



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2011

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages and 1 answer sheet.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read ALL the questions carefully and answer only what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place your ANSWER SHEET for SECTION A (QUESTION 1) inside your ANSWER BOOK.
8. Non-programmable calculators may be used.
9. Write neatly and legibly.

SECTION A**QUESTION 1**

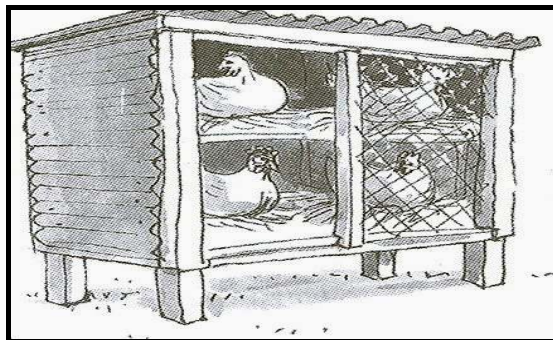
- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and make a cross (X) in the block (A–D) next to the question number (1.1.1–1.1.10) on the attached ANSWER SHEET. NO marks will be allocated if more than one cross (X) appears for an answer.

Example:

1.1.11	<input checked="" type="checkbox"/>	A	B	C	D
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- 1.1.1 Secretion of a digestive juice that contains an enzyme, amylase, secreted in the small intestine is associated with the ... which is an accessory organ of the alimentary canal.
- A liver
 - B salivary gland
 - C pancreas
 - D intestinal gland
- 1.1.2 Wasting disease in cattle is caused by a shortage of ...
- A zinc.
 - B cobalt.
 - C iron.
 - D copper.
- 1.1.3 ONE of the following feeds is an example of a protein-rich concentrate:
- A Soybean oilcake meal
 - B Soybean hay
 - C Yellow-maize meal
 - D Silage
- 1.1.4 The ... has finger-like protrusions called papillae that act as heating rods for temperature control.
- A omasum
 - B abomasum
 - C small intestine
 - D rumen

- 1.1.5 The Zulu people's system of building kraals from the branches of acacia thorn trees, forms part of a system called the ... knowledge system.
- A subsistence
 - B extensive
 - C intensive
 - D indigenous
- 1.1.6 The following tool is used to handle large animals, such as cattle, which are stubborn and resistant to move in a handling facility:
- A Burdizzo
 - B Prodder
 - C Dehorning iron
 - D Dosing gun
- 1.1.7 It is important to do ONE of the following when working with animals in a crush:
- A Be vigilant and aware of safety
 - B Use dogs to calm the cattle
 - C Whistle loudly
 - D Make sudden movements
- 1.1.8 The illustrated structure below has been designed for usage above ground mainly for ONE of the following reasons:



- A Protection against wind
 - B Removal of polluted air
 - C To support adequate bedding
 - D Prevention from infection by soil-borne organisms
- 1.1.9 Foot-and-mouth disease symptoms are common in ONE of the following animal species:
- A Horses
 - B Poultry
 - C Cattle
 - D Dogs

1.1.10 The hormone which is released from a gland in the brain responsible for the milk let-down reflex:

- A Oxytocin
- B Oestrogen
- C FSH
- D Progesterone

(10 x 2) (20)

1.2 In the table below a description and TWO possible answers are given. Decide whether the description in COLUMN B relates to A only, B only, both A and B or NONE of the answers in COLUMN A and make a cross (X) in the block (A–D) next to the question number (1.2.1–1.2.5) on the attached ANSWER SHEET.

Example:

COLUMN A		COLUMN B
A:	lucerne hay	the feed that is the most cost-effective source of carbohydrates for livestock
B:	oatmeal	

Answer:

The statement refers to:			
ONLY A	ONLY B	A AND B	NONE
A	B	C	D

COLUMN A		COLUMN B	
1.2.1	A:	molasses	increase(s) the palatability and digestibility of poor roughage
	B:	hormones	
1.2.2	A:	shelter	protects livestock against cold, rain and strong wind
	B:	shed	
1.2.3	A:	chorion	protects the embryo against shock and serves as a lubricant during calving
	B:	amnion	
1.2.4	A:	stud breeder	utilise the beneficial effect of cross-breeding in livestock
	B:	commercial farmer	
1.2.5	A:	heart water	the cause of this disease is an internal parasite found in the digestive system of poultry
	B:	gall sickness	

(5 x 2) (10)

- 1.3 Give ONE word/term/phrase for each of the following descriptions. Write only the word/term/phrase next to the question number (1.3.1–1.3.5) on the attached ANSWER SHEET.
- 1.3.1 The true, glandular stomach of a fowl, in which enzymatic and hydrochloric acid digestion of food takes place
- 1.3.2 The gross energy value of a feed minus the value of energy that is lost in the manure
- 1.3.3 The instrument used to inject the semen into the uterus of the female animal during artificial insemination
- 1.3.4 The process during which the primary male sex cells undergo metamorphosis in the testis and develop into sperm cells
- 1.3.5 The administration of a vaccine into the animal body using a syringe and a needle (5 x 2) (10)
- 1.4 Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write the appropriate word(s) next to the question number (1.4.1–1.4.5) on the attached ANSWER SHEET.
- 1.4.1 The first two compartments of a ruminant stomach are collectively known as a true stomach.
- 1.4.2 For the highest sustainable production, stock farmers need to make minimal use of the natural resources available.
- 1.4.3 A vitamin A supplement is injected into ewes before mating to ensure a higher rate of copulation that results in more ova being released.
- 1.4.4 When animals are moved next to the road green flags are used to warn the road users.
- 1.4.5 Symbiotic bacteria secrete toxins that cause diseases in animals. (5 x 1) (5)

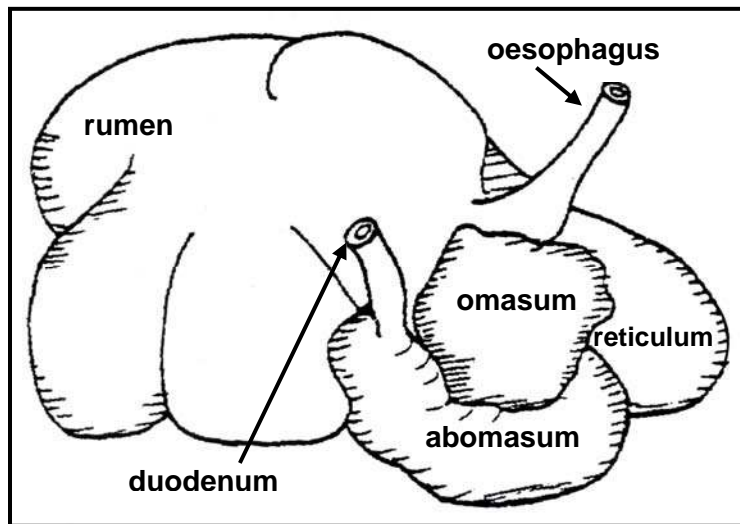
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: ANIMAL NUTRITION

2.1 The diagram below represents a compound stomach of a farm animal.



2.1.1 Select ONE example of a farm animal with a stomach similar to the one above from the following list:

goat; horse; ostrich; cattle; pig; poultry

(1)

2.1.2 Name the part of the stomach where swallowed food first gathers.

(1)

2.1.3 Give TWO reasons why the reticulum, rumen and omasum are normally underdeveloped in young suckling animals.

(2)

2.1.4 Explain why farm animals with the type of stomach shown above can be supplemented with non-protein nitrogen substances.

(2)

2.2 A cow was fed with oatmeal as part of the feeding programme. The oatmeal contains 71% of total digestible nutrients (TDN) and 9% of digestible protein (DP).

2.2.1 Classify oatmeal as a concentrate or as roughage.

(1)

2.2.2 Name a characteristic from the data above to support your answer to QUESTION 2.2.1.

(1)

2.2.3 Calculate, by using an appropriate formula, the nutritive ratio (NR) of oatmeal.

(4)

2.2.4 Give the appropriate production purpose of using oatmeal in animal nutrition. Motivate your answer. (2)

2.2.5 Calculate the ratio in which oatmeal and peanut oilcake meal need to be mixed to get a ration mix with a digestible protein (DP) value of 16%. Peanut oilcake meal has a digestible protein value of 32%. (5)

2.3 Feedlot industries have boomed in most of the outskirts of big cities. The productivity of a feedlot depends on the number of animals fattened and sent to the abattoirs.



