basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2010

MARKS: 150

TIME: 2½ hours

This question paper consists of 19 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

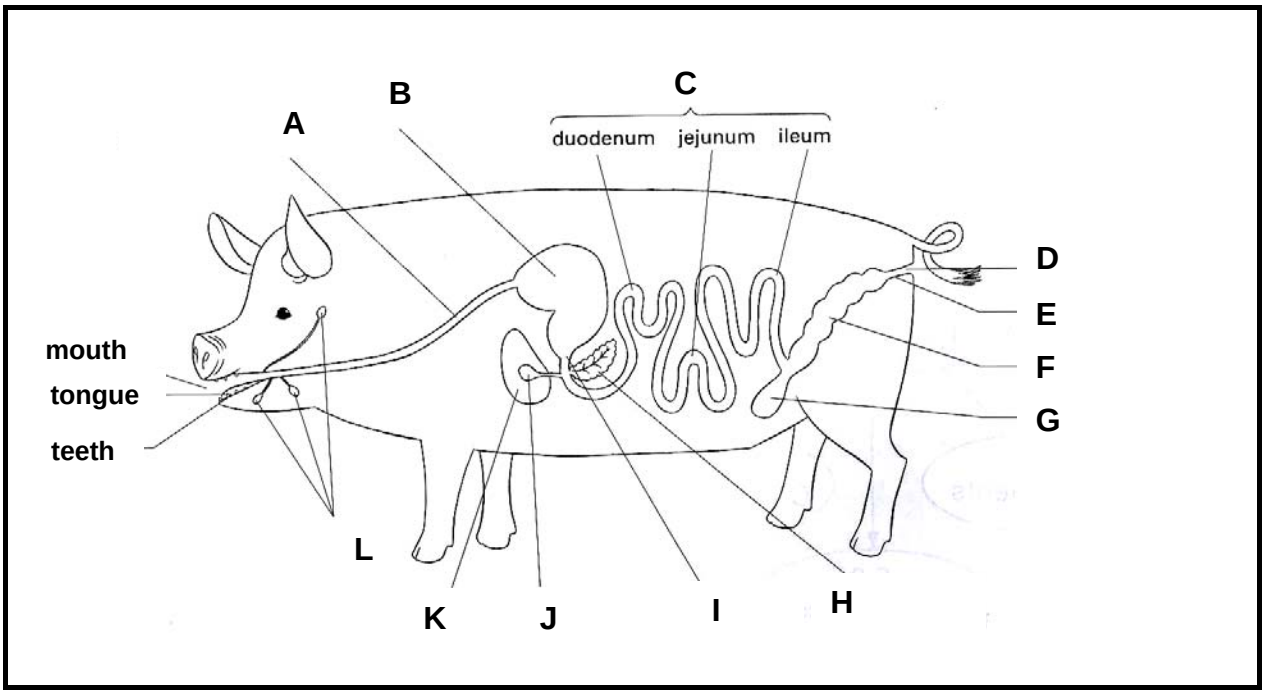
QUESTION 1

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	X	B	C	D

1.1.1 The diagram below illustrates the alimentary canal of a pig. The part of the alimentary canal labelled … is most suited for absorption.



A E
B C
C B
D A

1.1.2 The following animal feed could replace more than 60% of the feed intake of a sheep:

A Maize meal
B Carcass meal
C Lucerne hay
D Groundnut oilcake meal

1.1.3 The ingredient to be included in a winter lick to regulate the intake quantities by the ruminant animals is …

A bone meal.
B maize meal.
C fish meal.
D salt.

1.1.4 The digestibility of hay is also influenced by the age of the plant. Lucerne hay cut … will have the lowest digestibility.

A after the flowering stage
B during the full flowering stage
C during the beginning of the flowering stage
D before the flowering stage

1.1.5 One of the following methods of handling farm animals applies specifically to sheep:

A Working with animals using a neck clamp
B Sudden movement from behind
C Catching the animal as high as possible on a hind leg
D Throwing stones to direct the animals

1.1.6 The permanent intensive chicken housing system made of materials that are easy to clean, where the floor of the shed is covered by straw, sawdust or wood shavings is called a …

A free-range system.
B deep litter.
C close-range system.
D battery system.

