



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

JUNE 2017

**AGRICULTURAL SCIENCES
MEMORANDUM**

MARKS: 150

This memorandum consists of 11 pages.

SECTION A**QUESTION 1**

- | | | | |
|-----|--------|--|---------------|
| 1.1 | 1.1.1 | C ✓✓ | |
| | 1.1.2 | D ✓✓ | |
| | 1.1.3 | A ✓✓ | |
| | 1.1.4 | B ✓✓ | |
| | 1.1.5 | D ✓✓ | |
| | 1.1.6 | C ✓✓ | |
| | 1.1.7 | B ✓✓ | |
| | 1.1.8 | A ✓✓ | |
| | 1.1.9 | D ✓✓ | |
| | 1.1.10 | A ✓✓ | (10 x 2) (20) |
| 1.2 | 1.2.1 | B only ✓✓ | |
| | 1.2.2 | A only ✓✓ | |
| | 1.2.3 | None ✓✓ | |
| | 1.2.4 | Both A and B ✓✓ | |
| | 1.2.5 | A only ✓✓ | (5 x 2) (10) |
| 1.3 | 1.3.1 | Pancreas ✓✓ | |
| | 1.3.2 | Peristalsis / Peristalsis movement ✓✓ | |
| | 1.3.3 | Gestation ✓✓ | |
| | 1.3.4 | Quarantine ✓✓ | |
| | 1.3.5 | Impotence/Lack of libido/lack of sex urge ✓✓ | (5 x 2) (10) |
| 1.4 | 1.4.1 | Ventriculus / Gizzard ✓ | |
| | 1.4.2 | Extensive ✓ | |
| | 1.4.3 | Scrotum ✓ | |
| | 1.4.4 | Corpus Luteum / Yellow body ✓ | |
| | 1.4.5 | Antibodies ✓ | (5 x 1) (5) |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Digestive systems of ruminants and non-ruminants:****2.1.1 Identification of parts:**

E = Crop ✓

G = Gizzard / Ventriculus ✓

(2)

2.1.2 Glandular stomach secretes digestive juices for chemical digestion. ✓

(1)

2.1.3 Structures of DIAGRAM A:

(a) D ✓

(b) C ✓

(c) B ✓

(d) A ✓

(4)

2.2 The vitamin or mineral lacking:

2.2.1 Vitamin A / Retinol ✓

(1)

2.2.2 Vitamin E ✓

(1)

2.2.3 Iron/Fe/B6 ✓

(1)

2.3 Energy flow diagram:

2.3.1 Net energy ✓

(1)

2.3.2 1 000 kj – 850 kj ✓ = 150 kj ✓

(2)

2.3.3 Production / Growth / Lactation / Weight gain ✓

(1)

2.4 Examples on roughages and concentrates:**Examples of protein-rich roughage:**

Lucerne hay / Clover hay / Groundnut hay ✓

(Any 1 x 1)

(1)

Examples of carbohydrate-rich concentrate:

Maize meal / Oats meal / Barley meal / Rye meal / Sorghum meal ✓

(Any 1 x 1)

(1)

2.5 Digestibility of feeds:**2.5.1 TWO factors that can affect the digestibility of feeds:**

- Composition of feed ✓
- Composition of ration ✓
- Preparation of feed ✓
- Type of animal ✓
- Quantity of feed ingested ✓
- Age of the plant material ✓
- Individuality / Digestive system ✓
- Crop from which hay was produced ✓
- Stage plant was cut / Water amount ✓
- Method of making hay ✓
- Preparation of hay ✓
- Supplementation with NPN ✓
- Supplementation with molasses and protein ✓
- Palatability of ration ✓
- Temperature and humidity ✓
- Time, season and climate ✓

(Any 3 x 1) (3)

2.5.2 Methods to improve digestibility of feeds:

- Grinding / Crushing / Milling ✓
- Pelleting ✓
- Boiling ✓
- Roasting / Cooking ✓
- Soaking ✓
- Popping and micronising ✓
- Dry-rolling and cracking ✓
- Supplementing with protein, NPN or molasses ✓

(Any 2 x 1) (2)

