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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

2023

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.

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SECTION A

QUESTION 1

1.1	1.1.1	B ✓✓		
	1.1.2	A ✓✓		
	1.1.3	C ✓✓		
	1.1.4	C ✓✓		
	1.1.5	D ✓✓		
	1.1.6	D ✓✓		
	1.1.7	B ✓✓		
	1.1.8	D ✓✓		
	1.1.9	A ✓✓		
	1.1.10	B ✓✓	(10 x 2)	(20)
1.2	1.2.1	B only ✓✓		
	1.2.2	Both A and B ✓✓		
	1.2.3	A only ✓✓		
	1.2.4	B only ✓✓		
	1.2.5	None ✓✓	(5 x 2)	(10)
1.3	1.3.1	Regurgitation/retro-peristalsis ✓✓		
	1.3.2	Quarantine/isolation ✓✓		
	1.3.3	Urethra ✓✓		
	1.3.4	Nucleus ✓✓		
	1.3.5	Repeat-breeder syndrome ✓✓	(5 x 2)	(10)
1.4	1.4.1	Bolus ✓		
	1.4.2	Commercial ✓		
	1.4.3	Scrotum ✓		
	1.4.4	Mummification ✓		
	1.4.5	Ejaculation ✓	(5 x 1)	(5)
			TOTAL SECTION A:	**45**

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SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Digestive system of a farm animal

2.1.1 Name of the farm animal

Chicken/fowl/poultry ✓ (1)

2.1.2 TWO reasons visible in the diagram

- Presence of a crop ✓
- Presence of proventriculus/glandular stomach ✓
- Simple stomach/monogastric ✓
- Presence of ventriculus/gizzard/muscular stomach ✓
- Presence of caeca/two blind guts ✓ (Any 2) (2)

2.1.3 Indication of the pH

(a) **B -** Acidic ✓ (1)
(b) **E -** Alkaline/basic ✓ (1)

2.1.4 TWO importance of the substance/gastric juice in digestion

- It is antiseptic and destroys bacteria/prevent rotting of the stomach content ✓
- Changes the pH of the stomach from alkaline to acidic ✓
- Changes disaccharides into monosaccharide ✓
- Activates pepsinogen to form pepsin ✓
- Pepsin changes proteins to peptones ✓ (Any 2) (2)

2.1.5 Role played by part labelled C/gizzard

It grinds food into smaller particles for easy digestion/mechanical/ physical digestion ✓ (1)

2.2 Sow and its litter in a farrowing pen

2.2.1 Mineral element deficient

Iron/Fe ✓ (1)

2.2.2 TWO iron deficiency symptoms

- Anaemia ✓
- Paleness of mucous membranes ✓
- Listlessness/laziness/fatigue/lethargy ✓
- Laboured/difficult breathing ✓
- Accelerated heartbeat ✓
- Loss of appetite ✓
- Diarrhoea ✓
- Reduced growth ✓ (Any 2) (2)

2.2.3 A method of supplementing iron

- Soil sods ✓
- Injection ✓
- Iron paste/paint/solution ✓ (Any 1) (1)

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2.2.4 **Feed component for optimum growth of piglets**
Protein ✓ (1)

2.3 **Feed trial**

2.3.1 **The purpose of the feed trial**
To determine the digestibility of the hay/amount of oat hay digested and absorbed ✓ (1)

2.3.2 **Classification of the feed**
Roughage ✓ (1)

2.3.3 **Calculation of the digestibility co-efficiency**

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

$$= \frac{8\text{ kg} - 4{,}5\text{ kg}}{8\text{ kg}} \times \frac{100}{1} \checkmark$$

= 43,75 ✓ % ✓ (4)

2.3.4 **Naming the substances**
(a) Molasses ✓ (1)
(b) Urea/biuret ✓ (1)

2.4 **Nutritive ratio**

2.4.1 **Calculation**
(a) **% of non-nitrogen substances**
= 80% – 8% ✓
= 72% ✓ (2)

(b) **Nutritive ratio**

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

$$1 : \frac{80\% - 8\%}{8\%} \checkmark$$

1 : 9 ✓

OR

$$NR = 1 : \frac{\%\text{ digestible non-nitrogen substances}}{\%\text{ digestible protein}} \checkmark$$

$$1 : \frac{72\%}{8\%} \checkmark$$

1 : 9 ✓ (3)