1.1.7 Many farming enterprises could be described as intensive production enterprises. The following is NOT a characteristic of an intensive production enterprise:

A A relatively small piece of land is used for the enterprise
B Large sums of capital are invested in this enterprise
C Lots of labour is utilised in such an enterprise
D Enterprises that cover a vast area of land

1.1.8 In Africa cattle have traditionally always been acknowledged for their value in a community. Identify ONE of the following statements that does NOT fit with the others:

A Cattle add nutritional and commercial value through the meat, hide and milk that they produce.
B Cattle are used for ceremonial purposes like awards for weddings and lobola.
C Cattle are used for work purposes to prepare and cultivate land.
D Cattle are only seen as holy animals which should be worshipped.

1.1.9 A long muscular tube extending from the bladder to the tip of the penis of the bull is called the …

A vas deferens.
B epididymis.
C urethra.
D sigmoid flexure.

1.1.10 The life cycle of the single-host tick follows the following pattern of metamorphosis:

A Adult→eggs→nymphs→larvae
B Adult→nymphs→eggs→larvae
C Adult→eggs→larvae→nymphs
D Adult→larvae→eggs→nymphs (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:	Heartwater	A tick-borne disease transmitted by the blue tick
B:	Redwater	

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:	biuret	A substance which is added to a ration to supplement the protein component of the feed
	B:	urea	
1.2.2	A:	metabolic rate	The speed at which chemical reactions occur inside the body of an animal to release energy
	B:	digestible rate	
1.2.3	A:	oogenesis	The formation of female sex cells
	B:	spermatogenesis	
1.2.4	A:	dioestrus	The period of the oestrus cycle during which the progesterone hormone is secreted
	B:	oestrus	
1.2.5	A:	scabies	The condition caused by an external parasite like the mite which is a proclaimed disease
	B:	mange	

(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 The structure in the fowl which is a common opening for the digestive and urogenital systems

1.3.2 The energy value of a feed which represents the gross energy value minus the energy that is lost in the manure, urine, gases and through body heat

1.3.3 A restricted area where a large number of animals are kept for optimal production purposes

1.3.4 The type of micro-organism that causes foot-and-mouth disease in cattle

1.3.5 The insect that attacks the wet tail areas of sheep where eggs are laid and larvae breed out and cause severe damage to the skin

(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 <u>Passive</u> absorption takes place from a low concentration of molecules to a higher concentration and ATP supplies energy for this process.

1.4.2 Farm animals need a <u>maximum</u> environmental temperature to produce at the most cost effective levels with environmental control.

1.4.3 The structure erected at the entrance of a broiler unit to disinfect the feet of the workers, is called a <u>spray dip</u>.

1.4.4 The permanent removal of horn buds is done with the aid of a <u>burdizzo</u>.

1.4.5 <u>Branding</u> of lambs before they develop into ewes makes mating easier.

(5 x 1) (5)

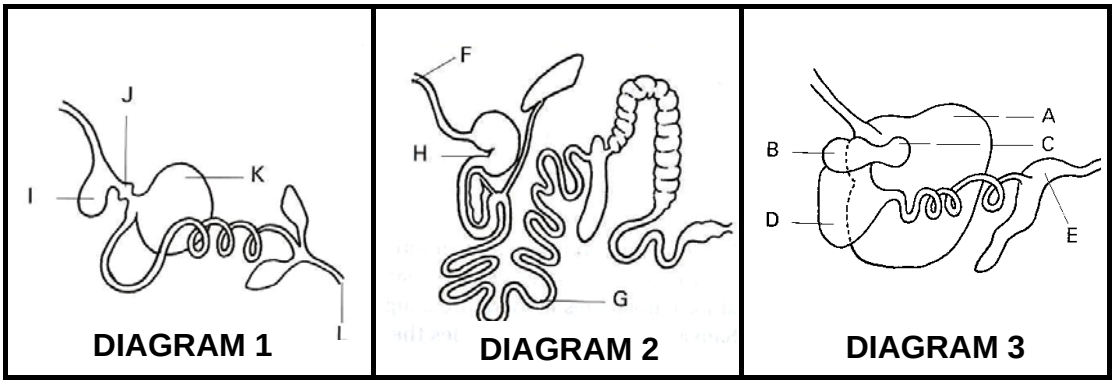
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: ANIMAL NUTRITION

2.1 The diagrams below indicate the alimentary canals of farm animals.



2.1.1 Evaluate DIAGRAM 3 and indicate why this animal would be classified as a ruminant. (2)

2.1.2 Identify the diagram above that has an organ in the alimentary canal that normally has small stones that are used for grinding food particles. (1)

