



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2009

MEMORANDUM

MARKS: 150

This memorandum consists of 11 pages.

SECTION A**QUESTION 1.1**

| | | | | |
|--------|-----|-----|-----|-----|
| 1.1.1 | X// | B | C | D |
| 1.1.2 | A | B | C | X// |
| 1.1.3 | X// | B | C | D |
| 1.1.4 | A | B | C | X// |
| 1.1.5 | X// | B | C | D |
| 1.1.6 | X// | B | C | D |
| 1.1.7 | A | B | C | X// |
| 1.1.8 | A | X// | C | D |
| 1.1.9 | A | B | X// | D |
| 1.1.10 | A | B | X// | D |

(10 x 2) (20)

QUESTION 1.2

| | ONLY A | ONLY B | A and B | NONE |
|-------|-----------|-----------|------------|------|
| 1.2.1 | | | | X// |
| 1.2.2 | X// | | | |
| 1.2.3 | | | X// | |
| 1.2.4 | X// | | | |
| 1.2.5 | | X// | | |

(5 x 2) (10)

QUESTION 1.3

- 1.3.1 Abomasum / True stomach / Milk stomach //
- 1.3.2 Villus / Villi //
- 1.3.3 Feedlot/Intensive farming/Intensive production //
- 1.3.4 Cryptorchidism //
- 1.3.5 Docking // (5 x 2) (10)

QUESTION 1.4

- 1.4.1 Protein ✓
- 1.4.2 Nutritional / Nutrient / Feed / Ration / Feeding ✓
- 1.4.3 Shelter / Housing / Adaptation ✓
- 1.4.4 Precision / Intensive/ Scientific ✓
- 1.4.5 Pregnancy / Gestation ✓

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2****2.1 Digestive system of ruminants**

- 2.1.1 Diagram 1 ✓ **and** (1)
The compartments of the stomach A (rumen), B (reticulum) and C (omasum) are underdeveloped ✓
D is well developed ✓ (Any 1) (1)

- 2.1.2
- | Diagram 1 | Diagram 2 |
|-----------|-----------|
| A | E✓ |
| B | F✓ |
| C | G✓ |
| D | H✓ |
- or paired these items (4)

- 2.1.3 I – oesophagus / gullet / cardiac sphincter ✓
J – small intestine/duodenum / pyloric sphincter / duodenal opening✓ (2)

- 2.1.4 Diagram 2 / E / rumen / reticulo-rumen ✓ **and** (1)
Rumen / reticulo-rumen is well developed and large (great volume) ✓
to cater for the bulky and fibrous roughages ✓
formed like a fermentation organ or vessel ✓
and is ideal for microbe/bacteria/protozoa activity / cellulase secretion by microbes ✓
has a warm and moist environment / correct pH / optimum pH ✓
fingerlike projections in the wall of the rumen ✓ (Any 3) (3)
[12]

2.2 Energy loss in animal body

- 2.2.1 A – Digestible energy ✓
C – Energy lost in heat / body heat / heat increment ✓ (2)

2.2.2 **THREE reasons to indicate the importance of nett energy value of a feed**

It is a small percentage / precise amount of the gross energy intake available for use by the animal ✓ for:

- Maintenance / Health ✓
- Growth ✓
- Production / e.g.: milk production / egg production / wool production / meat production etc. ✓
- Reproduction ✓ (Any 3) (3)

2.2.3 Lipids have a high gross energy level and would increase the nett energy value ✓

because they do not contribute greatly to the formation of faeces and fermentation gases ✓

so less energy is lost ✓ (Any 2) (2)

2.2.4 Monogastric animals / pig / chicken / poultry ✓

They lose less energy ✓

in faeces and fermentation gases ✓ (3)
[10]

