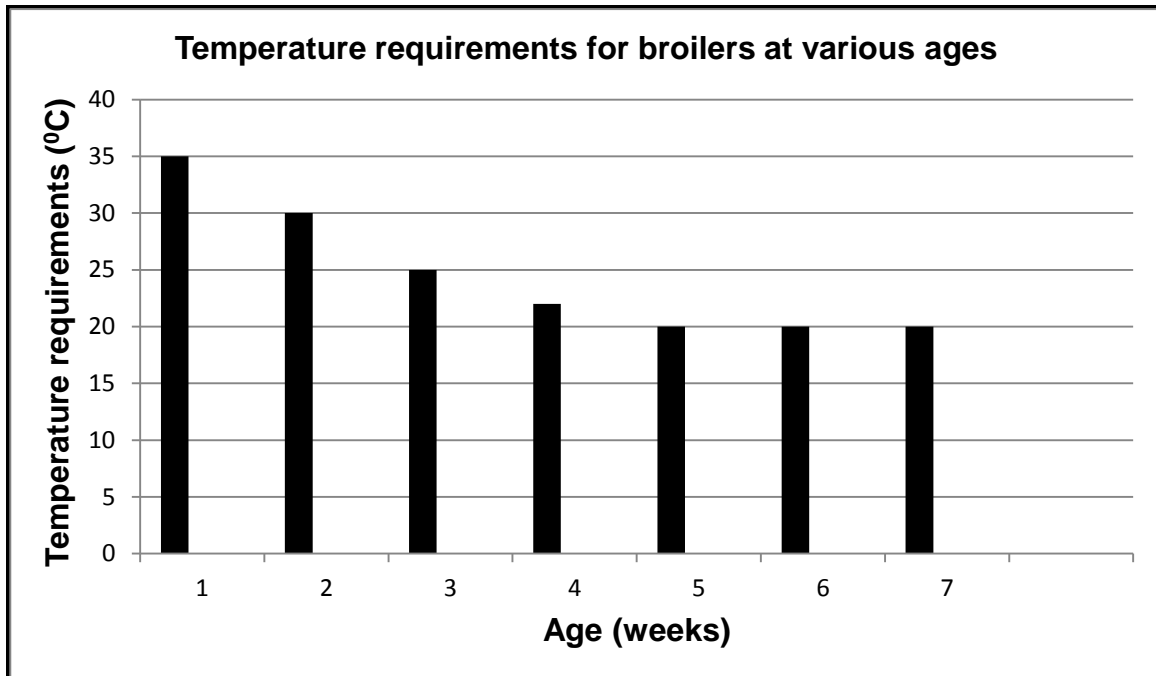
(2)

**[35]**

**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**

**3.1 Temperature requirements for broiler chickens**

**3.1.1 Bar graph**



**CRITERIA/RUBRIC/MARKING GUIDELINES**

- Correct heading ✓
  - X-axis: Correctly calibrated with label (Age in weeks) ✓
  - Y-axis: Correctly calibrated with label (Temperature) ✓
  - Correct units (weeks and °C) ✓
  - Bar graph ✓
  - Accuracy ✓
- (6)

**3.1.2 Trend of temperature requirement for broiler chickens**

- Temperature requirement of broiler chickens decreases ✓  
with increase in age ✓
  - The younger the chickens ✓  
the higher the temperature requirements ✓
  - The older the chickens ✓  
the lower the temperature requirements ✓
- (Any 1) (2)

**3.1.3 Equipment to maintain temperature in a broiler house**

- Heaters/air conditioners/fans/infra-red lamps/curtains/insulators ✓ (1)

**3.2 Indication of the animals showing the behaviour**

- 3.2.1 Cattle ✓ (1)
- 3.2.2 Sheep ✓ (1)
- 3.2.3 Pigs ✓ (1)
- 3.2.4 Chickens/poultry/birds ✓ (1)

### 3.3 Farming systems

#### 3.3.1 Identification of the farming system

- PICTURE A - Commercial ✓ (1)
- PICTURE B - Subsistence ✓ (1)

