



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2011

POSSIBLE ANSWERS

MARKS: 150

This memorandum consists of 11 pages.

SECTION A

QUESTION 1.1

1.1.1	A	B	X✓✓	D
1.1.2	A	X✓✓	C	D
1.1.3	X✓✓	B	C	D
1.1.4	A	B	C	X✓✓
1.1.5	A	B	C	X✓✓
1.1.6	A	X✓✓	C	D
1.1.7	X✓✓	B	C	D
1.1.8	A	B	C	X✓✓
1.1.9	A	B	X✓✓	D
1.1.10	X✓✓	B	C	D

(10 x 2) (20)

QUESTION 1.2

1.2.1	A✓✓
1.2.2	C✓✓
1.2.3	B✓✓
1.2.4	B✓✓
1.2.5	D✓✓

(5 x 2) (10)

QUESTION 1.3

1.3.1 Proventriculus ✓✓

1.3.2 Digestible energy ✓✓

1.3.3 Pistolette/pipette/insemination
rod/syringe ✓✓1.3.4 Spermatogenesis/Sperm
formation ✓✓1.3.5 Injection/Vaccination/
immunization ✓✓

QUESTION 1.4

1.4.1 Reticulo-rumen ✓

1.4.2 Optimal/Maximal/best ✓

1.4.3 Ovulation/ fertility ✓

1.4.4 Red ✓

1.4.5 Pathogenic /Disease causing /
harmful ✓

(5 x 1) (5)

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Compound stomach****2.1.1 Farm animals with compound stomach**

- Goat ✓
- Cattle ✓ (Any 1) (1)

2.1.2 Rumen/ large stomach ✓ (1)

- 2.1.3
- young suckling animals feed only on milk /milk moves straight to the abomasum /presence of esophageal groove/only abomasum functional ✓
 - and no need for rumination/ fermentation at this stage ✓
 - young suckling animals do not ingest crude fibre ✓ (Any 2) (2)

2.1.4 Supplementing with non-protein nitrogen substances

- these types of animals have a rumen that contains micro flora and fauna ✓
- that can utilise and change non- protein nitrogenous (NPN) substances into microbial protein ✓
- which is further digested and absorbed by the digestive system ✓ (Any 2) (2)

2.2 Nutritive ratio of oatmeal

2.2.1 Concentrate ✓ (1)

2.2.2 Oatmeal as a concentrate

It contains 71% of total digestible nutrients (TDN) ✓ (1)

2.2.3 Calculation of a nutritive ratio

$$\text{NR} = 1: \frac{\% \text{TDN} - \% \text{DP}}{\% \text{DP}} \text{ or } 1: \frac{\text{carbohydrates} + \text{fats}}{\text{protein}} \text{ or } 1: \frac{\text{non-nitrogenous substances}}{\text{digestible protein}}$$

$$= 1: \frac{71\% - 9\%}{9\%} \checkmark$$

$$= 1: \frac{62\%}{9\%} \checkmark$$

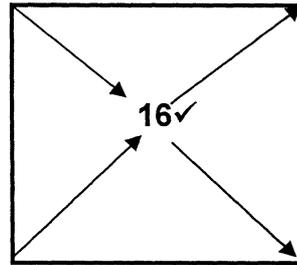
$$= 1:6,8 \text{ or } 1:7 \checkmark \quad (4)$$

2.2.4 **Production purpose of oatmeal in animal nutrition**

- For energy purposes/fattening/maintenance/production when supplemented ✓
- It has a wide nutritive ratio/ratio greater than 1:6 ✓
- More carbohydrates and fats compared to proteins/low percentage of proteins/carbohydrate-rich concentrate ✓

(Any 2) (2)

2.2.5 Oatmeal (DP) 9%



16 parts ✓

Peanut Oilcake meal 32%

7 parts ✓

Ratio: 16 Parts of oatmeal ✓ and 7 parts of Peanut oilcake meal ✓
or

16 ✓ : 7 ✓ (5)

2.3 **Feedlot industries**

2.3.1 Zero grazing/no grazing ✓ (1)

2.3.2 **Protein requirements for mature animals**
Require less proteins for maintenance and growth ✓

Protein requirements of young animals
Growing animals need more protein ✓ (2)