2.3 **Lucerne as a feed to livestock**

2.3.1 Protein rich ✓
Roughage ✓ (2)

2.3.2 Hay – Dry content: $7 \text{ kg} - 0,56 = 6,44 \text{ kg}$ ✓

or

$$92/100 \times 7 = 6,44 \text{ kg} \checkmark$$

Manure – Dry content: $2 \text{ kg} - 0,08 = 1,92 \text{ kg}$ ✓

or

$$96/100 \times 2 = 1,92 \text{ kg} \checkmark$$

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

$$= \frac{(7 \text{ kg} - 0,56 \text{ kg}) - (2 \text{ kg} - 0,08 \text{ kg})}{6,44} \times \frac{100}{1} \checkmark$$

$$= \frac{6,44 - 1,92}{6,44} \times \frac{100}{1} \checkmark \quad \text{OR} \quad = \frac{4,52}{6,44} \times \frac{100}{1} \checkmark$$

(Any 3) (3)

$$= 70,2\% / 70\% \checkmark (1)$$

- 2.3.3 Younger sheep need proteins mainly for growth ✓
while older sheep need proteins for production and reproduction ✓
or
Young animals need more than the older animal ✓
For growth requirements ✓ (2)
- 2.3.4 **Suitability of lucerne hay**
- Easy for sheep (ruminant) to digest ✓
 - It is palatable / tasty ✓
 - Rich in proteins ✓
 - Rich in calcium ✓
 - Rich in vitamins A and D ✓
 - Contains cobalt and potassium that stimulate microbial activities ✓ (Any 2) (2)
- 2.3.5 **THREE ways to improve digestibility of lucerne hay**
- Milling / Grinding / Crushing / Pounding ✓
 - Pelleting / Crumbing ✓
 - Chopping / cutting into pieces ✓
 - Adding supplements ✓ (Any 3) (3)
- [13]
[35]

QUESTION 3**3.1 Animal production**

- 3.1.1 Nkomani feedlot ✓ (1)
- 3.1.2 Sondela feedlot: ✓
The total cost was the lowest (78 compared to 81) and ✓
The production output was the highest (72 compared to 68) ✓ (3)
- 3.1.3 **The most efficient way to improve**
- Genetic improvement and breeding ✓ (1)
- 3.1.4 Climate conditions / Rainfall / Drought / Temperature / Light / Humidity / Wind / Nutrition / Slope / Topography / Feeding / Shelter ✓ (Any 1) (1)
- 3.1.5 A specialised breeding program / Inbreeding / Cross-breeding / AI / Embryo transplantation / Genetic engineering / Upgrading will increase the genetic potential of the herd / Buying of superior animals from selected breeders ✓ (1)

3.2. Dairy farming

3.2.1 Suitable / favourable / conducive / correct / appropriate / ideal temperature for maximum production ✓ (1)

3.2.2 - Low temperature will increase food intake to maintain a constant body temperature (heat) ✓
- High temperature leads to a lower intake of food as the animal needs less energy to maintain its body temperature / animal is uncomfortable and eats less ✓ (2)

3.2.3 **TWO possible measures to control high temperature**

- Shelter / housing / cattle shed / shade netting ✓
- Ventilation / air conditioning / cooling during warm periods ✓
- Fogging / spraying ✓ (Any 2) (2)

[5]

3.3 THREE requirements for transporting animals

- Big and strong vehicles/adapted vehicles for transportation/strong sides ✓
- Enough space for animals / no overloading ✓
- Enough air flow ✓
- Correct documentation / permit for the transport of livestock ✓
- Animals should be marked as prescribed by regulations ✓
- Animals of same sex and age transported together / no sick animals ✓
- Sufficient protection ✓
- Cooling and shading of animals ✓
- Provision of drinking water / a calm area prior to departure ✓ (Any 3) (3)

3.4 Inspection by organic farmers' association

3.4.1 **The reasons for inspection of a farmer by organic association**

- To make sure that the farmer meets the requirements for being a registered member of the association ✓
- to check membership compliance ✓
- to supply more information and detail on organic farming / check on progress and possibilities ✓
- Intention to change to organic farming ✓ (Any 1) (1)