#### 3.3.2 Comparison of the farming systems

- **Commercial farming system** - High environmental pollution due to heavy use of chemicals/release gases like methane ✓ (1)
- **Subsistence farming system** - Low environmental pollution due to low animal density/less use of chemicals ✓ (1)

### 3.4 Parasites

#### 3.4.1 Classification of diseases according to pathogens

- Bacterial ✓ (1)
- Viral ✓ (1)

#### 3.4.2 Meaning of zoonotic diseases

Diseases that can be transmitted from animals to humans ✓ and humans to animals ✓ (2)

#### 3.4.3 Reason for swine flu to be enzootic

Affects specific animals in a particular region ✓ (1)

#### 3.4.4 TWO roles of the state in controlling notifiable diseases

- Implementation of legislation ✓
- Creation of buffer zones for testing and vaccination of clean stock before movement ✓
- Establish quarantine zones/isolation ✓
- Research ✓
- Prevent stock movement ✓
- Deployment of state veterinarians for testing and vaccination ✓
- Removal/culling of infected stock ✓
- Public awareness ✓
- Import/export bans ✓ (Any 2) (2)

### 3.5 Internal parasites

#### 3.5.1 Identification of the internal parasites

- **Parasite A** - Round worm/nematodes ✓ (1)
- **Parasite B** - Tape/flat worm/cestodes ✓ (1)

- 3.5.2 **TWO visible symptoms in sheep infested with roundworm**
- Diarrhoea ✓
  - Whitish mucus membranes in the inside of the eyelids ✓
  - Anaemia ✓
  - Weight loss ✓
  - Rough coat ✓
  - Loss of appetite ✓
  - Bottle jaw ✓
  - Rapid breathing ✓
  - Coughing ✓
  - Bloated stomach ✓
  - Wasting diseases ✓
  - Pneumonia ✓
- (Any 2) (2)
- 3.5.3 **TWO management practices to manage heavy infestation of a flock by internal parasites**
- Resting, rotational grazing of camps ✓
  - Avoid wet grazing areas ✓
  - Feed animal well ✓
  - Clean drinking water/sanitation ✓
  - Veld burning ✓
  - Fencing off infected areas ✓
  - Use feeders to avoid contamination of food/zero grazing ✓
  - Hygienic measures ✓
  - Breeding animals that are more resistant ✓
  - Good health programme (deworming/dosing) ✓
- (Any 2) (2)
- 3.6 **Plant poisoning**
- 3.6.1 **Identification of the poison**  
Maize fungus ✓ (1)
- 3.6.2 **TWO measures to prevent fungus contamination of stored feeds**
- Store feeds in a dry cool place/avoid wet areas ✓
  - Improved ventilation ✓
  - Continuously checking the place for leaks/dampness where feed is stored
  - Clean the sheds ✓
- (Any 2) (2)
- 3.6.3 **TWO actions to be taken once the presence of maize fungus is detected in feeds**
- Remove and dispose of the feed contaminated with fungus ✓
  - Clean off the space and give animals fresh feed ✓
  - Use fungicides to prevent fungal growth ✓
- (Any 2) (2)
- [35]**



**QUESTION 4: ANIMAL REPRODUCTION****4.1 Reproductive system of a bull****4.1.1 Identification of parts**

- A** Testes/scrotum ✓ (1)  
**B** Penis/urethra ✓ (1)  
**C** Vas deferens/seminal tube/ductus deferens/sperm duct ✓ (1)

**4.1.2 ONE function of testes**

- Secretion of hormone testosterone/male sex hormone ✓
- Production of sperm cells/male sex cells ✓ (Any 1) (1)

**OR****ONE function of the scrotum**

- Protects the testis ✓
- Regulates temperature of the testis ✓ (Any 1) (1)

**4.1.3 Role of seminal vesicles**

- Secrete fluid that transports the spermatozoa ✓
- Protect the semen against pH changes ✓
- Provide energy for sperm cells ✓ (Any 1) (1)

**4.2 Lack of libido in bulls****4.2.1 Term for the condition**

Lack of libido ✓ (1)