2.3.1 Name the type of grazing system utilised in the above feedlot. (1)

2.3.2 Compare the protein requirements of mature and young animals for growth over a period of production. (2)

2.3.3 State a way in which the farmer possibly improved the digestibility of the feed/ration of the cattle in this feedlot. (1)

2.3.4 State TWO important functions of carbohydrates in the body. (2)

2.3.5 'The quality of protein in a ration of ruminant animals is less important than that of non-ruminant animals in a feedlot system.' Justify this statement. (2)

2.4 Chemical substances to improve growth are used in feedlots for beef and broiler production to increase the growth rate. Identify the most applicable chemical substance that can be administered to the animals or the organ in EACH of the following cases:

2.4.1 A substance administered to cattle in feedlots to calm them down (1)

2.4.2 The chemical that influences secretion of thyroxin which in turn influences the metabolism of an animal (1)

2.4.3 Name the specific organ or position on the animal body where growth hormones in a round pellet formulation are usually implanted. (1)

2.5 The two tables below show the biological values (BV) of high- and low-quality protein sources grouped as A and B.

A: HIGH BV SOURCES	
PROTEIN SOURCE	BV
Milk protein	95
Fish protein	90
Beef protein	76
B: LOW BV SOURCES	
PROTEIN SOURCE	BV
Maize	60
Wheat	67
Soybean	75

2.5.1 Define the term *biological value (BV)*. (2)

2.5.2 Name the specific type of protein that is accepted as a comparative protein. (1)

2.5.3 Evaluate the suitability of fish meal as a protein source by referring to the data above. (2)

[35]

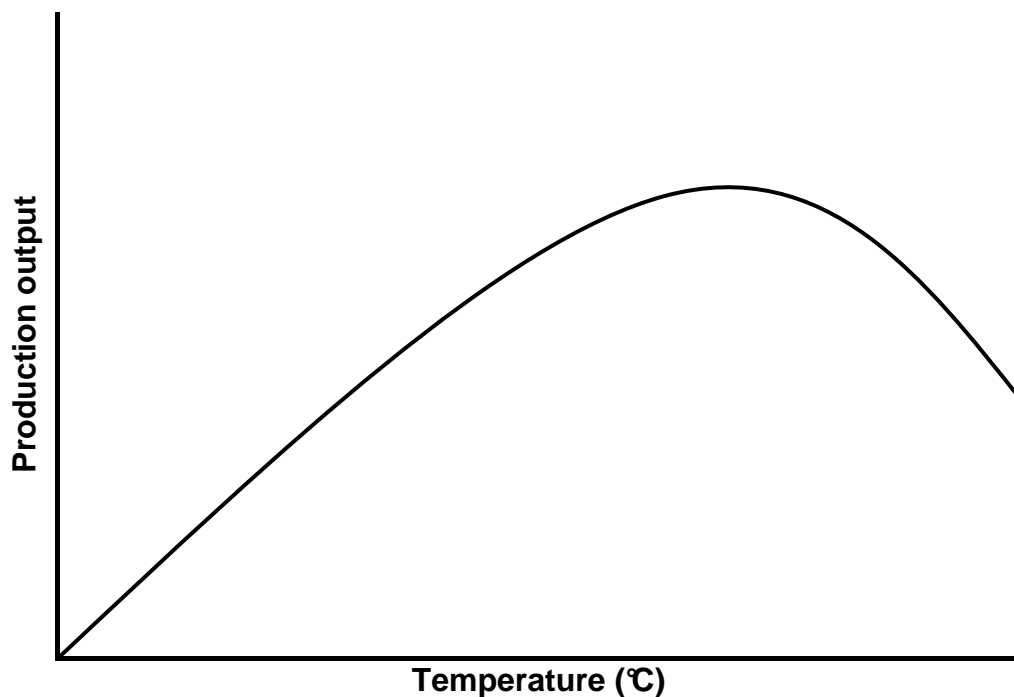
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QUESTION 3: ANIMAL PRODUCTION

3.1

Environmental control, breeding, nutrition and management are the main factors that influence the production output in any animal production system. Most farm animals are homoeothermic but react differently to temperature variations. Some ruminants have a lower optimum temperature and can produce normally at lower temperatures. This ability is related to the micro-organisms in their compound stomach.

The graph below represents the effect of temperature on production output in an animal production unit.



The table below illustrates the optimum temperature and heat production for farm animals performing at the most economic production levels.

FARM ANIMALS	OPTIMUM TEMPERATURE (°C)	HEAT PRODUCTION (kJ/h)
Dairy cows	10–15	2 500
Pigs	15–25	800

- 3.1.1 Describe the relationship between production output and temperature as reflected in the graph above. (2)
- 3.1.2 Give TWO reasons for dairy cows having a lower optimum temperature compared to pigs by referring to the data in the table above. (2)
- 3.1.3 Discuss TWO possible measures that the farmer can take to protect animals against the effects of extreme temperatures, as shown in the graph above. (4)

- 3.2 Losses arising from injury, bruising and death amongst cattle in transit between the farm and the abattoir are substantial. This must be avoided for legal, anti-animal cruelty and financial reasons. It is therefore imperative that cattle be handled sympathetically as much as possible to minimise these losses.

The diagrams below represent modes of transporting animals, marked **A** and **B**.

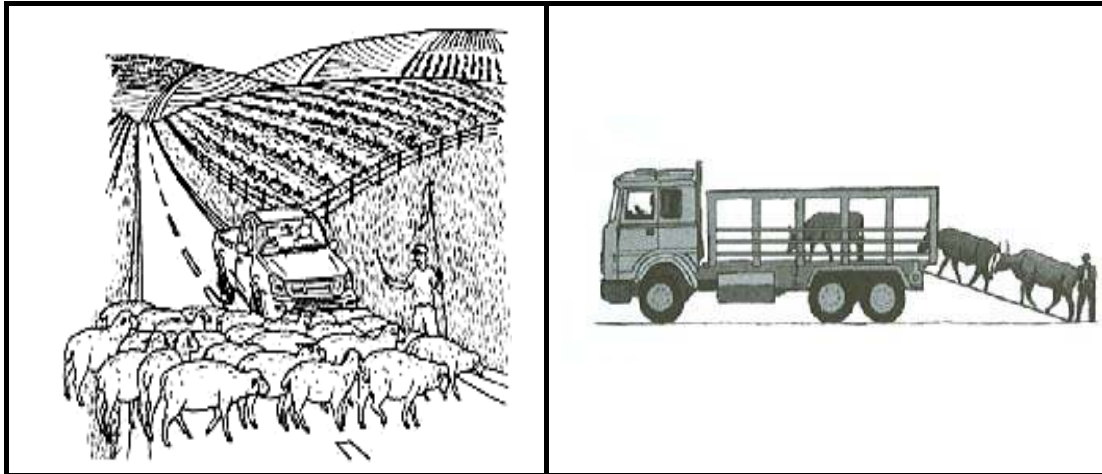


DIAGRAM A

DIAGRAM B

- 3.2.1 With reference to DIAGRAM B, give FIVE basic aspects to be considered when transporting beef cattle to the abattoir. (5)
- 3.2.2 Name TWO tools that must be used when animals are moved along the road, as illustrated in DIAGRAM A. (2)

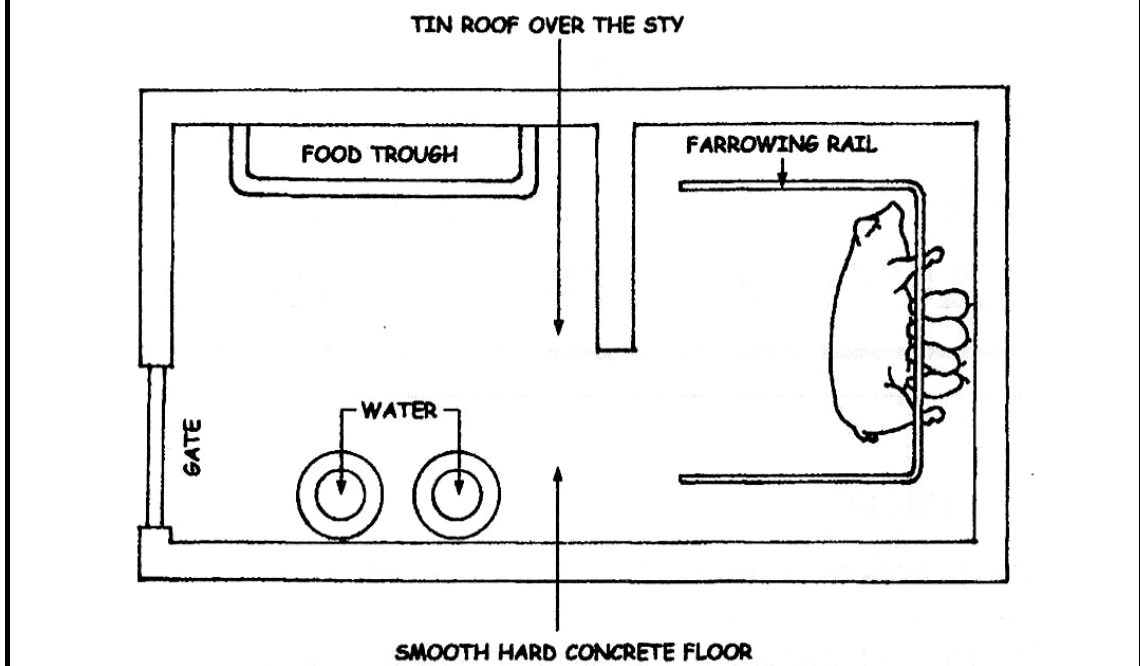
3.3

'Efficient use of feed and optimising growth are the main ingredients for maximising profits on pig farms,' says Dr Peter Evans.