2.4.2 **TWO components making up non-nitrogen content in a feed**
- Digestible fat/lipids ✓
- Digestible carbohydrates ✓
- Vitamins ✓
- Minerals ✓ (Any 2) (2)

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2.5 **Feed flow programme**

2.5.1 **Calculation of the total amount of feed required**
Feed required = number of animals x feed/animal/day x number of days
= 150 animals x 5 kg x 30 days ✓
= $\frac{22\ 500}{1\ 000}$ ✓
= 22,5 tons ✓ (3)

2.5.2 **Quantity of cattle feed during month 3**
Feed will be enough ✓ (1)

2.5.3 **Reason**
Feed required is 22 500 kg and feed available is 30 000 kg/there is a surplus of 7 500 kg ✓ (1)

2.5.4 **The month with the least shortage of feed**
Month 6 ✓ (1)

2.5.5 **ONE cost effective strategy to address the shortage of feed**
- Storage feed during months where there is an excess ✓
- Stock reduction/culling ✓
- Controlled calving/change the breeding season ✓
- Planting of seasonal fodder crops ✓ (Any 1) (1)

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QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 **Production output and cost distribution for two feedlots**

3.1.1 **The feedlot which operates at the highest cost**
Feedlot 2 ✓ (1)

3.1.2 **The feedlot which operates in the most cost-efficient way**
Feedlot 1 ✓ (1)

3.1.3 **Explanation of the answer in QUESTION 3.1.2**
- The total cost was the lowest/R780 compared to R810 ✓ the output was the highest/R1 720 compared to R1 680 ✓
- A greater output ✓ for a lower cost ✓ (Any 1) (2)

3.2 **How the structures help the farm animals to survive adverse environmental conditions**

(a) **Shelter -** Has sides for protection against cold winds/reduce the wind chill/the enclosed area keeps heat within/insulation ✓ (1)

(b) **Insulation material -** Heat can be retained/protection against cold/ heat for a longer period of time/cooling effect ✓ (1)

(c) **Roofing -** For protection against rain/cold/direct sunlight ✓ (1)

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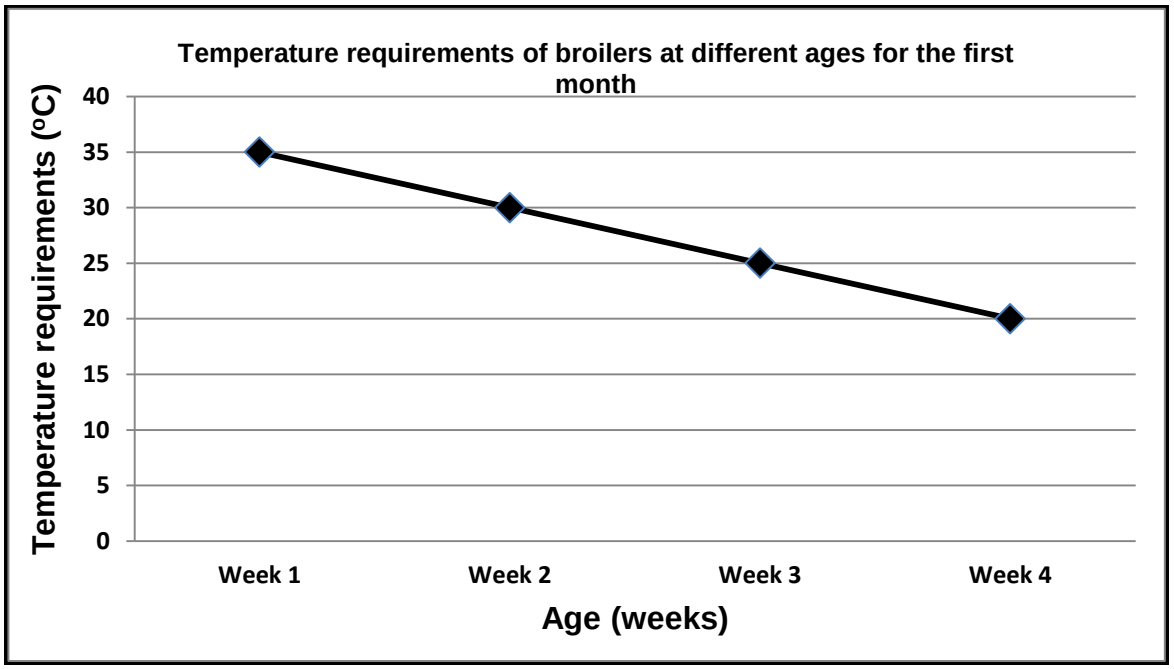
3.3 **Temperature requirements of broilers at different ages**

