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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2022

MARKING GUIDELINES

MARKS: 150

These marking guidelines consists of 11 pages

SECTION A**QUESTION 1**

1.1	1.1.1	C ✓✓	(10 x 2)	(20)
	1.1.2	B ✓✓		
	1.1.3	A ✓✓		
	1.1.4	D ✓✓		
	1.1.5	C ✓✓		
	1.1.6	B ✓✓		
	1.1.7	D ✓✓		
	1.1.8	A ✓✓		
	1.1.9	B ✓✓		
	1.1.10	C ✓✓		
1.2	1.2.1	B only ✓✓	(5 x 2)	(10)
	1.2.2	A only ✓✓		
	1.2.3	None ✓✓		
	1.2.4	None ✓✓		
	1.2.5	Both A and B ✓✓		
1.3	1.3.1	Passive absorption/diffusion ✓✓	(5 x 2)	(10)
	1.3.2	Quarantine/isolation ✓✓		
	1.3.3	Adrenalin ✓✓		
	1.3.4	Semen ✓✓		
	1.3.5	Vagina ✓✓		
1.4	1.4.1	Ideal/complete/egg ✓	(5 x 1)	(5)
	1.4.2	Knife/scalpel ✓		
	1.4.3	Ectoderm ✓		
	1.4.4	Mating/copulation ✓		
	1.4.5	Mitosis ✓		

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Stomach compartments in farm animal****2.1.1 Naming the farm animal**

Cattle/sheep/goat ✓

(1)

2.1.2 Identification of the letter**(a)** C ✓

(1)

(b) B ✓

(1)

2.1.3 Justification of animal surviving on food poor in vitamins

Stomach has rumen micro-organisms ✓ that can synthesise vitamins ✓

(2)

2.1.4 Letters indicating the sequence of feed flow

B ✓ → C ✓ → A ✓

(3)

2.2 Nutrient deficiencies**2.2.1 Identification of the mineral deficient in****C** - Zinc/Zn ✓

(1)

D - Iron/Fe ✓

(1)

2.2.2 Naming of the deficiency symptoms**B** - Osteomalacia/porous bones ✓

(1)

E - Goitre/enlarged thyroid gland ✓

(1)

2.2.3 Classification of vitamin A

Fat-soluble vitamin ✓

(1)

2.2.4 TWO methods of supplementing vitamin deficiency in A

- Injection ✓
- Dosing/water based vitamin A mixed with drinking water ✓
- Supplementing the ration ✓

(Any 2) (2)

2.3 Digestibility co-efficiency trial**2.3.1 Type of farm animal****Animal A** - Non-ruminant/monogastric farm animal ✓

(1)

2.3.2 Reason

Feed is less digested/low digestibility co-efficient/stomach of the animal is not adaptable to digest crude fibre/simple stomach/13%/2 kg of the feed was digested and 87%/13 kg was excreted ✓

(1)

2.3.3 TWO factors that have influenced digestibility of feed

- Type/composition of feed ✓
- Type of animal ✓
- Individuality ✓
- Preparation of the feed ✓
- Age of the animal ✓
- Age of the plant ✓
- Quantity of feed consumed ✓

(Any 2) (2)

2.3.4 TWO methods of improving digestibility of wheat straw

- Pelleting ✓
- Supplementing/mixing with additives/molasses/urea/ammonification ✓
- Grinding ✓

(Any 2) (2)

2.4 Composition of a feed**2.4.1 Calculation of the nutritive ratio**

$$\text{TDN} = 55\% + 15\% + 5\% = 75\% \checkmark$$

$$\text{NR} = 1: \frac{\% \text{TDN} - \% \text{DP}}{\% \text{DP}} \checkmark$$

$$\text{NR} = 1: \frac{75\% - 15\%}{15\%} \checkmark$$

$$\text{NR} = 1:4 \checkmark$$

OR

$$\text{DNNS} = 75\% - 15\% = 60\% \checkmark$$

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

$$\text{NR} = 1: \frac{60\%}{15\%} \checkmark$$

$$\text{NR} = 1:4 \checkmark$$

(4)

2.4.2 Suitability of feed

Suitable for growth/production/reproduction ✓

(1)