2.3.3 **Improving digestibility**

- Boiling/soaking ✓
- Roasting ✓
- Pelleting / rolling ✓
- Grinding and milling ✓
- Cutting of plants for making hay (time & physiological stage) ✓
- Supplementing with molasses ✓
- Supplementing with non- protein nitrogen ✓
- Supplementing with protein ✓

(Any 1) (1)

2.3.4 Important functions of carbohydrates

- Serve to supply energy for metabolic processes✓
- During combustion of carbohydrates heat is produced – body heat✓
- Glycogen is stored in the liver as reserve source of energy✓
- Some carbohydrates combine with protein (glycoprotein) structural components of cells/Component of RNA/DNA controlling the functioning of the cell ✓
- Used for fattening/ finishing✓
- Normal functioning of the digestive system /provides bulkiness of the ration ✓

(Any 2) (2)

2.3.5 Quality of proteins

- Ruminants contain microorganisms that are able to synthesize microbe/microbial protein✓
- From Non Protein Nitrogen (NPN) sources✓
- The microbial protein can then be further digested✓
- Non-ruminants do not have any micro-organisms that can synthesize microbial proteins✓ and
- is dependent on the protein sources in the feed ✓

(Any 2) (2)

2.4 Growth stimulants

- 2.4.1 Sedative/tranquiliser/stress packs/depressant medication✓ (1)
- 2.4.2 Thyroid regulator/ iodine ✓ (1)
- 2.4.3 Ear/under the skin/sub-cutaneous✓ (1)

2.5 The table on BV of high and low quality proteins

2.5.1 Definition of biological value

BV = is the index/measure✓ of the quality✓ of the protein of the feed based on the amino-acid content✓ OR (Any 2)

The efficiency ✓with which a protein supplies nitrogen/amino-acid requirement of an animal✓ (2)

- 2.5.2 Egg protein/albumin ✓ (1)

2.5.3 Judgement of the suitability of fishmeal as a protein source

- Animal proteins like fish meal have higher biological values than plant proteins✓
- High biological value (90%) indicates a good quality protein source✓.
- Suitable✓ / Suited for production ration✓ (Any 2) (2)

[35]

QUESTION 3: ANIMAL PRODUCTION**3.1 Effect of environmental conditions on production****3.1.1 Relationship between the production and temperature**

- An increase in temperature leads to increase in production output ✓
- Until at a maximum point and thereafter production decreases as the temperature is still rising ✓

(2)

3.1.2 TWO reasons for lower optimum temperature in dairy cows

- Micro-organisms produce extra heat in the rumen ✓
- Stratified epithelium – heating rods in the stomach area (fermentation vessel) ✓
- Dairy cow has a lower optimum temperature (10-15°C) ✓
- Dairy cow has ability to produce more heat (2 500kJ/hour) ✓

(Any 2) (2)

3.1.3 Measures taken by a farmer against extreme temperatures**Hot conditions:**

- Provide well ventilated shelter, fans, sprinklers, foggers misters, showers, large industrial fans, air conditioners ✓
- Hosepipes to spray water over animals can be used or a combination to bring down the effect of the extreme temperatures on the animals ✓

Cold conditions:

- Natural or artificial shelter/housing (e.g. barns) ✓ with
- Heating units, infra red lights can be used to protect the animals when it is too cold ✓

NB: One measure 1mark;& explanation 1 mark (Any 2x2) (4)**3.2 Handling and behaviour of farm animals.****3.2.1 Basic aspects to be considered when transporting beef cattle.**

- Plan for journey and avoid peak hours/have resting periods during the journey ✓
- Movement permit with driver/markings of animals ✓
- Fit and healthy animals are selected to travel ✓
- Do not mix young and old animals together/same sex/age ✓
- The floor of the truck must not be slippery/any hazards ✓
- Air /ventilation and light must be able to enter the truck where the animals are kept/ventilation ✓
- Provide enough space to prevent stampede ✓
- Prepare animals for journey ✓
- suitable loading/off-loading/ proper supervision ✓ (Any 5) (5)

3.2.2 Tools used when animals are moving alongside the road

- Red flags /sign boards✓
- Truck with hazards on✓
- Whips / stick/halter ✓
- Harness/bridle ✓
- Whistle ✓

(Any 2) (2)

3.3 Case study**3.3.1 System of production**

Intensive system✓

(1)