2.5 Fodder flow programme:**2.6.1 Total dry matter (DM) available for A:**

14 tons/ha x 25,5 ha ✓
= 357 tons ✓

(2)

2.6.2 Total costs of buying 20 tons feed shortage:

R4,28 x 20 x 1 000 ✓
= R85 600,00 ✓

OR

R4,28 x 20 000 ✓
= R85 600,00 ✓

(Any 2 x 1) (2)



2.6.3 Month when surplus and shortage are at zero:

June ✓

(1)

2.7 The Pearson square:

2.7.1 (Maize): **9%(20)** ✓ (parts) $(38 - 18 = 20)$

<div style="text-align: center;">  18% ✓  </div>

(Sunflower): **38%(9)** ✓ (parts) $(18 - 9 = 9)$

The ratio of oat meal to sunflower is **20 : 9** ✓ (4)

2.7.2 The amount of maize in kg:

Maize to sunflower is $20 + 9 = 29$ ✓

Amount of maize is $\frac{20}{29} \times 650 \text{ kg}$ ✓ = 448,3 kg ✓

OR

Maize to sunflower is $20 + 9 = 29$ ✓

Amount of maize is $\frac{20}{29} \times 100 = 68,9655\% \times 650 \text{ kg}$ ✓ = 448,3 kg ✓ (3)

2.8 The Nutritive Ratio (NR) of feeds:

FEED B ✓

It has a narrow nutritive ratio / It has more protein and less carbohydrates. ✓ (2)
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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Temperature ranges****3.1.1 TWO reasons to support why cows grow better at low temperature:**

- The presence of papilla in the rumen act as heating rods ✓ to keep the temperature constant. ✓
- Cows have less radiation relative to their size. ✓ (Any 2 x 1) (2)

3.1.2 TWO methods to protect pigs against extreme cold weather:

- Shed for sheltering ✓
- Bedding in a pen ✓
- Provide insulation material ✓
- Insert heaters in a pen ✓ (Any 2 x 1) (2)

3.2 Housing structure for broiler production:**3.2.1 TWO examples of equipment in a poultry house:**

- Feed troughs ✓
- Water drinkers/troughs ✓
- Lighting ✓
- Nesting boxes / layer cages ✓
- Roosts ✓
- Bedding ✓
- Foot baths ✓
- Fans / Air conditioner ✓
- Heaters / Air conditioner ✓
- Incubators ✓
- Egg trays ✓
- Egg scale ✓
- Thermometer ✓ (Any 2 x 1) (2)

3.2.2 TWO other ways in which temperature can be regulated

- Heat lamps / heaters in cold weather ✓
- Fans ✓
- Ventilation systems ✓
- Air conditioning ✓ (Any 2 x 1) (2)

3.2.3 TWO purposes of the part labelled A:

- To allow ventilation / air flow ✓
- To allow diffused sunlight ✓ (Any 1 x 1) (1)

3.3 Production system in farming:

3.3.1 Intensive production system (1)

3.3.2 Motivation:

- High stocking density ✓
- High input costs (very expensive sophisticated equipment) / specialised equipment ✓
- Pigs are kept in a small closed area ✓
- Pigs are being fed with no access to natural pastures ✓ (Any 1 x 1) (1)

3.4 Equipment used on a farm:

- 3.4.1 Castration ✓ (1)
- 3.4.2 **A** – Elastrator ✓
B – Emasculator ✓
C – Burdizzo ✓ (3)
- 3.4.3 **Suitability of A and C:**
(a) Younger animals: **A** ✓
(b) Adult animals: **C** ✓ (2)

3.5 Farm animals and the ways in which they lose heat:

- 3.5.1 **A:** Conduction ✓
B: Heat radiation / Radiation ✓ (2)
- 3.5.2 Evaporation / Convection / Excretion / Oxidation / Respiration ✓
(Any 1 x 1) (1)

3.6 Methods used to administer medicines to animals:

- 3.6.1 Balling gun ✓ (1)
- 3.6.2 Drenching gun / Syringe ✓ (1)
- 3.6.3 Balling gun ✓ (1)