3.4.2 Five criteria for organic farming

- Irrigation water should be free from inorganic minerals like sodium, potassium, boron etc ✓
- Fertilisation is done with organic fertilisers e.g. compost / farm manure / kraal manure ✓
- Weed control is done biologically without any herbicides ✓
- Pest and disease are controlled biologically / by introducing natural enemies ✓
- The produce (milk) is supplied to consumers that deal with organic products ✓
- No growth stimulants added into rations e.g. hormones / antibiotics ✓
- Use of alternative environmentally friendly energy sources like wind and solar energy / methane production for generating electricity / use of bio-fuels ✓
- Minimise the carbon footprint ✓
- No supplements of mineral licks, only animal products like bone meal or carcass meal ✓

(Any 5) (5)

3.4.3 Necessity for registration with the association

- To ensure that the products have a relevant market ✓
- To ensure that the produce (milk) supplied to consumers meets the criteria ✓
- Dairy farmer will be supplied with relevant and new information as well as technology ✓
- The association will ensure/strengthen the negotiating power of the organic dairy producer ✓

(Any 2) (2)

3.4.4 TWO advantages of organic farming

- There is no more pollution of the environment with poisonous chemicals / the use of ecologically friendly methods and substances to improve soil and control pests ✓
- The produce is sold at a higher price / higher price for the produce will make his/her dairy farming more profitable ✓
- Milk is free of contaminants (additives such as chemicals, antibiotics and hormones) ✓
- Farmer and workers enjoy healthier working conditions ✓
- Optimal resource utilization / sustainable agricultural production ✓
- combat the effect on global warming ✓

(Any 2) (2)
[10]

3.5 Natural grazing

- 3.5.1 July ✓ (1)
- No rainfall in winter / dry condition / drought ✓
 - Too low temperatures for growth / not growing season ✓ (2)
- 3.5.2 TWO observations of pasture conditions
- Colour of grazing / green highly nutritious/age of plants ✓
 - Volume of grazing / size of plants / carrying capacity of the pasture ✓
 - Type of dominant plants/permanent plants/annual plants ✓
 - Cover density/damage to grazing plants ✓
 - From March to July the nutritive value decreases ✓
 - From August to February the nutritive value increases ✓(Any 2) (2)
- 3.5.3 Autumn / Summer ✓ (1)
- New offspring will then be ready for marketing (Autumn) ✓
- When the nutritive value of pasture start to decrease (Autumn) ✓
- Because the nutritive value is high during summer (Summer)
- Lots of food available in summer and animals will be look ready for marketing (Summer) ✓ (1)
- 3.5.4 May – Sept. (during winter months) / during the months that the nutritive value is low ✓ (1)
- 3.5.5 When the nutritional value of the pasture is low ✓✓ (2)

[10]
[35]

QUESTION 4**4.1 Animal disease carriers**

- 4.1.1
- The ticks have different stages and move from one animal to another ✓ and spread diseases from one animal to another ✓
 - or**
 - Ticks suck blood ✓ (parasites) these pathogens (toxins and bacteria) are transmitted through the saliva ✓ (2)

4.1.2 **Control measures to restrict infectious diseases**

- Vaccination / immunization / injecting ✓
- Work closely with veterinarians ✓
- Apply strict health measures on the farm (clean housing and clean fresh water) / sanitation / sterilization of equipment / personal hygiene ✓
- Isolate sick animals / separation of sick animals from healthy animals ✓
- Destroy carcasses, skins and other material from infected animals ✓
- Strict control of pests or parasites / dosing / dipping / controlled burning of infested pastures ✓
- Provide proper nutrition / balanced feeding / balanced ration / rotational grazing ✓
- Reporting of some infectious diseases ✓
- Quarantine of sick animals / nursing / restricted movement of animals ✓

(Any 3)

(3)
[5]4.2 **Fertilisation and embryo development**4.2.1 Luteinising hormone (LH) / Oestrogen ✓
Ovulation ✓

(2)

4.2.2 fallopian tube / oviduct / egg tube / ampulla / between A and B /
B / uterus horn (will be allowed) ✓