Growth rate and feed intake are closely linked. Feed intake is a function of social and environmental comfort, healthy pigs, high-quality rations and good systems and equipment.

Growth rate is measured in grams per day. The average daily gain (ADG) is determined by subtracting the initial weight from the final weight and dividing this by the number of days of monitoring.

[Adapted: *Farming SA*, April 2010]



- 3.3.1 Indicate the system of production practised in the illustrated diagram above. (1)
- 3.3.2 Identify TWO factors that will influence the growth rate of pigs in the above-mentioned case study. (2)
- 3.3.3 Select the measure which is used against the following. Write only the appropriate name, chosen from the diagram above.
 - (a) Protection against rain (1)
 - (b) Protection of the litter (1)

- 3.3.4 Calculate the average daily gain (ADG) for the following pigs by using the data in the table below and the information on the previous page. Show ALL your calculations.

PIG	INITIAL WEIGHT	FINAL WEIGHT	DAYS
A	46 kg	78 kg	35
B	48 kg	75 kg	35

(4)

- 3.3.5 Select the pig that would contribute more to the profit of the pig production system.

(1)

3.4

THE FUTURE OF SOUTH AFRICAN DAIRY INDUSTRIES

Big supermarkets' shelves had very low stocks of dairy products, especially long-life milk, in 2007. This has been attributed to the general shortage of milk products worldwide, drought, increased demand for dairy products and low producer prices locally. The data on milk production and average price trends for the years 2005 to 2010 is given below.

YEAR	PRODUCTION ('000 LITRES)	PRICE (CENTS/LITRE)
2005	1 500	820
2006	1 700	840
2007	1 900	860
2008	2 100	880
2009	2 100	840
2010	1 900	820

- 3.4.1 Draw a bar graph to compare milk production and the price of milk during the above time period.

(6)

- 3.4.2 From the milk production data in the table above, give the milk production tendency during the period 2005 to 2009

(2)

- 3.4.3 Suggest TWO factors from the data above, that can cause dairy farmers to quit this industry.

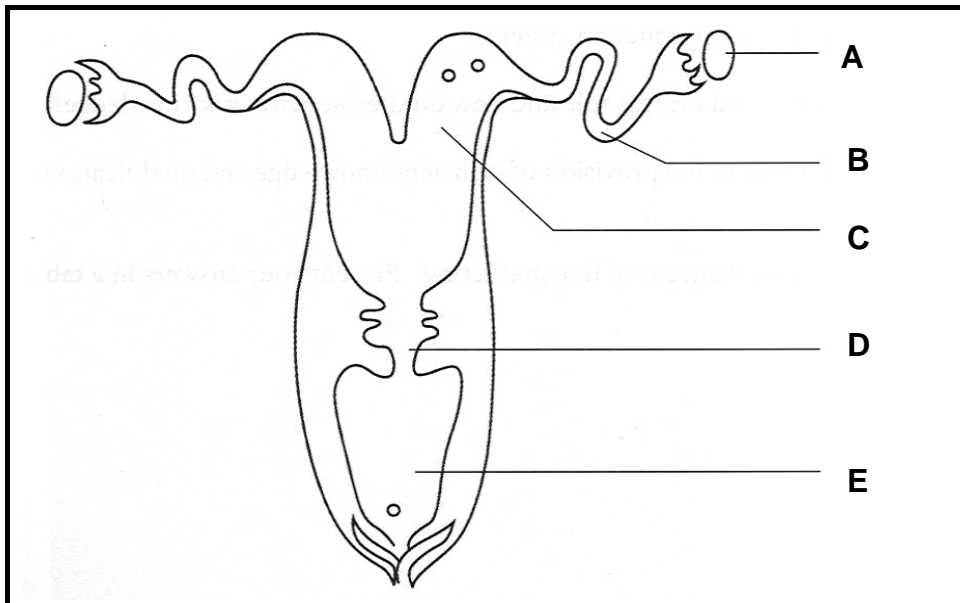
(2)

[35]

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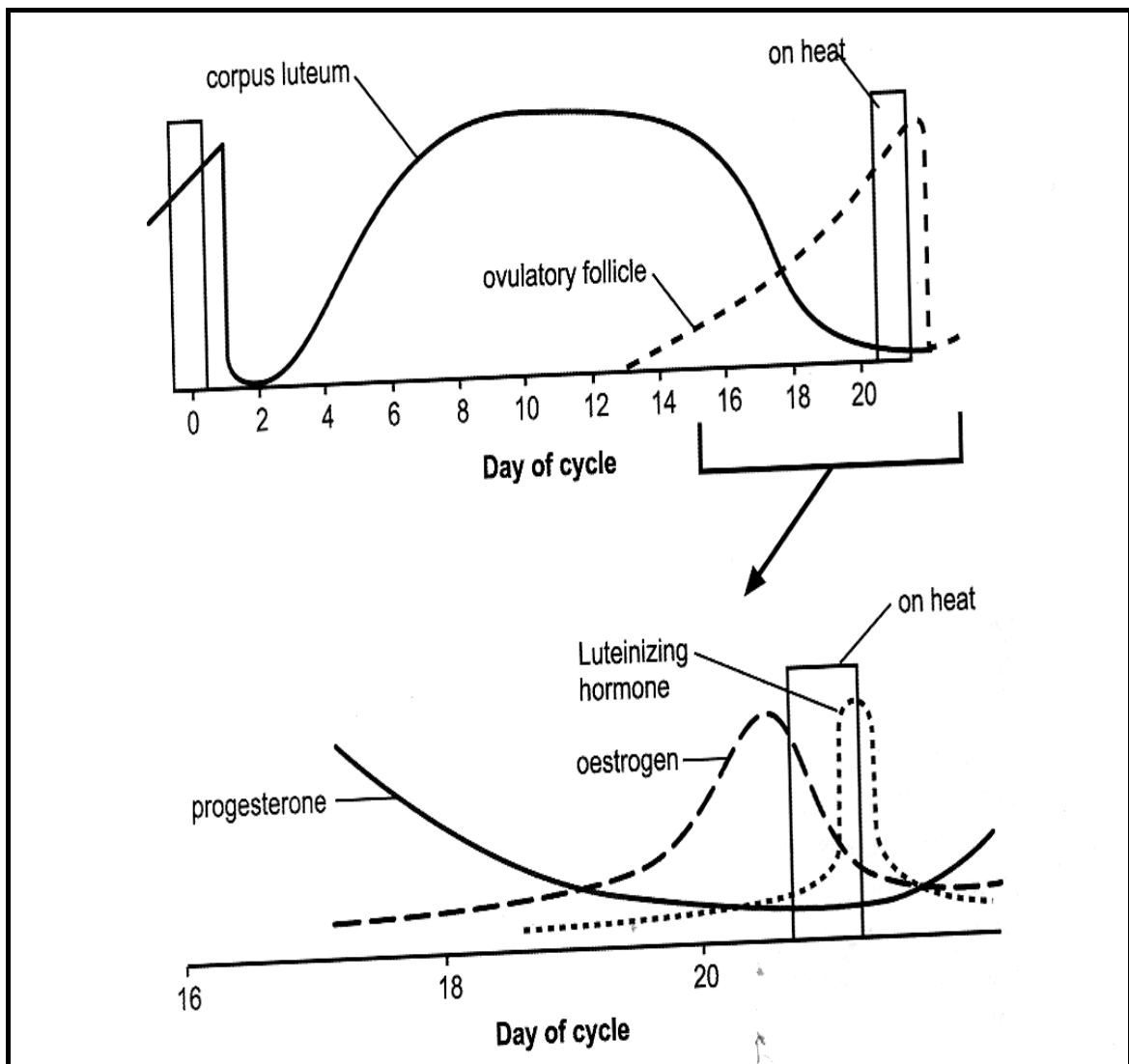
QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

4.1 The diagram below illustrates the female sex organs of a cow.



- 4.1.1 Identify TWO labels (**A–E**) that represent secondary sex organs from the illustrated diagram above. (2)
- 4.1.2 Indicate the labelled part (**A–E**) where the following will take place:
- (a) Site of fertilisation (1)
 - (b) Prevention of microbial infection of the uterus during pregnancy (1)
- 4.1.3 Briefly describe the function of the part labelled **D** in the diagram above. (1)
- 4.1.4 Identify the part of the fallopian tube that is responsible for catching the released ovum and name TWO adaptations for this purpose. (3)