2.4.3 Reason

High in protein/has a narrow nutritive ratio/less than 1:6 ✓

(1)

2.5 Energy flow**2.5.1 Name of the energy in C**

Net energy/NE ✓

(1)

2.5.2 Function of energy represented by D

Production/growth/reproduction/work ✓

(1)

2.5.3 Calculation of digestible energy and energy lost through heat**(a) Calculation of digestible energy**

Gross energy – energy lost in faeces

$$= 1000 \text{ kJ} - 150 \text{ kJ} \checkmark$$

$$= 850 \text{ kJ} \checkmark$$

(2)

(b) Calculation of amount of energy lost through heat

Metabolic energy – net energy

$$= 800 \text{ kJ} - 550 \text{ kJ} \checkmark$$

$$= 250 \text{ kJ} \checkmark$$

(2)

2.5.4 TWO aims of calculating the energy value of the feed

- To determine the animal's diet ✓
- To determine the feeding standards ✓
- To determine the ration formulation ✓

(Any 2)

(2)

[35]**QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL****3.1 Temperature ranges and the expected growth rates****3.1.1 Identification of animals that need an environment with housing facilities - Pigs ✓**

(1)

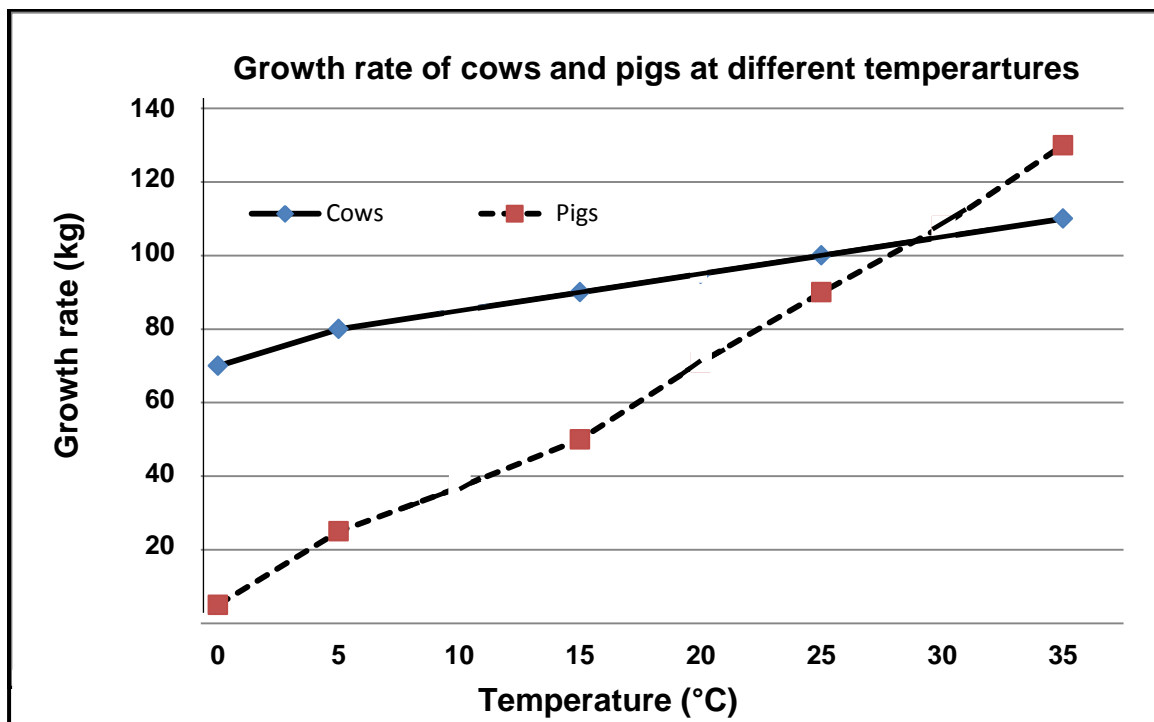
3.1.2 Reason

- Growth rate shows a substantial decrease ✓ with a slight decrease in temperature ✓
- Growth rate shows a substantial increase ✓ with a slight increase in temperature ✓

(Any 1)

(2)