3.3.1 **The temperature requirements at three weeks**
25°C ✓ (1)

3.3.2 **The trend of temperature requirements over a period of 7 weeks**
Temperature requirements decline with increased age ✓ until it stabilizes from week 5 to 7 ✓ (2)

3.3.3 **Line graph showing the temperature requirements of broilers at different ages for the first month**



CRITERIA/RUBRIC/MARKING GUIDELINES
- Correct heading ✓
- X-axis: correct calibrations and labelling (Age) ✓
- Y-axis: correct calibrations and labelling (Temperature requirements) ✓
- Correct units (°C and weeks) ✓
- Line graph ✓
- Accuracy (80% + correctly plotted) ✓ (6)

3.4 **Handling facility**

3.4.1 **Identification of the handling facility**
Holding pen/paddock ✓ (1)

3.4.2 **TWO reasons for restraining farm animals in a crush**
- To ensure safety while working with large animals/no harm to the handlers ✓
- To be able to work with animals while they are stable ✓
- To perform specialised practices on animals/AI/dehorning/ castration/tattooing/branding/medication/physical examinations ✓
- Time and labour efficient ✓ (Any 2) (2)

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3.4.3 **TWO basic guidelines when handling cattle**

- Keep safety as the main principle in mind ✓
- Cattle should be kept as calm as possible ✓
- Use the correct handling equipment/facilities ✓
- No carrying of sticks/beating/throwing stones ✓
- No shouting/whistling/wild gestures ✓
- Move around slowly/no running around ✓
- Keep animals of the same size/age/sex together ✓
- Separate sick/old/pregnant animals from healthy animals ✓
- Limit the number of people in a facility ✓
- Do not approach animals from behind ✓
- Announce your presence through touch to the animal's front or side ✓
- Let cattle in and out in the same manner/use routine ✓ (Any 2) (2)

3.5 **Animal diseases**

3.5.1 **Completing the table on animal diseases**

A - Virus ✓ (1)
B - Mastitis ✓ (1)
C - Poultry/cattle/pigs/sheep ✓ (1)
D - Fleece contains hard lumps/crusts/scabs on the ears/lips/face/ shanks/scrotum/sores on the skin/loss of wool ✓ (1)

3.5.2 **TWO preventative measures for controlling Newcastle disease**

- Timely diagnosis and vaccination against diseases ✓
- Outbreaks must be detected quickly ✓
- Good husbandry must be practiced/housing/nutrition/ management ✓
- Movement of animals should be controlled ✓
- Proper hygiene/sanitation/clean ✓
- Use breeds resistant to diseases ✓
- Quarantine/isolation ✓
- Proper disposal of carcasses ✓ (Any 2) (2)

3.5.3 **TWO financial implications of animal diseases**

- Decrease in production/poor quality ✓
- Stock losses/death ✓
- Decrease in income/profit ✓
- Banning of exports/international trade decreases ✓
- Have negative impact on food security ✓
- High cost to control/treatment ✓ (Any 2) (2)

3.6 **Letters representing stages in the life cycle of the parasite**

(a) B ✓ (1)
(b) D ✓ (1)
(c) E ✓ (1)
(d) C ✓ (1)

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3.7 **TWO symptoms of urea poisoning in farm animals**

- Nervous symptoms/lack of balance/incoordination ✓
- Excessive salivation ✓
- Frequent defecation and urination ✓
- Struggling violently/bellowing ✓
- Bloating ✓
- Tetany/muscular pain ✓
- Breathing difficulty ✓
- Rapid death ✓ (Any 2) (2)

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QUESTION 4: ANIMAL REPRODUCTION

4.1 **The reproductive systems of farm animals**

4.1.1 **The letter representing the part in the diagrams**

(a) D ✓ (1)
(b) G ✓ (1)
(c) B ✓ (1)