4.2 The graphs below illustrate the hormonal changes in a typical oestrus cycle of a farm animal.



- 4.2.1 Identify the day when ovulation will take place. (1)
- 4.2.2 Indicate TWO hormones responsible for the process of ovulation. (2)
- 4.2.3 State TWO functions of each of the following hormones at their peak levels:
- (a) Luteinising hormone (2)
- (b) Oestrogen (2)
- 4.2.4 Name the change that occurs in the progesterone levels after successful mating. Explain the TWO effects of this change. (3)

- 4.3 The first milk produced by the cow, within the first three days of lactation, differs from the normal milk produced by the cow thereafter.
- 4.3.1 Identify the first milk released and describe TWO ways how it differs from the normal milk produced after three days. (3)
- 4.3.2 Name TWO negative impacts that would occur if the new-born calf does not receive this milk. (2)
- 4.4 Rift Valley fever is a disease that severely affected most farmers in the Free State due to high rainfall between January and February in 2010. The pathogen is transmitted by mosquitoes amongst the herds of livestock. According to Andre Ferreira, the chairperson of the Free State Red Meat Producers Organisation (RPO), its outbreak befits to be classified as an epidemic disease.
- Thirty eight farms were confirmed infected and affected, nearly 100 000 animals in the same province were potentially infected whilst 23 000 animals were confirmed as affected. Farmers were warned to limit the movement of animals and dip them regularly with super methrine-based substances against mosquitoes. Human beings can be infected through the handling of meat, blood and organs of infected animals, as well as by drinking milk of the infected animals.
- [Source: *Farmers' Weekly*, 9 April 2010]
- 4.4.1 Name the type of micro-organism that causes Rift Valley fever. (1)
- 4.4.2 Identify the specific vector that carries this pathogen. (1)
- 4.4.3 Rift Valley fever can be classified as an epidemic disease. Justify your answer by giving TWO reasons that support this statement. (2)
- 4.4.4 State TWO measures that farmers can apply to prevent the further outbreak of this disease. (2)
- 4.5 Mites are closely related to ticks, but are much smaller and most cannot be seen by the naked eye. Mites are found on less hairy parts on the bodies of cattle, sheep, goats, pigs and horses.
- 4.5.1 Give a reason from the above extract to proof that mites are external parasites. (1)
- 4.5.2 Identify TWO non-ruminants in the extract that are affected by mites. (2)
- 4.5.3 Mites cause a proclaimed disease called mange. Explain a characteristic of this disease and name TWO responsibilities of the farmer in this regard. (3)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

ANSWER SHEET

SECTION A

CENTRE NUMBER:

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EXAMINATION NUMBER:

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QUESTION 1.1

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

(10 x 2) (20)

QUESTION 1.2

	ONLY A	ONLY B	A and B	NONE
1.2.1	A	B	C	D
1.2.2	A	B	C	D
1.2.3	A	B	C	D
1.2.4	A	B	C	D
1.2.5	A	B	C	D

(5 x 2) (10)

QUESTION 1.3

- 1.3.1 _____
 - 1.3.2 _____
 - 1.3.3 _____
 - 1.3.4 _____
 - 1.3.5 _____
- (5 x 2) (10)

QUESTION 1.4

- 1.4.1 _____
 - 1.4.2 _____
 - 1.4.3 _____
 - 1.4.4 _____
 - 1.4.5 _____
- (5 x 1) (5)

TOTAL SECTION A: 45



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GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2011

MEMORANDUM

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 1.31.3.1 **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

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

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

$$= 1: \frac{62\%}{9\%} \text{✓}$$

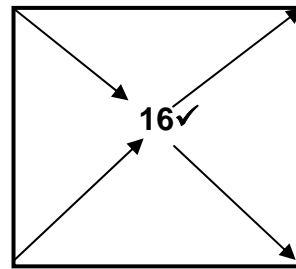
$$= 1:6,8 \text{ or } 1:7 \text{✓} \quad (4)$$

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%



Peanut Oilcake meal 32%

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 1 mark; & explanation 1 mark (Any 2x2) (4)

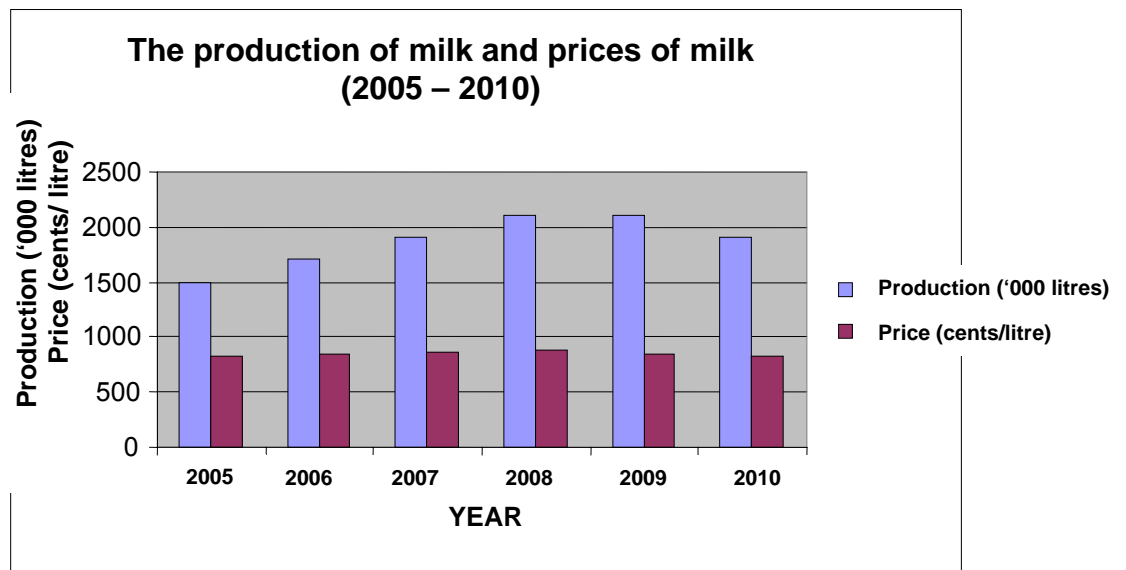
3.2 Handling and behaviour of farm animals.**3.2.1 Basic aspects to be considered when transporting beef cattle.**

- 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: (1)
tin roof✓
- (b) Protection of litter: (1)
farrowing rail/ pig sty✓
- 3.3.4 **Calculation of average daily gain**
Weight gain – weaning mass/days of monitoring
- Pig A:** $(78000 - 46000) / 35$ ✓
= 914g/day ✓ (2)
- Pig B:** $(75000 - 48000) / 35$ ✓
= 771g/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



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2011

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages and 1 answer sheet.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read the questions carefully and make sure that you answer what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place your ANSWER SHEET for SECTION A (QUESTION 1) in your ANSWER BOOK.
8. Non-programmable calculators may be used.
9. Write neatly and legibly.

SECTION A**QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and make a cross (X) in the block (A–D) next to the question number (1.1.1–1.1.10) on the attached ANSWER SHEET. NO marks will be allocated if more than one cross (X) appears for an answer.

Example:

1.1.11	<input checked="" type="checkbox"/>	B	C	D
--------	-------------------------------------	---	---	---

- 1.1.1 An advantage of free marketing is ...
- A orderly marketing.
 - B standardisation.
 - C that producers have more time for their farming activities.
 - D that sales are often in cash.
- 1.1.2 The main reason why some agricultural products are cooled during the distribution process to various market outlets, is to ...
- A reduce their weight for easier transport.
 - B reduce their volume for easier transport.
 - C improve their taste for the consumer.
 - D prevent them from perishing.
- 1.1.3 A business plan is set up to provide all planning information needed for a specific farming operation. Which ONE of the following aspects is NOT normally part of a business plan?
- A Farm budget
 - B Soil surveyance detail
 - C Detail of employees
 - D Marketing plan
- 1.1.4 The process that describes the changes to primary agricultural products at an industrial plant to increase their value is called ...
- A processing.
 - B a marketing chain.
 - C distribution.
 - D preservation.

