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SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

2023

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.

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

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)

- 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**

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

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

$$= 43,75 \checkmark \% \checkmark$$
 (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**

$$= 80\% - 8\% \checkmark$$

$$= 72\% \checkmark$$
 (2)
- (b) **Nutritive ratio**

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

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

$$1 : 9 \checkmark$$

OR

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

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

$$1 : 9 \checkmark$$
 (3)
- 2.4.2 **TWO components making up non-nitrogen content in a feed**
 - Digestible fat/lipids ✓
 - Digestible carbohydrates ✓
 - Vitamins ✓
 - Minerals ✓
 (Any 2) (2)

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

$$= 150 \text{ animals} \times 5 \text{ kg} \times 30 \text{ days} \checkmark$$

$$= \frac{22\,500}{1\,000} \checkmark$$

$$= 22,5 \text{ tons} \checkmark$$

(3)

2.5.2 Quantity of cattle feed during month 3

Feed will be enough \checkmark

(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 \checkmark

(1)

2.5.4 The month with the least shortage of feed

Month 6 \checkmark

(1)

2.5.5 ONE cost effective strategy to address the shortage of feed

- Storage feed during months where there is an excess \checkmark
- Stock reduction/culling \checkmark
- Controlled calving/change the breeding season \checkmark
- Planting of seasonal fodder crops \checkmark

(Any 1)

(1)

[35]**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 \checkmark

(1)

3.1.2 The feedlot which operates in the most cost-efficient way

Feedlot 1 \checkmark

(1)

3.1.3 Explanation of the answer in QUESTION 3.1.2

- The total cost was the lowest/R780 compared to R810 \checkmark
the output was the highest/R1 720 compared to R1 680 \checkmark
- A greater output \checkmark for a lower cost \checkmark

(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 \checkmark

(1)

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

(1)

(c) **Roofing** - For protection against rain/cold/direct sunlight \checkmark

(1)

3.3 Temperature requirements of broilers at different ages**3.3.1 The temperature requirements at three weeks**

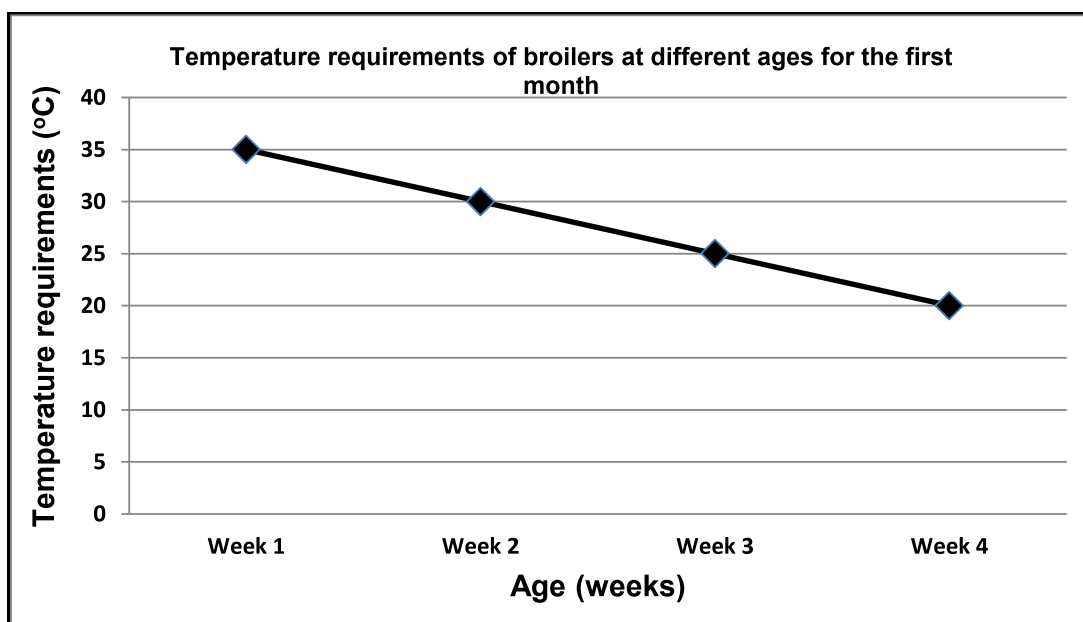
25°C ✓

(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)

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)

- 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)
[35]

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)

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)

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 ✓
- (b) **Milk release** - Oxytocin ✓

(1)

(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)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150