3.7 Differentiation between *pulse rate* and *respiratory rate*:**Pulse rate:**

- Number of heartbeats of an animal in one minute ✓ (1)

Respiratory rate:

- Number of breaths of an animal in one minute ✓ (1)

3.8 The table showing diseases:

- A:** Newcastle disease ✓
B: Sores on the skin, secrete pus, scab, hard lumps on the skin and wool ✓
C: Anaplasmosis / Gall sickness ✓
D: Anthrax ✓ (4)

3.9 The life cycle of an internal parasite:

- 3.9.1 Liver flukes / Trematodes / Flukes / Fasciola hepatica ✓ (1)
- 3.9.2 **The intermediate host:**
Snail / Slug ✓ (1)

3.9.3 **TWO financial implications and detrimental effects of internal parasites:**

- Tissue damage ✓
- Poor production / stock losses / loss of income ✓
- High treatment costs ✓

(Any 2 x 1) (2)

3.9.4 **TWO pasture management measures of controlling internal parasites:**

- Rotational grazing ✓
- Resting of infected pastures ✓
- Allowing animals that are resistant to specific internal parasites ✓
- Avoid wet places ✓
- Use of zero grazing ✓
- Removal of manure / hygienic measures ✓

(Any 2 x 1) (2)

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QUESTION 4: ANIMAL REPRODUCTION**4.1 The parts labelled A, C and E:**

- 4.1.1 **A – Ovary ✓**
 C – Vagina ✓
 E – Uterus ✓ (3)

4.1.2 Function of B (cervix):

- Provide favourable environment for sperm survival and serve as a reservoir for semen. ✓
- Transports or facilitates sperm transfer into the uterus. ✓
- It secretes thick mucus which acts as a barrier during pregnancy (preventing foreign material or bacteria from entering the uterus) ✓
- Prevents microbial contamination of the uterus. (Any 1 x 1) (1)

4.1.3 The functions of glands labelled 1, 2 and 3 from DIAGRAM B:

- **Gland 1: (Cowper's gland):**
Secretes a substance that lubricates and cleans urethra / improves mobility of sperms / Contribute to the volume of the ejaculate ✓
- **Gland 2: (Prostate):**
Milky alkaline secretion give semen its distinctive smell ✓
- **Gland 3: (Seminal vesicles):**
Makes about 50% of bull's ejaculate / Nutrition for sperms / Responsible for correct pH / Responsible for correct osmotic pressure of seminal fluid ✓ (3)

4.1.4 Identification of parts F and G in DIAGRAM B:

- F – Sigmoid Flexure ✓
- G – Testicle / Testis ✓ (2)

4.2 Oestrus cycle in a cow:

- 4.2.1 Spermatogenesis ✓ (1)

4.2.2 Deduction on the type of cell division:

- Meiosis ✓
- **Reason** – genetic material is reduced into half (diploid(2n) changed into haploid (n)/reduction division) ✓ (2)

4.2.3 The stages of spermatogenesis:

- **C** – Formation of the spermatids ✓
- **D** – Formation of sperm cells/spermatozoa ✓ (2)

4.3 Oestrus cycle in a cow:

- 4.3.1 21 days ✓ (1)