4.1.2 **A membrane responsible for implantation**

Endometrium ✓ (1)

4.1.3 **The part performing the same function as the testis**

C ✓ (1)

4.1.4 **TWO congenital defects of the testes**

- Cryptorchidism ✓
- Hypoplasia ✓ (2)

4.2 **Pie chart**

4.2.1 **Duration of the oestrus cycle in cows**

21 days ✓ (1)

4.2.2 **Oestrus stages**

(a) **B -** Di-oestrus ✓ (1)
(b) **D -** Oestrus ✓ (1)

4.2.3 **The letter representing the stage of oestrus cycle**

C ✓ (1)

4.2.4 **TWO practical methods to identify a dairy cow in heat**

- Heat mount detector ✓
- Tail chalking/tail head marker ✓
- Pedometer ✓
- Chin-ball marker ✓
- Heat observation ✓
- Androgenised females ✓ (Any 2) (2)

4.2.5 **What happens to the corpus luteum if the cow becomes pregnant**

Corpus luteum persists and continue to secrete progesterone ✓ (1)

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4.3 Mating behaviour

4.3.1 TWO factors regulating mating behaviour

- Hormonal influences ✓
- Social interaction ✓
- Senses/sight/smell ✓
- Environmental factors ✓
- Physiological factors ✓
- Previous experience ✓
- Health ✓
- Genetic factors ✓
- Libido ✓ (Any 2) (2)

4.3.2 Substance in cow's urine that stimulates libido in bulls

Pheromones ✓ (1)

4.4 Reproductive techniques

4.4.1 Identification of a reproductive technique

(a) Cloning ✓ (1)
(b) Synchronization of oestrus/embryo transfer ✓ (1)

4.4.2 Definition of embryo transfer

The transfer of embryo from a genetically superior female animal (donor) ✓ to the uterus of genetically inferior female animal (recipient) ✓ (2)

4.4.3 TWO advantages of Artificial insemination

- Reduces the exchange of sexually transmitted diseases ✓
- Superior male animal can fertilize more female animals ✓
- Semen from males in other countries can be used ✓
- Quick and economical way to improve the herd ✓
- Valuable tool in assisting with progeny testing ✓
- Semen can be used long after bull's death ✓
- Possible where mating is impossible ✓
- No need to buy, keep and maintain expensive bulls ✓
- Inferior bulls can be detected at an early stage and avoided ✓
- AI increases the reproductive and conception rate ✓ (Any 2) (2)

4.4.4 Reproductive stage following immediately after successful insemination

Fertilisation ✓ (1)

4.5 Parturition

4.5.1 Scientific term for difficult birth

Dystocia ✓ (1)

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4.5.2 **TWO causes of dystocia**

- Deviation of the head ✓
- Flexion of elbow ✓
- Retention of one or both forelegs ✓
- Hydrocephalus ✓
- Congenital defects/abnormalities/malformed foetus ✓
- Twinning/multiplets ✓
- Posterior/incorrect presentation ✓
- Age of the animal ✓
- Large foetus ✓
- Dead foetus ✓
- Torsion of the uterus
- Uterine inertia/weak contractions/labour ✓
- Prolonged gestation period ✓
- Size of the pelvic area ✓
- Poor body condition ✓
- Incomplete cervical dilation ✓
- Vaginal tear/injuries ✓
- Diseases ✓ (Any 2) (2)

4.5.3 **Hormone responsible for the relaxation of the cow's muscles**

Relaxin ✓ (1)

4.5.4 **THREE noticeable behavioural changes in a cow which is about to give birth**

- Isolation/nesting behaviour ✓
- Stops eating/lack of appetite ✓
- Making bellowing noises ✓
- Restlessness/signs of discomfort because of pain ✓
- Urinates and defecates often ✓ (Any 3) (3)

4.6 **Milk production in cows**

4.6.1 **The hormones responsible for**

(a) **Milk production -** Prolactin ✓ (1)

(b) **Milk release -** Oxytocin ✓ (1)

4.6.2 **TWO stimuli enhancing the release of milk**

- Touching/washing/massaging of the udder ✓
- Sound of the milking machine ✓
- Presence/sight of the calf/suckling of the calf ✓
- Presence of the milker ✓ (Any 2) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

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