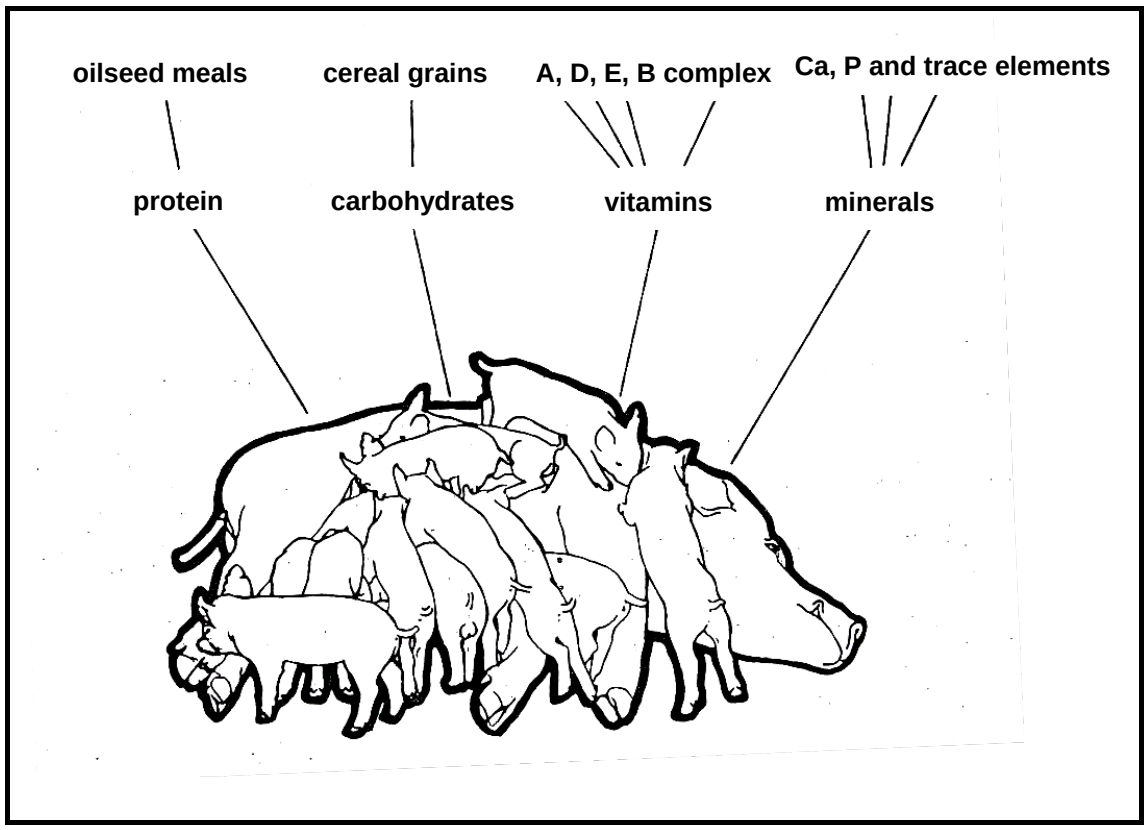
2.1.3 Name TWO types of micro-organisms that are found in the stomach areas of the ruminant animal (DIAGRAM 3). (2)

2.1.4 State TWO conditions that exist in the stomach that provide the ideal living conditions for the micro-organisms in the stomach of this ruminant animal in DIAGRAM 3. (2)

2.1.5 A ruminant animal underwent a change in its nutrition after being marketed to a feedlot. The rations of the animals were changed from a roughage percentage of 60% to a roughage percentage of 40%.

Describe THREE possible changes in the digestion process because of this change in the rations to increase the production output. (3)

2.2 The diagram below depicts a sow with a litter of piglets that needs balanced nutrition to grow. The sow is housed in a furrowing pen that has a cement floor. To meet the nutritional requirements of the piglets, the farmer made provision for the different types of feeds and supplements as follows: oilseed meals, cereal grains, vitamins A, B complex, D and E and calcium (Ca), phosphorus (P) and trace elements or micro-elements.



2.2.1 Recommend an important trace or micro-element for the piglets that may be deficient in the pen that has a cement floor. (1)

2.2.2 Name the metabolic disease that is associated with deficient levels of the element mentioned in QUESTION 2.2.1. (1)

2.2.3 State the cheapest and easiest method of supplementing the element mentioned in QUESTION 2.2.1. (1)

2.2.4 Name TWO functions of the element mentioned in QUESTION 2.2.1 in the animal body. (2)

2.2.5 Feeds for farm animals can be grouped as sources of nutritional components. Name ONE nutritional component that is not indicated in the schematic representation above. (1)

2.2.6 Choose the relevant feed, vitamin or mineral that is associated with the following descriptions from the given list provided in the schematic representation.