4.3.2 Devices to detect oestrus in the cow:

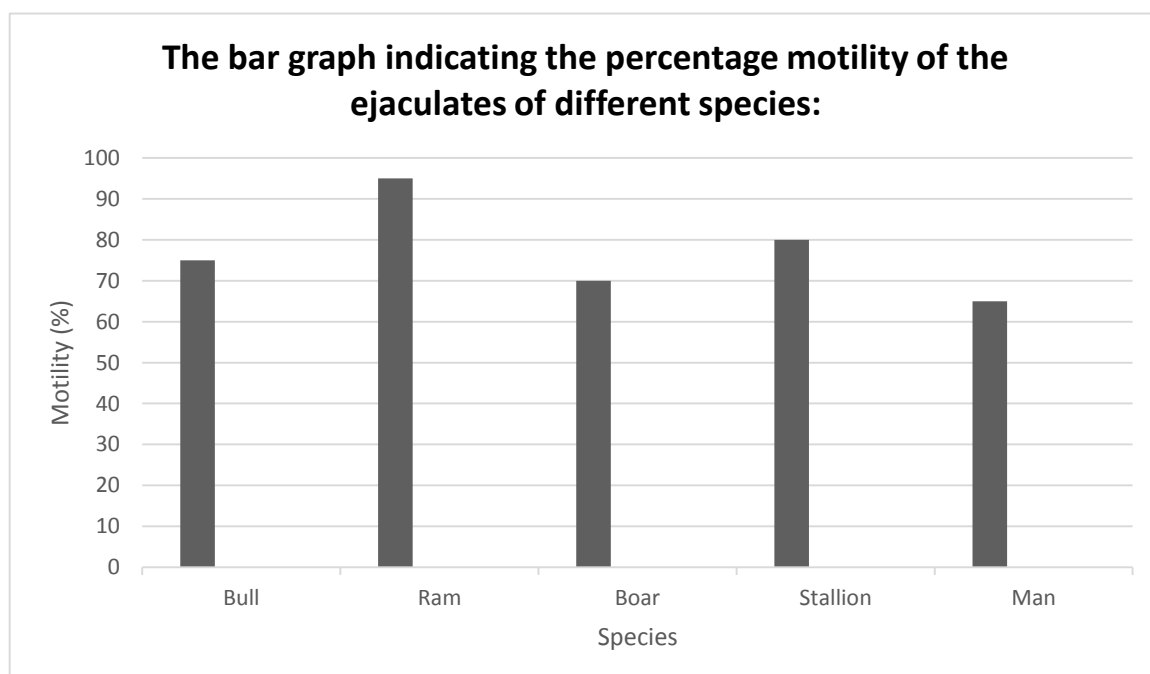
- Pedometer ✓
- Chin-ball marker ✓
- Tail-chalking ✓
- Kamarheatmount detector ✓

(Any 2 x 1) (2)

4.3.3 Sequential order of FOUR reproductive hormones that are produced by a cow:

- Progesterone ✓
- Luteotrophic hormone/LTH/prolactin ✓
- Relaxin ✓
- Oxytocin ✓

(Any 4 x 1) (4)

4.4 Bar graph:**Criteria/rubric/marking guidelines**

- Correct heading ✓
- X-axis – correctly calibrated with label (Species) ✓
- Y-axis – correctly calibrated with label (Motility) ✓
- Correct units (%) ✓
- Bar graph ✓
- Accuracy ✓

(Any 5 x 1) (5)

4.5 The breeding technique:

- 4.5.1 Embryo transplantation / Embryo transfer / Embryo flushing / Embryo harvesting ✓

(1)

4.5.2 Donor cow ✓ (1)

4.5.3 **Disadvantages of ET:**

- Expensive ✓
- Require technical knowledge / Needs veterinarian ✓
- Genetic viability decreases with the use of only one superior cow ✓
- Recipient cow may not become pregnant / Abort eggs ✓
- Diseases can be spread ✓
- Ethics and animal welfare ✓
- Synchronisation of recipient and donor can be difficult ✓ (Any 1 x 1) (1)

4.6 **Difficult birth:**

4.6.1 Dystocia ✓ (1)

4.6.2 **Reason for difficult births in heifers:**

- Heifers are physically smaller ✓ and less developed (younger)/age ✓
- Incorrect presentation / position/ posture ✓
- Too large foetus / hydrocephalus ✓
- Deformities of the foetus ✓
- Torsion / twisting of the foetus ✓
- Prolapsed uterus ✓
- Multiple births / twins ✓
- Size of the pelvic area ✓
- Weak / ineffective labour ✓
- Cervix failing to dilate ✓
- Prolonged gestation / pregnancy period ✓
- Malnutrition ✓
- Diseases ✓ (Any 2 x 1) (2)

4.6.3 **Parturition process has three distinct stages:**

- Preparatory stage ✓
- Ejection stage ✓
- Expulsion of the placenta ✓ (3 x 1) (3)

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TOTAL SECTION B: 105

GRAND TOTAL: 150