3.1.3 Line graph

**CRITERIA/RUBRIC/MARKING GUIDELINES**

- Correct heading ✓
- X-axis: Correctly calibrated and labelled (Temperature) ✓
- Y-axis: Correctly calibrated and labelled (Growth rate) ✓
- Line graph ✓
- Correct units (kg and °C) ✓
- Accuracy (80%+ correctly plotted) ✓

(6)

3.2 **Equipment in a broiler production unit**3.2.1 **Indication of equipment**

(a) Insulation material on the roof ✓

(1)

(b) Electric heaters ✓

(1)

(c) Fans on the roof and walls/foldable curtains ✓

(1)

3.3 **Types of intensive chicken production systems**3.3.1 **Identification of the types of intensive chicken production systems****PICTURE A** - Free range ✓

(1)

PICTURE B - Backyard ✓

(1)

3.3.2 **TWO factors leading to increased production other than nutrition**

- Environment ✓
- Reproduction/breeding ✓
- General enterprise management ✓

(Any 2)

(2)

3.4 Type of animal handled

- 3.4.1 Chicken/poultry/fowl ✓ (1)
- 3.4.2 Sheep/goat ✓ (1)
- 3.4.3 Pigs ✓ (1)

3.5 Seasonal trends of parasite infestation

- 3.5.1 **Identification of the season**
Summer ✓ (1)

- 3.5.2 **ONE possible reason for the higher parasite infestation**
- Conducive environmental conditions for parasites to breed ✓
 - Poor herd management ✓ (Any 1) (1)

- 3.5.3 **TWO economic impacts of parasites**
- Stock losses ✓
 - Loss of production/reproduction ✓
 - Degrading of carcasses ✓
 - Increased production costs ✓
 - Loss of income/profit ✓ (Any 2) (2)

- 3.5.4 **TWO good herd management practices**
- Adequate feeding ✓
 - Well planned health programme/chemical/biological control ✓
 - Avoiding breeding places of parasites/wet areas ✓
 - Practice rotational grazing ✓
 - Avoid keeping animals in infested pens ✓
 - Good clean/hygienic practices ✓
 - Creating an environment for natural enemies ✓
 - Using/selecting/breeding more resistant animals ✓
 - Burning of veld and pasture fields ✓ (Any 2) (2)

3.6 The life cycle of two different parasites

- 3.6.1 **Classification of the parasite in DIAGRAM B**
Internal/endo parasite ✓ (1)

- 3.6.2 **Naming the parasites that are represented by**
- DIAGRAM A** - Tapeworm ✓ (1)
- DIAGRAM B** - Liver fluke/fluke worm ✓ (1)

- 3.6.3 **TWO biological measures of controlling liver fluke**
- Creating an environment for natural enemies ✓
 - Introduction of dung beetles/micro-fungi ✓
 - Breeding parasite resistant animals ✓ (Any 2) (2)

3.7 Different symptoms of diseases that affect farm animals**3.7.1 Indication of diseases****ANIMAL 1** - Anthrax ✓

(1)

ANIMAL 2 - Red water ✓

(1)

3.7.2 Identification of the animal

Animal 1 ✓

(1)

3.7.3 Indication of the animal with non-infectious disease

Animal 2 ✓

(1)

3.7.4 Name of the vector

Blue tick ✓

(1)

[35]**QUESTION 4: ANIMAL REPRODUCTION****4.1 The accessory sex glands**

4.1.1 Prostate ✓

(1)

4.1.2 Cowper's glands ✓

(1)

4.1.3 Seminal vesicle ✓

(1)

4.2 Part of the reproductive system**4.2.1 Identify the following**(a) **Part I** - Mid piece ✓

(1)

(b) **Part H** - Tail ✓

(1)

(c) **Process taking place in 1** - Ovulation ✓

(1)

(d) **Process taking place in 2** - Fertilization ✓

(1)

4.2.2 The hormone responsible for the process in 1 to take place

Luteinizing hormone/LH ✓

(1)

4.2.3 ONE function of structure D

- Produce female gametes/egg cells/ova/oogenesis/ovogenesis ✓

- To produce female sex hormones ✓

(Any 1)

(1)