- 1.1.5 The economic characteristic of land which makes it senseless for the farmer to try and increase his production by applying more and more fertiliser to the soil, is ...
- A the law of diminishing returns.
 - B the mineral content of the soil.
 - C the water-holding capacity of soil.
 - D the physical properties of soil.
- 1.1.6 A primary natural resource utilised in agricultural production is ...
- A labour.
 - B soil.
 - C capital.
 - D diesel fuel.
- 1.1.7 Increased scarcity of farm labour may be a result of ...
- A political stability.
 - B less attractive working conditions.
 - C unskilfulness.
 - D effective labour management.
- 1.1.8 The quality of labour can best be described and measured as the ...
- A satisfaction of the workers.
 - B willingness of the workers.
 - C size of the labour squad.
 - D productivity of the workers.
- 1.1.9 The phenotypic ratio for a qualitative characteristic in the F_1 generation produced by parents which both have heterozygotic genes will be ...
- A 1 : 2 : 1.
 - B 3 : 1.
 - C 1 : 1.
 - D 4 : 0.
- 1.1.10 ... is one of the internal causes of variation.
- A Climate
 - B Topography
 - C Light intensity
 - D Mutation
- (10 x 2) (20)

- 1.2 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (1.2.1–1.2.5) on the attached ANSWER SHEET, for example 1.2.6 N.

COLUMN A		COLUMN B
1.2.1	Comprehensive activity involving the combination and coordination of human, physical and financial resources	A depreciation B line breeding
1.2.2	The loss or decline in value of assets such as vehicles, machinery et cetera caused by age, wear and tear	C selection D management
1.2.3	Inferior cows are mated with a pure-bred Friesland bull to increase milk production	E species crossing F supervision
1.2.4	A process in breeding by which certain individuals in a population are chosen for the production of the next generation	G motivation H decision-making
1.2.5	A stallion is mated with a jenny (female donkey) resulting in infertile offspring	I control J upgrading

(5 x 2)

(10)

- 1.3 Give ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.3.1–1.3.5) on the attached ANSWER SHEET.

1.3.1 A document in which you write down what you think you will spend and earn over a period of time in your business in order to work out what your profit or loss is likely to be

1.3.2 An autonomous association of persons united voluntarily to meet their social, economic and cultural needs and aspirations through a jointly owned and democratically controlled enterprise

1.3.3 A marketing approach that allows you to select a few segments and to develop a marketing strategy to fit them all

1.3.4 A current is passed through a solution, carrying cells of the recipient plants which allows the desired genes to enter these cells and be incorporated into the DNA to form a transgenic plant

1.3.5 The study of how characteristics are passed from parents to their offspring

(5 x 2)

(10)

1.4 Change the underlined word(s) to make the following statements TRUE. Write the appropriate word(s) next to the question number (1.4.1–1.4.5) on the attached ANSWER SHEET.

1.4.1 Market gathering refers to the collection of information about consumers as well as the existing competition.

1.4.2 Niche marketing involves marketing a product in different ways to reach as many people as possible.

1.4.3 Line breeding is practised by stock farmers to obtain hybrid vigour.

1.4.4 In a communal tenure system, a farmer owns a piece of land that has his/her name on the title deed.

1.4.5 A farm engineer spends most of his/her time on planning, motivation, administration, marketing and supervisory tasks.

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: AGRICULTURAL MANAGEMENT

- 2.1 The table below indicates some of the income and expenses on a farm for the month of July.

EXPENSES			INCOME		
DATE	ITEM BOUGHT	COST (R)	DATE	ITEM SOLD	COST (R)
02/07	Transport of eggs	80,00	04/07	40 dozen @ R7/dozen	280,00
06/07	4 x 50 kg layers feed	320,00	06/07	47 dozen @ R7/dozen	294,00
06/07	Transport of feed @ R5/bag	40,00	06/07	40 dozen @ R7/dozen	280,00
06/07	200 egg trays @ R50 for 100	100,00	07/07	44 dozen @ R7/dozen	308,00
06/07	Loan repayment (ABSA)	125,00	08/07	43 dozen @ R7/dozen	301,00
12/07	Transport of free eggs	80,00	10/07	40 dozen @ R7/dozen	280,00
15/07	Free 4 dozen eggs for workers	28,00	11/07	2 dozen eggs for home	14,00
24/07	4 x 50 kg layers feed	320,00	26/07	43 dozen @ R7/dozen	301,00
TOTAL		1 093,00	TOTAL		2 058,00

- 2.1.1 Give TWO reasons why it is important for a farm manager to keep financial records. (2)
- 2.1.2 Calculate the total monthly cost of transport. (3)
- 2.1.3 Use a formula to calculate the profit the farmer received for the month, based on the data given above. (4)
- 2.1.4 Deduce what incentive the farmer uses to motivate the farm labourers. (2)
- 2.1.5 From the data given above, identify and explain TWO ways in which this farmer generated farm capital. (4)

2.2

CELLPHONES BEAT STOCK THIEVES AND IMPROVE STOCK MANAGEMENT

According to the National Stock Theft Forum, the red meat industry suffered losses of almost R400 million during the 2009/10 financial year due to stock theft. Farmers are now installing high-tech anti-stock theft security systems that send an alarm to the farmer's cellphone when an animal is in danger.

In addition, this technology can also be used to assist in management tasks on the farm. This message also contains information on the movement of the flock. The system can also indicate when mating took place as well as the specific ram and ewe involved.

[Adapted from *Farmers' Weekly*, 4 February 2011]

2.2.1 Give TWO reasons for investing in a high-tech anti-stock theft security system. (2)

2.2.2 Suggest TWO entrepreneurial skills that were used by the manufacturers of the security system. Motivate your answer in each case. (4)

2.3 The following entrepreneurial success factors are necessary for good human relations:

- Appreciation
- Punctuality
- Leadership
- Motivation

Identify the success factor that will match each of the following descriptions. Each success factor can only be used ONCE.

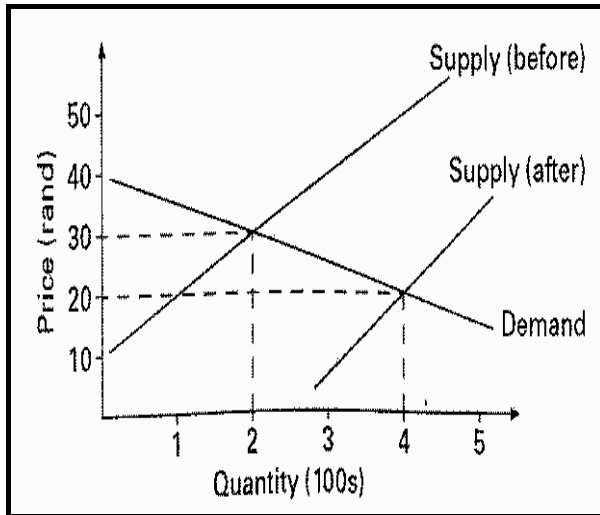
2.3.1 A newly designed bonus system that will improve the productivity of workers, benefiting them when they reach the goals set out for the season, is implemented by the farmer. (1)

2.3.2 The entrepreneur sets an example and arrives 10 minutes ahead of time for duties that have to be performed or meetings that are called. (1)

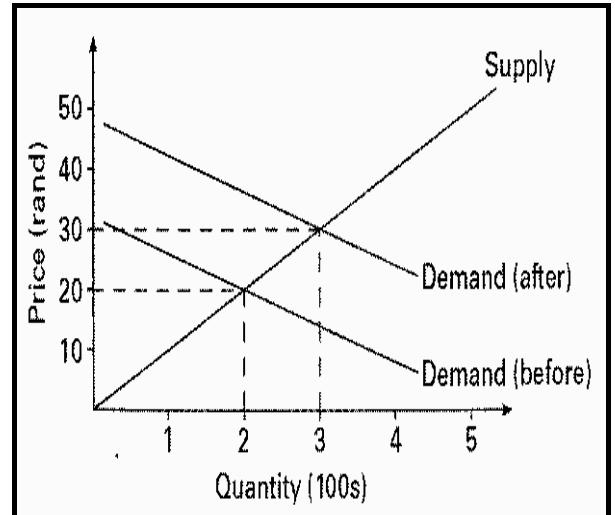
2.3.3 The entrepreneur presents certificates of excellence to workers that performed beyond their normal duty at the annual award ceremony. (1)

2.3.4 The farm manager inspires workers through his/her clear vision and professionalism. (1)

2.4 The graphs below show the changes in equilibrium prices when the supply (GRAPH A) and demand (GRAPH B) of a product increase or decrease at different times.



GRAPH A



GRAPH B

- 2.4.1 Deduce the relationship between supply and demand as illustrated in the graphs above. (2)
- 2.4.2 Define the *equilibrium price* for a particular agricultural product. (2)
- 2.4.3 Describe the effect of supply at different times on the equilibrium price, as illustrated in GRAPH A above. (2)
- 2.4.4 Determine the quantities of the product sold at the equilibrium price before and after a specific event that affected the marketing of that product, as indicated in GRAPH B. (2)
- 2.4.5 Choose a graph that represents the marketing of an agricultural product which resulted in a higher demand after intensive promotion was done. Give a reason to support your answer. (2)

[35]

Start this question on a NEW page.

QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

- 3.1 Record-keeping in a farming situation is just as important as planning. Examples include physical and financial records that reflect the farm assets and finances. Examples of farm assets are listed below.

tractor; borehole fitted with a wind mill; fertiliser bags;
pesticides; farm shed; bakkie (farm van); diesel; bags of maize seed

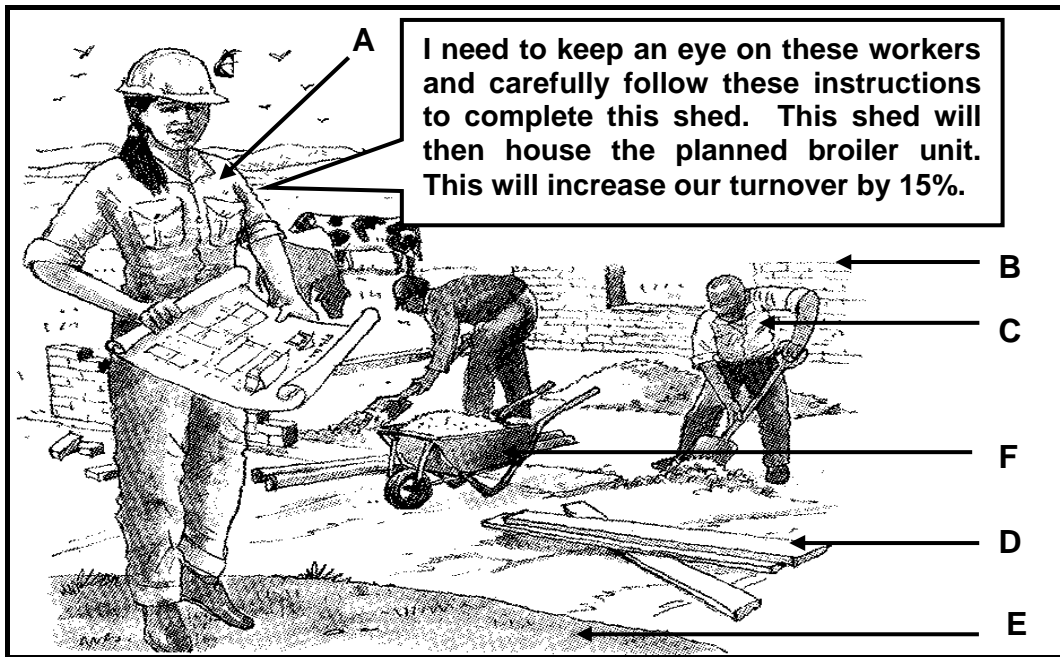
- 3.1.1 Tabulate the farm assets listed above under the following headings: (2)
- (a) Fixed assets (2)
- (b) Movable assets (2)
- 3.1.2 When large capital investments are made in a farming operation, the capital would normally be borrowed from external sources. Suggest THREE examples of such sources. (3)
- 3.1.3 Describe the term *net worth* of a farming business as reflected by financial records. (3)
- 3.2 State THREE functions of land as a factor in agricultural production. (3)
- 3.3 The following represent the approaches to management of farmer A and farmer B:

Farmer A: 'I like to have a neat farming operation and am prepared to invest in the neatness of my farming operation. All my fences and gates are in an excellent condition and I spend a lot of time improving my farm roads and watering facilities. I recently erected new homes for my farm workers and am proud to say that they have electricity and water.'

Farmer B: 'I work on a cash basis and will not borrow money to pay for any improvements on my farm. I try to save money by using second-hand parts and scrap metal parts lying on my farm. I always try to use the cheapest possible means to complete a task. My farm workers had to build their own homes from materials on the farm, again saving me money.'

- 3.3.1 Briefly describe the management approaches of farmer A and farmer B above. (2)
- 3.3.2 Identify the farmer that would have the most motivated workforce. Give a reason to support your answer. (2)

3.4 The illustration below indicates how production factors are coordinated for effective agricultural production.



3.4.1 Identify the letter (A–F), that represents each of the following:

- (a) Farm manager (1)
- (b) Farm labourer (1)
- (c) Movable capital (1)
- (d) Fixed capital (1)
- (e) A production factor subjected to the law of diminishing returns (1)

3.4.2 Identify the main management principle that is reflected in the picture above. Give a reason to support your answer. (2)

3.4.3 Identify TWO entrepreneurial skills that are visible in the picture above, which represent the combination of production factors in a farming operation. (2)

3.4.4 Identify the person or party that will reap the largest benefits from the increase in turnover in the farming operation. (1)

3.5

LABOUR MANAGEMENT

You are a farm manager on a dairy farm. The following workers have to do specific tasks on the farm and they should be given tasks according to their experience and expertise.

**A**

Has a driver's license, is literate and has some milking experience

**B**

Has ten years' experience in milking, calf rearing and irrigation

**C**

Very experienced in agricultural technology; highly literate; unsuitable for normal farm labour

**D**

Experienced in driving tractors, does not have a license, can operate different irrigation equipment

**E**

Has experience in milking and cleaning the milking parlour, but lacks experience in irrigation

Write down the letter (A–E) that represents the person that will be the MOST appropriate for each of the following farm tasks:

- 3.5.1 Weaning of calves (1)
- 3.5.2 Delivering milk in an urban area close to the farm using a trailer (1)
- 3.5.3 Cultivating land with an old tractor which has been scrapped from the road (1)
- 3.5.4 Maintaining milking equipment in a hygienic condition (1)
- 3.5.5 Change the pipes to irrigate the lucerne field (1)

3.6 Labour legislation impacts on farm workers.

3.6.1 Briefly describe the basic implication of each of the following Labour Acts on farm workers:

- (a) Labour Relations Act, 1995 (Act 66 of 1995) (1)
- (b) Occupational Health and Safety Act, 1993 (Act 85 of 1993) (1)

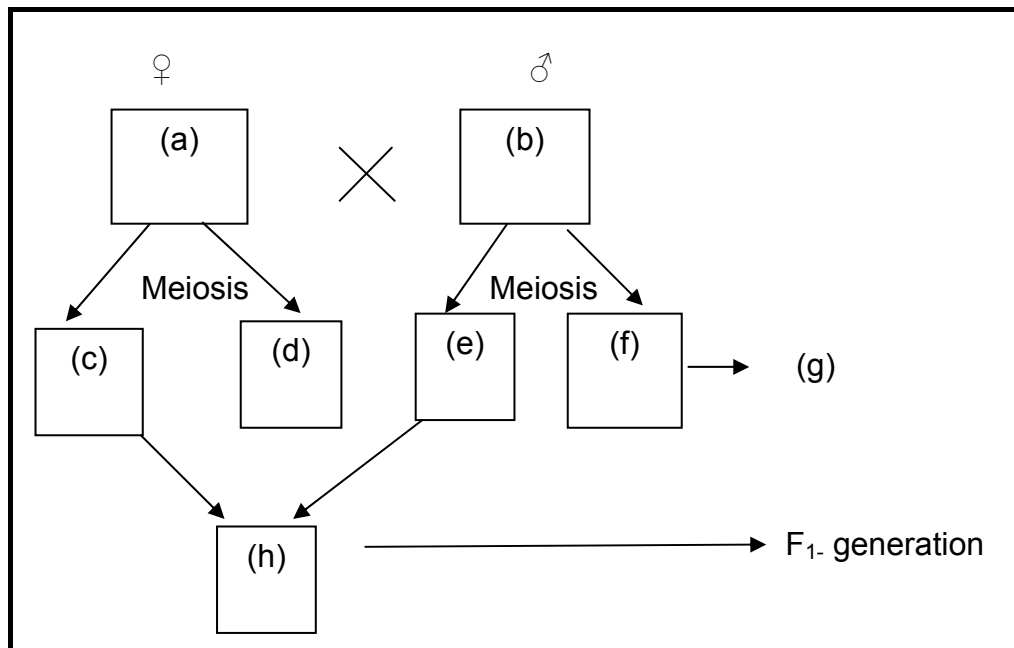
3.6.2 Name the appropriate legislation (Act) that applies to employees and employers who are injured, disabled or killed because of an accident at a workplace. (1)

[35]

Start this question on a NEW page.

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 The breeding of a black (BB) male farm animal and a white (WW) female farm animal gave rise to heterozygous grey offspring in the F₁-generation. The same offspring of the F₁-generation were allowed to breed through inbreeding and their offspring of the F₂-generation had a phenotypic ratio of 1 : 2 : 1.