3.3.2 Factors that influence growth rate of pigs

- Supply clean water✓
- Good quality rations /food✓
- Good quality systems (intensive)/ shelter✓
- Temperature ✓
- Health situation/hygiene/social-environmental comfort /
disease ✓

(Any 2) (2)

**3.3.3 Equipment used
Protection against rain**(a) Temperature control:
tin roof✓

(1)

(b) Protection of litter:
farrowing rail/ pig sty✓

(1)

3.3.4 Calculation of average daily gain

Weight gain – weaning mass/days of monitoring

Pig A: $(78000 - 46000) / 35$ ✓
 $= 914\text{g/day}$ ✓

(2)

Pig B: $(75000 - 48000) / 35$ ✓
 $= 771\text{g/day}$ ✓

(2)

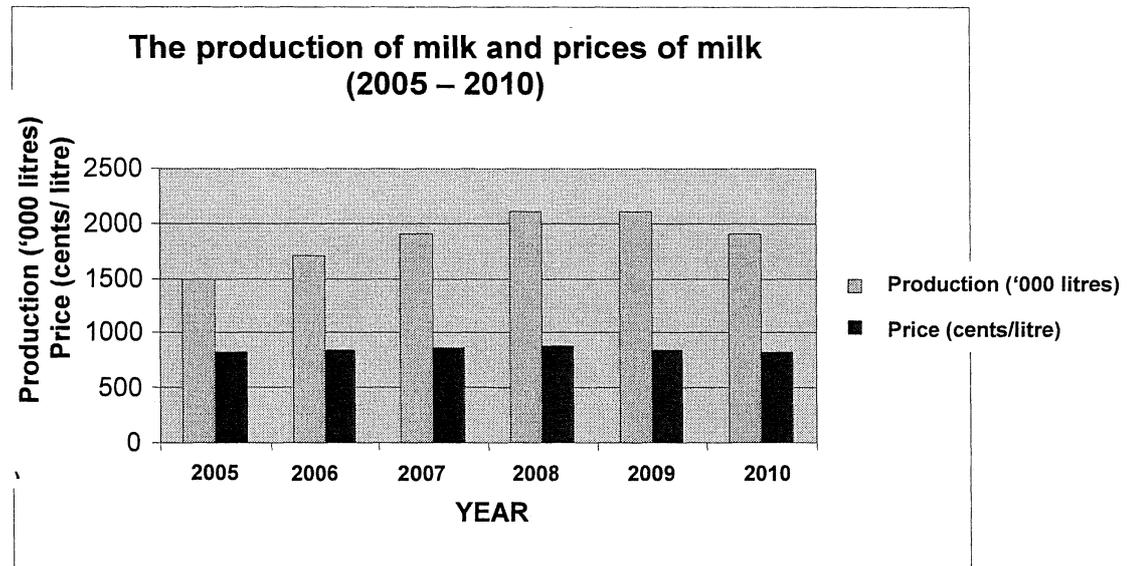
3.3.5 Pig that will give more profit

A ✓

(1)

3.4 Dairy industry

3.4.



Bar graph check list

Evidence	Yes	No
Heading	1	0
X axis both labelled (year)	1	0
Y axis labelled both(production & price)	1	0
Correct values	1	0
Bar graph : price	1	0
Bar graph : production	1	0

(6)

3.4.2 Deduction from the data above

- The milk production increase from 2005-2008 ✓
- from 2008-2009 it stabilises ✓

(2)

3.4.3 TWO factors causing dairy farmers to quit

- Drought ✓
- Low producer/milk prices/not profitable business ✓

(2)
[35]

QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

4.1 The process or events that take place during reproduction

4.1.1 Secondary sex organs

- C/Uterus horn/ uterus ✓
- B/Fallopian tubes / oviduct/ egg tube ✓
- D/Cervix / cervical canal/uterus neck ✓
- E/Vagina ✓

(Any 2) (2)