**4.2.2 THREE causes of lack of libido**

- Immaturity/lack of experience ✓
- Overwork/exhaustion/over exertion ✓
- Malnutrition ✓
- Poor health/diseases/low testosterone ✓
- Change in environment ✓
- Stress ✓
- Temperament ✓
- Age/senility ✓ (Any 3) (3)

**4.3 Process of artificial insemination (AI)****4.3.1 Identification of the hours after oestrus to get the highest pregnancy rate**

10 to 13 hours after onset of oestrus ✓ (1)

**4.3.2 A reason why the cow would allow insemination between the first hour and 12 hours after the start of oestrus**

The cow will be receptive to the bull/it will be on heat/in oestrus ✓ (1)

- 4.3.3 **TWO visible signs the cow will show when in oestrus**
- Allows mating/insemination ✓
  - Mucus strings from the vulva ✓
  - Swollen and red vulva ✓
  - Mounts others ✓
  - Hair on the back/rump are fluffed up ✓
  - Mud patches on her back ✓
  - Bellowing noises ✓
  - Cows are excited/restless ✓
  - Frequent urination ✓
  - Sniffs the genitals of other cows ✓
  - Raises their heads and curls her lips ✓
  - Decrease in milk production ✓
- (Any 2) (2)
- 4.3.4 **ONE reason to inseminate hours before ovulation**
- Ovum has a shorter lifespan than a sperm cell ✓
  - Ovum needs to arrive when sperm cells are already waiting for fertilisation ✓
- (Any 1) (1)
- 4.3.5 **ONE requirement for a successful insemination**
- Use of healthy/viable semen ✓
  - Technique performed by a skilled/experienced technician ✓
  - Insemination at the correct stage of oestrus ✓
  - Use the correct sterilised equipment ✓
- (Any 1) (1)
- 4.4 **Fertilisation**
- 4.4.1 **Labels**
- A** Egg cell/ovum/female gamete ✓ (1)
- B** Sperm cell/spermatozoon/male gamete ✓ (1)
- C** Zygote/fertilized egg cell ✓ (1)
- 4.4.2 **Name of the process represented by the illustration**  
Fertilisation ✓ (1)
- 4.5 **Pregnancy**
- 4.5.1 **Identification of the process**  
Pregnancy/gestation ✓ (1)
- 4.5.2 **THREE stages of the process**
- Ovum/stage of ovum ✓ (1)
  - Embryo/embryonic stage/stage of embryo ✓ (1)
  - Foetal/stage of foetus ✓ (1)
- 4.5.3 **Indication of the normal presentation of the calf**  
Anterior ✓ (1)

**4.6 Parturition**

4.6.1 **The condition experienced by heifers calving for the first time**  
Dystocia ✓ (1)

4.6.2 **TWO signs of an animal experiencing birth problems**

- Show signs of prolonged distress/excessive pain and discomfort ✓
- Foetus/after birth showing in birth canal without expulsion ✓
- Prolonged birth process ✓
- Exhaustion ✓

(Any 2) (2)

4.6.3 **ONE cause of problems during birth in heifers**

- Large foetus/small sized heifer ✓
- Small pelvic area ✓
- Inexperience ✓
- Incorrect presentation ✓
- Malformed foetus ✓
- Cervix not dilated ✓
- Twisted uterus ✓
- Weak labour ✓
- Diseases ✓
- Twinning/multiple birth ✓
- Hydrocephalus ✓
- Weak muscle contraction ✓
- Prolong gestation ✓
- Vaginal tear ✓

(Any 1) (1)

4.6.4 **Hormone that initiates milk release**  
Oxytocin ✓ (1)

4.6.5 **First milk produced in the first 3 days after calving**  
Colostrum/beestings ✓ (1)

**4.7 Embryo transfer**

4.7.1 **Process in the scenario**  
Embryo transfer/ER ✓ (1)

4.7.2 Main importance of embryo transfer  
Creation of multiple offspring ✓ with the desirable characteristics of superior parents ✓ (2)

4.7.3 **Explanation of a donor cow**  
Production of superior ova ✓ for implantation to inferior cows ✓ (2)  
**[35]**

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