4.1.1 Complete the diagram by filling in the missing genotype in the blocks labelled (a), (b), (c), (e), (g) and (h). Redraw the diagram in the ANSWER BOOK. (6)

4.1.2 Suggest the type of dominance that is described above. (1)

- 4.1.3 Motivate your answer to QUESTION 4.1.2 by giving TWO reasons. (2)
- 4.1.4 Identify the organ in the body where the process of meiosis occurs. (1)

4.2 Bb represents a black-furred farm animal and bb represents a farm animal with white fur. The Punnet square below represents the genotypes of the offspring. Black is the dominant trait.

		FEMALE		
		♀	b	b
MALE	♂	B	Bb	Bb
	b	bb	bb	

- 4.2.1 Identify the phenotype(s) visible in the offspring. (2)
- 4.2.2 Identify the gender of the heterozygous parent. (1)
- 4.2.3 Calculate the percentage of the offspring that is heterozygous black. (2)

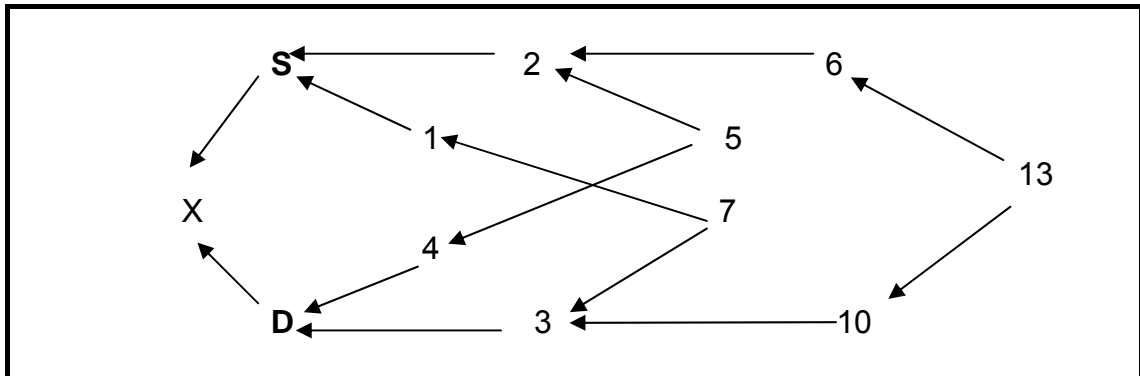
4.3

INDIGENOUS CATTLE BREEDS OF SOUTH AFRICA

The Nguni Innovation Project launched in 2004 in the different provinces will reintroduce the Nguni cattle to emerging livestock farmers. These animals can survive in our country because they are resistant to a number of diseases, parasites and extreme heat conditions.

- 4.3.1 Deduce a reason from the passage above suggesting that Nguni cattle are indigenous. (1)
- 4.3.2 Name THREE adapting qualities of Nguni cattle that make it possible for them to survive in the extreme conditions of our country. (3)

4.4 The flow chart below is a schematic representation of line breeding.



4.4.1 Identify THREE common ancestors of individuals **S** and **D** in the schematic representation above. (3)

4.4.2 Explain THREE ways in which livestock farmers could benefit from upgrading by using a purebred breed in their commercial crossbred herd. (3)

4.5 Name FOUR selection methods used by animal breeders. (4)

4.6 **IMPROVING SORGHUM THE GENETICALLY MODIFIED (GM) WAY**

Africa's scientists are developing a genetically modified (GM) super strain of the staple grain sorghum that they say will be vitamin-packed to help fight malnutrition. The objective of the project is to produce seeds of nutritionally improved cultivars of sorghum, appropriate for planting.

Biotech crops have sparked controversy in Africa, where some countries, despite having trouble growing food, have refused GM food aid or insisted it be milled before distribution to avoid contamination of local seed stocks. Anti-GM activists say GM foods risk destabilising the environment and food production.

[Adapted from *Cape Argus*, 2005]

4.6.1 Identify TWO reasons for developing this genetically modified sorghum in Africa. (2)

4.6.2 Describe TWO superior abilities that the GM sorghum would have compared to normal sorghum cultivars. (2)

4.6.3 Indicate TWO dangers of using GM cultivars. (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

ANSWER SHEET

CENTRE NUMBER:

--	--	--	--	--	--	--	--

EXAMINATION NUMBER:

--	--	--	--	--	--	--	--	--	--	--	--	--	--

SECTION A

QUESTION 1.1

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

(10 x 2) (20)

QUESTION 1.2

1.2.1	
1.2.2	
1.2.3	
1.2.4	
1.2.5	

(5 x 2) (10)

QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 x 2) (10)

QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 x 1) (5)

TOTAL SECTION A: 45



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2011

MEMORANDUM

MARKS: 150

This memorandum consists of 9 pages.

SECTION A**QUESTION 1.1**

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

(10 x 2) (20)

QUESTION 1.2

1.2.1	D✓✓
1.2.2	A✓✓
1.2.3	J✓✓
1.2.4	C✓✓
1.2.5	E✓✓

(5 x 2) (10)

QUESTION 1.3

- 1.3.1 Budget/business/enterprise plan ✓✓
- 1.3.2 Cooperative ✓✓
- 1.3.3 Multi segmented ✓✓
- 1.3.4 Electroporation/genetic manipulation/engineering/biotechnology ✓✓
- 1.3.5 Genetics ✓✓

(5 x 2) (10)

QUESTION 1.4

- 1.4.1 Research ✓
- 1.4.2 Mass ✓
- 1.4.3 Crossbreeding/out breeding ✓
- 1.4.4 Private ✓
- 1.4.5 Manager/entrepreneur/owner ✓

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: AGRICULTURAL MANAGEMENT****2.1 Financial record keeping****2.1.1 Importance of keeping financial records**

- To manage the capital of a farm/determine profit or loss /idea of income and expenses✓
- To analyse past and current performance/analyse success of business ✓
- Plan for the future of the farm /budgeting/replanning✓
- Proof of payment/Tax purposes✓

(Any 2) (2)

2.1.2 Total transport cost

$$R80,00 + R40,00 + R80,00 = R200,00 \checkmark\checkmark\checkmark$$

OR

$$R80,00 + R40,00 + R80,00 \checkmark = R200,00 \checkmark\checkmark$$

(3)

$$\begin{aligned} \text{Profit} &= \text{income} - \text{expenses} \checkmark \\ &= R\ 2\ 058 - R\ 1\ 093 \checkmark \\ &= R\ 965 \checkmark\checkmark \end{aligned}$$

OR

$$\begin{aligned} \text{Profit} &= \text{income} - \text{expenses} \checkmark \\ &= R\ 2\ 093 - R\ 1\ 093 \checkmark \\ &= R1\ 000 \checkmark\checkmark \end{aligned}$$

(4)

- 2.1.4 • Farm workers receive eggs for free/ 4 dozen eggs were given to workers✓✓ (2)

2.1.5 Creation of capital

- Production/layers✓ – created when more eggs are produced and then offered to generate capital✓
- Capital needed to start a business is obtained by means of credit/loan✓supplied by financial institutions/ABSA/bank✓
- Savings✓ – farming profits are allowed to accumulate in the bank✓

(Any 2 x 2) (4)

2.2 Cellphones beat stock thieves**2.2.1 TWO reasons for investing in high-tech anti-stock theft security systems**

- For the fight against stock theft/to notify when animals are in danger ✓
- Indication of the time when mating takes place/assist in management/saves time and labour ✓
- Indication of the ram and ewe that were involved in mating✓
- Tracking/monitoring the movement of animals ✓
- To determine grazing patterns of animals✓

(Any 2) (2)

2.2.2 **TWO important entrepreneurial skills of the manufacturers**

- Creativity✓ - involve new ideas that are put to test/first of its kind✓
- Innovation✓ - the systems are of a high-tech nature/it is a futuristic apparatus that can accommodate many uses ✓
- Marketing/communication✓ - convince the clients to use the apparatus✓
- Technical ✓ – knowledge on installing of the apparatus✓
- Research/problem solving ✓ - determine the opportunity in the market✓
- Risk orientation✓ - high initial investment for the manufacturer

(Any 2) (4)

2.3 **Entrepreneurial success factors[Only used once]**

- 2.3.1 Motivation/appreciation ✓ (1)
- 2.3.2 Punctuality ✓ (1)
- 2.3.3 Appreciation/motivation ✓ (1)
- 2.3.4 Leadership ✓ (1)

2.4 **The demand and supply graph**

- 2.4.1
- Reversed relationship/As the quantities supplied increases ✓ the demand for the product will decrease ✓
- OR**
- Reversed relationship /As the quantities demanded increases ✓ the supply of a agricultural product would decrease ✓ (2)
- 2.4.2
- A point where the amount demanded by the market and the amount supplied ✓ are equal ✓
- OR**
- Supply = ✓ demand✓ (2)
- 2.4.3
- Equilibrium price high/R30 at supply (before) and low/R20 at supply (after)/the supply described as before had an equilibrium price that was higher ✓
 - Compared to the situation after ✓ (2)
- 2.4.4
- Quantities before: 200 ✓
 - Quantities after: 300 ✓ (2)
- 2.4.5
- Graph B ✓
 - The demand was higher after the promotion/demand before was 200 and then increased to 300 ✓ (2)

