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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

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

TOTAL SECTION A: 45

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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)

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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**

TDN = 55%+15%+5% = 75% ✓

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

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

NR = 1:4 ✓

OR

DNNS = 75% – 15% = 60% ✓

$$NR = 1: \frac{\%DNNS}{\%DP}$$ ✓

$$NR = 1: \frac{60\%}{15\%}$$ ✓

NR = 1:4 ✓ (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)

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2.5.3 **Calculation of digestible energy and energy lost through heat**

(a) **Calculation of digestible energy**
Gross energy – energy lost in faeces
= 1000 kJ – 150 kJ ✓
= 850 kJ ✓ (2)

(b) **Calculation of amount of energy lost through heat**
Metabolic energy – net energy
= 800 kJ – 550 kJ ✓
= 250 kJ ✓ (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)

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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)

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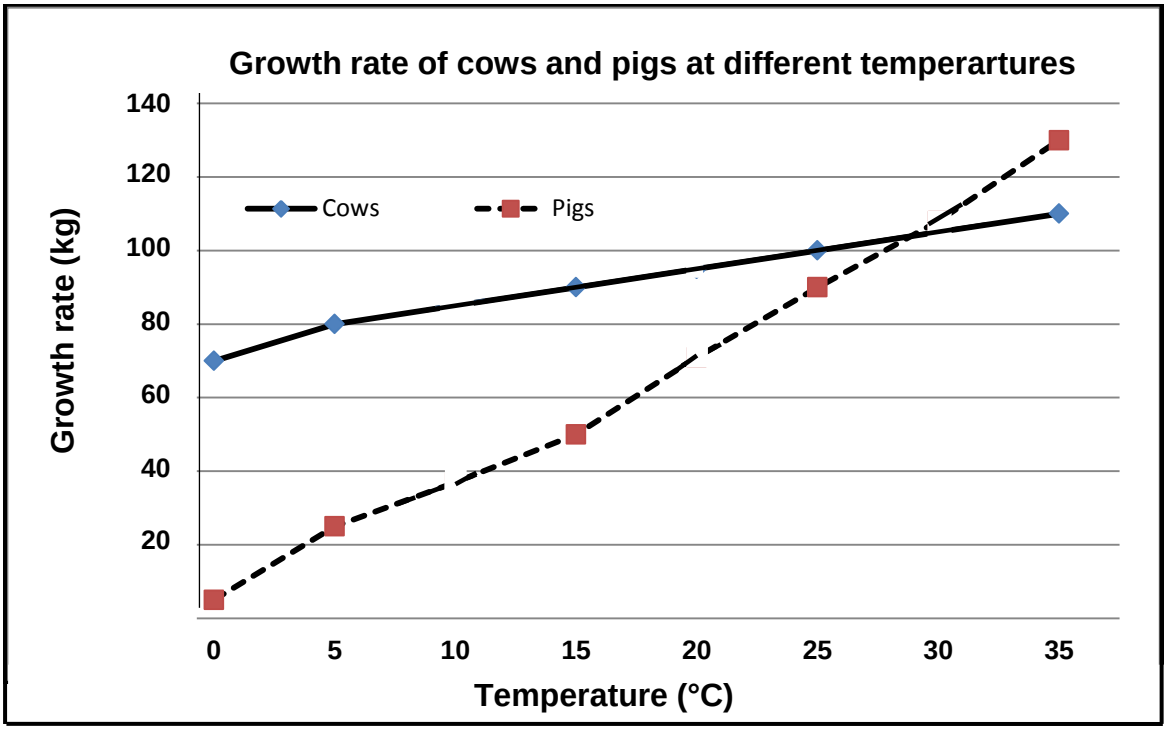
3.1.3 **Line graph**



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)

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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)

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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)
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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/ ovigenesis ✓
- 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)

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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)

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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)

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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)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

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