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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 ✓
- 74,07% of feed is digested ✓
- 25,93% is excreted ✓

(Any 1) (1)

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

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

(Any 2) (2)

**2.4 Energy value of feeds****2.4.1 Energy important for production and maintenance**

Net energy/NE ✓ (1)

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

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

(Any 2) (2)

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

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

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

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

**OR**

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

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

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

(3)

**2.5.2 Indication of the age group that will benefit most from the feed**

Young/growing/producing animal ✓

(1)

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

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

(Any 2)

(2)

**2.6 Planning and managing of the feed****2.6.1 Appropriate term**

Feed/fodder flow programme ✓

(1)

**2.6.2 TWO importance of planning fodder production**

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

(Any 2)

(2)

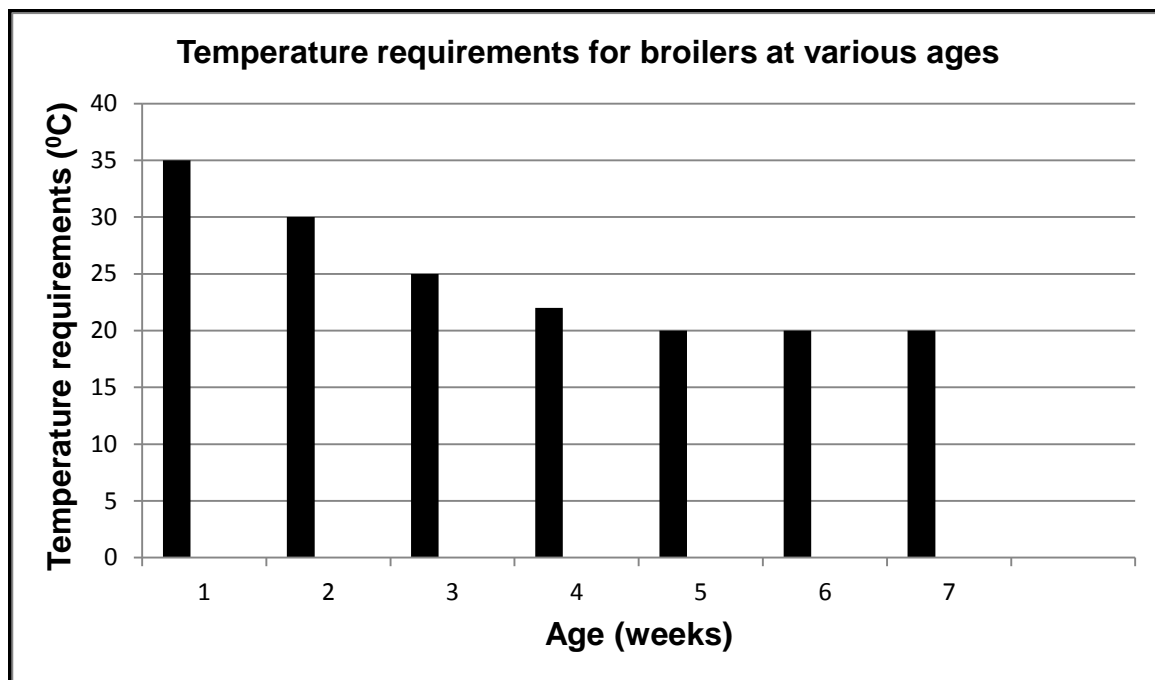
**2.6.3 TWO aspects to be considered when planning fodder production**

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

(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 ✓
- **Subsistence farming system** - Low environmental pollution due to low animal density/less use of chemicals ✓

(1)

(1)

**3.4 Parasites****3.4.1 Classification of diseases according to pathogens**

- Bacterial ✓
- Viral ✓

(1)

(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 ✓
- **Parasite B** - Tape/flat worm/cestodes ✓

(1)

(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**