4.2.4 ONE function of fluid in B

- Protects the embryo from injuries/shock absorber ✓

- Hydration/prevents dehydration/drying out of the foetus ✓

- Lubricates the birth canal during parturition ✓

- Thermo regulation ✓

- Prevents the embryo to attach to other tissues ✓

(Any 1)

(1)

4.2.5 **Description of how the acrosome enables sperm penetration**
Part F - Releases an enzyme ✓ that break the egg wall for the sperm cell to enter ✓ (2)

4.2.6 **The process that leads to formation of the sperm cell**
 Spermatogenesis ✓ (1)

4.3 **Artificial Insemination (AI)**

4.3.1 **The phase of oestrus during which AI could be performed**
 Oestrus/met-oestrus ✓ (1)

4.3.2 **TWO methods to detect heat in cows**

- Chin ball marker ✓
- Tail chalking ✓
- Heat mount/watching detectors
- Heat observation ✓
- Pedometer ✓
- Good record keeping ✓
- The use of teaser animals ✓ (Any 2) (2)

4.3.3 **TWO characteristics of good quality semen**

- Opaque/milky in colour ✓
- Sticky ✓
- Less than 15% dead sperm cells ✓
- No deformed sperm cells/deformities ✓
- No blood in semen ✓
- Healthy sperm cells ✓
- Viable sperm cells ✓
- High concentration of sperm cells ✓ (Any 2) (2)

4.3.4 **TWO disadvantages of AI**

- Spread of diseases if semen is not tested ✓
- Inexperience/unskilled operator may cause damage ✓
- Decreased genetic variation ✓
- Some heifers are difficult to inseminate successfully ✓
- May not give the desirable results ✓
- Higher management demands ✓
- Undesirable traits/congenital defects may be transferred to more offspring ✓
- Labour intensive ✓
- Time consuming ✓
- Expensive procedure ✓
- Difficult under extensive production systems ✓ (Any 2) (2)

- 4.4 The different reproductive processes that occur in a dairy cow**
- 4.4.1 Identification of curve A**
Lactation curve ✓ (1)
- 4.4.2 Indication of the reproductive process and pregnancy stage**
 (a) Months 3 to 12 - Pregnancy/gestation ✓ (1)
 (b) Stage of the process - Foetal stage ✓ (1)
- 4.4.3 Identification of the month**
Month 12 ✓ (1)
- 4.4.4 TWO causes of abortion**
 • Malnutrition ✓
 • Injuries ✓
 • Hormonal disturbances/stress conditions ✓
 • Toxins/poisonous substances/laxatives/allergies/
 clovers high in oestrogen/immunization of pregnant animals ✓
 • Diseases/infections/high fever ✓
 • Multiple births ✓
 • Genetic factors ✓
 • Transportation/moving of pregnant animals ✓
 • Embryo abnormalities ✓ (Any 2) (2)
- 4.4.5 Reason for drying off pregnant lactating cows before the next lactation**
 • For tissues in the mammary gland to recover ✓
 • To store body reserves/to prepare for the next lactation ✓
 • Supply the foetus with nutrients ✓ (Any 1) (1)
- 4.5 Different techniques used in animal reproduction**
- 4.5.1 Reproductive techniques**
 • 1 - Synchronization of oestrus ✓ (1)
 • 2 - Embryo transfer/ET ✓ (1)
 • 3 - Cloning/nuclear transfer ✓ (1)
- 4.5.2 TWO hormones used in technique 1**
 • Prostaglandin ✓
 • Gonadotropin-releasing hormone (GnRH) ✓
 • Progestin (synthetic progesterone) ✓
 • Oestradiol ✓
 • MGA/Melengestrol acetate ✓ (Any 2) (2)
- 4.5.3 Naming the two female animals in technique 2**
 • Donor/superior cow ✓
 • Recipient/inferior/surrogate cow ✓ (2)

4.5.4 The aim of cloning

- To preserve/revive endangered species ✓
 - Rapid increase of animals with superior genetic traits ✓
 - For medical reasons ✓
 - To preserve and extend superior genes ✓
 - To create a replica/genetically identical organisms ✓ (Any 1) (1)
- [35]**

TOTAL SECTION B: 105

GRAND TOTAL: 150