- 4.1.2 **Labelled parts**
 (a) **B** fallopian tube/oviduct/ampulla ✓ (1)
 (b) **D** plug at the mouth of the cervix ✓ (1)
- Functions**
- 4.1.3 Protection/closing of the foetus/uterus during pregnancy/canal for entry of sperm/mucous plug ✓ (1)
- 4.1.4 **Part responsible for catching ovum**
 Infundibulum/finger-like projections/ fimbria /funnel shaped structure ✓ (1)
- Adaptation of the fallopian tube**
- Positions itself around the ovary to ensure ova does not fall/funnel shaped ✓
 - Guides ovulated ova into the oviduct ✓
 - Vibrating cilia allow movement ✓
 - Ensuring that the ova moves in the right direction ✓ (Any 2) (2)
- 4.2 **Hormonal changes in the oestrus cycle**
- 4.2.1 **Start of ovulation**
 Values between **day 20 and 21** ✓ (1)
- 4.2.2 **Hormones responsible for ovulation**
- Oestrogen ✓
 - Luteinizing hormone (LH) ✓ (2)
- 4.2.3 **Hormone responsible**
- (a) Luteinizing hormone**
- LH released by the brain causes the ovary to release the ova / together with oestrogen causes the follicles to burst to release the ova ✓
 - Responsible of the formation of corpus luteum ✓
 - Tightens infundibulum around ovary ✓ (Any 2) (2)
- (b) Oestrogen**
- Thickens/preparation the lining of the uterus for the fertilized egg /enhances the thickness of the uterus wall ✓
 - Responsible for heat symptoms ✓
 - Stimulates the graafian follicle to release the ovum/ovulation ✓
 - Stimulates brain to release LH ✓
 - Delays the secretion of FSH ✓
 - Increases blood supply to uterus ✓
 - Prevents bacterial infection of the uterus when cervix is open ✓
 - Relaxes the walls of the uterus ✓ (Any 2) (2)

- 4.2.4 **Changes in progesterone levels**
Progesterone levels increase/becomes higher ✓ (1)
Effects:
- Prepares the uterine wall (thickens) for the implantation of the fertilized ovum/maintaining pregnancy ✓
 - Delays the secretion of FSH ✓
 - Inhibits the maturation of the graafian follicle ✓
 - Prevents oestrus/ovulation ✓ (Any 2) (2)
- 4.3 **Lactation**
- 4.3.1 **First milk released**
Colostrum/beestings ✓ (1)
Differences
- More yellow in colour than normal milk ✓
 - Higher fat content/ creamier/ more concentrated/nutritious/thicker ✓
 - Contains anti-diseases substances/anti-bodies ✓ (Any 2) (2)
- 4.3.2 **Negative impacts of no colostrum**
- Energy loss ✓
 - Susceptible to diseases/low resistance ✓ (2)
 - Stunted/slow growth ✓
 - Uncleansed system/malfunctioning of alimentary canal ✓
 - Insufficient nutrients ✓ (Any 2) (2)
- 4.4 **Rift Valley Fever: case study**
- 4.4.1 Virus ✓ (1)
- 4.4.2 mosquito ✓ (1)
- 4.4.3 **Reasons that support the statement on epidemic diseases**
- This is a wide spread occurrence of a disease that spreads rapidly through an area/country ✓
 - It kills animals that may be counted in thousands ✓
 - Humans can also be affected ✓ (Any 2) (2)
- 4.4.4 **Preventative measures for the spread of Rift Valley fever**
- Limiting the movement of animals/quarantine ✓
 - avoid wet areas ✓
 - Regular dipping of animals with super methionine-based substance against mosquitoes ✓
 - Vaccinations against this disease ✓
 - Avoid handling products of infected animals ✓
 - Report/inform relevant authorities ✓ (Any 2) (2)

4.5 Infestation by mites**4.5.1 Reason to proof that mites are external parasites**

- Mites are found on less hairy parts of the body of cattle, sheep, goats, pigs and horses/Mites related to ticks ✓ (1)

4.5.2 Two non ruminant affected by mites

- horses ✓
- pigs ✓ (2)

4.5.3 Proclaimed disease

- Spreads very rapidly ✓
- Great losses in production (skin & wool) can be experienced ✓
- Not easily controlled ✓ (Any 1) (1)

Farmers' responsibility

- The farmer should immediately report to the relevant authorities ✓
- The farmer must adhere to quarantine measures that are imposed ✓
- The farmer needs to dip the sheep regularly (at least twice)/disinfect pens ✓

(Any 2) (2)

[35]**TOTAL SECTION B: 105****GRAND TOTAL: 150**