(1)

4.2.3 **TWO functions of membranes around the embryo**

- For nutrition/gases/antibodies ✓
- For protection against shock ✓
- For excretion/waste products ✓
- Lubricates the birth canal ✓
- Create the ideal environment for the foetus ✓
- Prevent the desiccation or drying up of foetus ✓

(Any 2)

(2)

4.2.4 Causes of termination of pregnancy

- Infections ✓
 - Allergies ✓
 - Poison/Toxin / use of strong laxatives ✓
 - Malnutrition/Incorrect feeding ✓
 - Diseases / Brucellosis / Trichomoniasis / high fever ✓
 - Vaccines ✓
 - Injuries ✓
 - Hormonal disturbances / estrous synchronization ✓
 - Congenital defects ✓
 - Stress conditions ✓
 - Mummification ✓
- (Any 2) (2)

4.2.5 Visible signs of approaching parturition

- Isolation / nesting behaviour ✓
 - Stops eating / lack of appetite ✓
 - Making bellowing noises / restlessness / signs of discomfort because of pain ✓
 - Urinates and defaecates often ✓
 - Ligaments of tail area, pelvis, vagina and cervix relax ✓
 - Vulva enlarges/swollen ✓
 - Strings of mucus appear from the vulva ✓
 - Udder becomes swollen and leak milk ✓
- (Any 2) (2)
[9]

4.3 Life cycle of animal pests

- 4.3.1
- The pest will affect the human alimentary canal/human health (nutrition) ✓
 - The animal health (market value) will be affected ✓
 - The quality of meat will be negatively affected ✓
 - Mechanical damage on the digestive system as it destroys some tissues and organs/cause wounds ✓
 - Damage to the digestive capacity in both animals since the pests destroy tissue (cells) secreting gastric juices ✓
 - Depletive damage as it absorbs nutrients required by the host ✓
 - Due to lower resistance the animal is more susceptible to other diseases ✓
- (Any 3) (3)

- 4.3.2 The animal will get the pest through grazing/infested pasture ✓ (1)
 - 4.3.3 Man (humans) ✓ and cattle ✓ (2)
 - 4.3.4 Meat is inspected before consumption / Meat is checked by health officials at abattoirs ✓ (1)
 - 4.3.5 Dosing / Drenching / Premixes (worm remedy mixed into feed) / Pastes (remedies smeared onto the tongue)/Injections (remedies that are injected) / Lick blocks (that contain remedies) ✓
The tapeworm is an internal parasite ✓ (2)
 - 4.3.6 Tapeworm / Beef measles tapeworm / *Taenia saginata* ✓ (1)
- [10]

4.4

| Battery system | Free-range system |
|--|---|
| Chickens are protected from contact with other chickens and humans ✓ | Chickens are allowed to utilise the space freely ✓ |
| Chickens are protected in an enclosed environment ✓ | Chickens are exposed to the sunlight and other environmental conditions ✓ |
| Disease prevention is emphasised at all levels of the operation ✓ | Chickens are more exposed to diseases ✓ |
| Sterilisation of cages and shelter is carefully done and monitored ✓ | Manure and other material is left on the soil surface ✓ |
| All layers receive vaccines and remedies simultaneously ✓ | Chickens are treated for diseases as necessary ✓ |
| Receive additions in their food ✓ | Receive only food and roam the area where they are kept ✓ |
| Separate food is provided for batches ✓ | They supplement their food with vegetation and things they pick from the soil ✓ |

(Any 3 from each column)

(6)

4.5 Mineral deficiency diseases

- 4.5.1 Vitamin B₂ ✓ (1)
 - 4.5.2 Vitamin D ✓ (1)
 - 4.5.3 Vitamin A ✓ (1)
 - 4.5.4 Vitamin K ✓ (1)
 - 4.5.5 Vitamin D ✓ (1)
- [5]
[35]

TOTAL SECTION B: 105

GRAND TOTAL: 150