[35]

QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT**3.1 Recordkeeping: physical and financial records**

	(a)	(b)	
3.1.1	<ul style="list-style-type: none"> • Borehole with a wind mill ✓ • Farm shed ✓ (2) 	<ul style="list-style-type: none"> • Tractor ✓ • Bakkie(Farm van) ✓ (2) 	(4)

3.1.2 THREE sources of capital

- Commercial Bank ✓
- Land Bank ✓
- Development Finance Corporation Ltd. ✓
- Insurance companies ✓
- Agricultural cooperatives ✓
- Agricultural business partners ✓ (Any 3) (3)

- 3.1.3 • Net worth is the difference between ✓ the value of your assets ✓ and the value of your liabilities ✓ (3)

3.2 THREE functions of land as a production factor:

- Provides space ✓
- Provides raw materials ✓
- Provides food for humans and animals ✓
- It is a source of minerals used as fertilisers ✓ (Any 3) (3)

3.3 Approaches to management**3.3.1 Farmer A:**

- Sound financial management ✓
- Neatness/orderly
- Humanitarian relations/caring towards labour ✓ (Any 1)

Farmer B:

- Money saving approach/stingy farmer ✓
- Savings(worthiness record)/cash operation
- Not caring towards labourers/bad human relations ✓ (Any 1) (2)

3.3.2 Farmer A ✓**and**

Built new homes for workforce/water and electricity to workers/neatness stimulates motivation ✓ (2)

3.4 Coordination of production factors

- 3.4.1 (a) A ✓ (1)
 (b) C ✓ (1)
 (c) F/D ✓ (1)
 (d) B/E ✓ (1)
 (e) E ✓ (1)
- 3.4.2 • Supervision/Control/Coordination/organising ✓
 • Entrepreneur is supervising workers according to the plan ✓ (2)
- 3.4.3 • Planning skills ✓
 • Financial skills ✓
 • Management skills ✓
 • Human relations skills ✓
 • Risk orientation skills ✓
 • Communication skills ✓
 • Leadership skills ✓
 • Marketing skills ✓
 • Organisational skills ✓
 • Motivational skills ✓
 • Problem solving ✓ (Any 2) (2)
- 3.4.4 Owner/Farmer/Manager/Entrepreneur/A ✓ (1)

3.5 Labour management

- 3.5.1 B ✓ (1)
 3.5.2 A ✓ (1)
 3.5.3 D ✓ (1)
 3.5.4 E ✓ (1)
 3.5.5 B/D ✓ (1)

3.6 Labour legislation

- 3.6.1 (a) **The labour Relations Act (1995)**
 • It governs labour relations at workplace/unfair labour practices/regulates trade union activities ✓
 • It governs the involvement of workers in decision making ✓
 • It governs procedures for labour disputes/right to strike ✓
 (Any 1) (1)

(b) **Occupational Health and Safety Act (1993)**

- It deals with the safety of workers in the workplace/mutual responsibility on safety ✓
- It makes the farmer responsible to ensure that the working environment is safe ✓
- It holds the farmer responsible to provide protective clothing to workers ✓
- It holds the farmer responsible to train workers on operating machinery or equipment ✓

(Any1) (1)

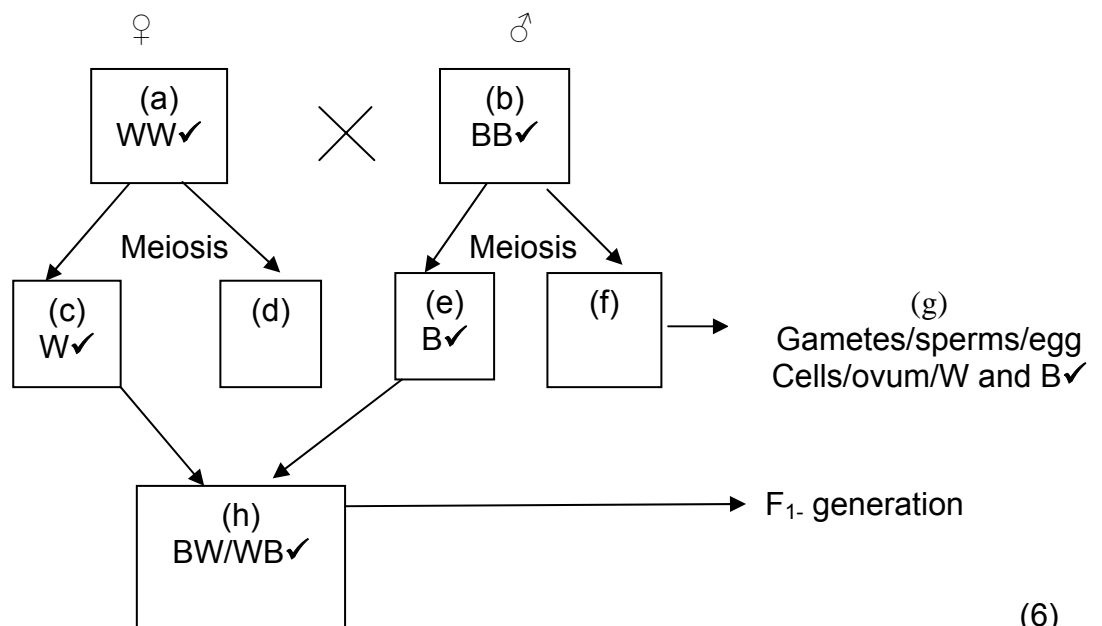
3.6.2 The Compensation for Occupational Injuries and Diseases Act ✓

(1)
[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 **Illustration of incomplete dominance**

4.1.1 **Completion of the missing answers in the blocks**



4.1.2 Incomplete dominance ✓

(1)

4.1.3 **Motivation on the type of dominance**

- Parents of P₁ have only homozygous (pure-bred) dominant genes/intermediate phenotype is shown in the offspring/none of the colours of parents are visible in the offspring ✓
- There are no recessive genes in all the generations ✓
- The phenotypic ratio of the F₂ is 1:2:1 ✓

(Any 2) (2)

4.1.4 Testes/Ovary/Primary sex organs/Primary reproductive organs ✓

(1)

4.2 Crossing of farm animals

- 4.2.1 Black ✓ and white ✓ (2)
- 4.2.2 Male ✓ (1)
- 4.2.3 $2/4 \times 100 \checkmark = 50\% \checkmark$
OR
50% ✓✓ (2)

4.3 Indigenous cattle breeds of South Africa

- 4.3.1 Indigenous cattle breeds of South Africa/Nguni cattle are reintroduced ✓ (1)
- 4.3.2 **Adaptation qualities of Nguni cattle**
- Resistant to a number of diseases ✓
 - Resistant to internal and external parasites ✓
 - Adapted to high excessive heat conditions ✓
 - High fertility ✓
 - Short calving interval ✓
 - High adaptation to poor quality grazing ✓
 - Long productive lifespan ✓
- (Any 3) (3)

4.4 Schematic representation of line breeding

- 4.4.1
- 13 ✓
 - 5 ✓
 - 7 ✓
- (3)
- 4.4.2 **Benefits of upgrading to livestock farmers**
- A new breed is gradually imported into the herd/fewer adaptation problems ✓
 - Economical way to raise the stock to a pedigree level ✓
 - Initial rapid results(50% improvement in first generation) ✓
 - Deformities and unwanted characteristics occur less frequent ✓
 - Expert knowledge not needed ✓
 - Creates a more uniform herd ✓
- (Any 3) (3)

4.5 FOUR selection methods used by livestock breeders

- Mass/individual selection ✓
 - Pedigree selection/blup ✓
 - Family selection ✓
 - Progeny selection/performance of progeny ✓
 - Natural selection ✓
 - Breeding values ✓
- (Any 4) (4)

4.6 Genetically modified sorghum

- 4.6.1
- Enriched with vitamins ✓
 - Balanced in terms of nutrition/prevent malnutrition ✓
 - To alleviate the problem of poverty/hunger in Africa ✓
 - Improve cultivars ✓
 - Improved seed appropriate for planting ✓ (Any 2) (2)
- 4.6.2
- GM sorghum will be vitamin enriched (packed) ✓
 - to help fight malnutrition ✓ (2)
- 4.6.3
- TWO dangers of GM food**
- GM food risk destabilising the environment/Contamination of local seed stocks ✓
 - GM food risk destabilising food production ✓
 - Socio-economic concerns ✓
 - Food safety/health risk ✓ (Any 2) (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150