For example:

QUESTION: Feed that supplies energy to the piglets and the sow

ANSWER: Cereal grains

(a) Production of more milk for the suckling piglets (1)

(b) A vitamin supplement to prevent rickets during the growth of the piglets (1)

(c) Prevention of night blindness of the piglets and the sow (1)

(d) Feed which could be transformed into glycogen for the storage of energy in the animal body (1)

2.3 During a digestibility trial with maize consumed by a pig, 49 kg of maize was consumed and 12 kg of manure was excreted. The results are indicated in the table below.

COMPONENTS MEASURED	DRY MATERIAL	CRUDE PROTEIN	CRUDE FIBRE	NITROGEN-FREE EXTRACT
Maize	40,33 kg	4,80 kg	0,94 kg	34,32 kg
Droppings	4,6 kg	0,86 kg	0,62 kg	2,11 kg
Amount digested	37,73 kg	3,94 kg	0,32 kg	32,21 kg
Digestibility coefficient	89%	82,08%	34,4%	93,85%

2.3.1 Calculate the moisture content of the manure or droppings as a percentage. (Show ALL the calculations.) (3)

2.3.2 The feed that was investigated in the above experiment was a concentrate. Give TWO reasons from the data in the table above to support this statement. (2)

2.3.3 Name the TWO components of a feed that are represented by the nitrogen-free extract. (2)

2.3.4 State THREE methods to improve the digestibility of maize as a grain feed. (3)

2.4 You have been approached by a group of farmers who want to feed their lactating ewes some concentrate feed in addition to their normal grazing. The farmers say they can buy some maize and sunflower oilcake meal cheaply. You do some research and find out that maize has a crude protein content of 10,6% and sunflower oilcake meal has a crude protein content of 40%. These lactating ewes require 13,4% crude protein in their concentrate.

2.4.1 Use the Pearson-square method to calculate the ratio in which maize and sunflower oilcake meal should be mixed to get to the required crude protein value for these lactating ewes. (4)

2.4.2 Choose the production status of these ewes from the options below that requires them to have a relatively higher protein requirement:

- Lamb ewes
- Dry ewes
- Pregnant ewes
- Lactating ewes

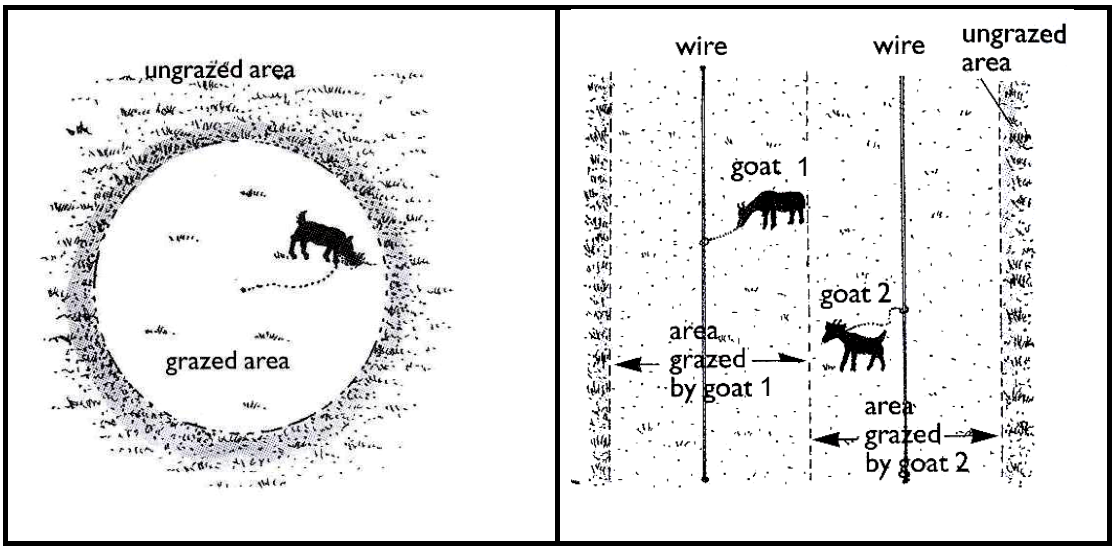
(1)
[35]

Start this question on a NEW page.

QUESTION 3: ANIMAL PRODUCTION

3.1 A young rural farmer has limited funds and a grazing area next to a neighbour's orchard and planted vegetable garden. Initially the farmer used a pen with a chain to tie goats down, as indicated in DIAGRAM A. The young farmer was later advised by the grandparent to use a running tether as illustrated in DIAGRAM B.

A **B**

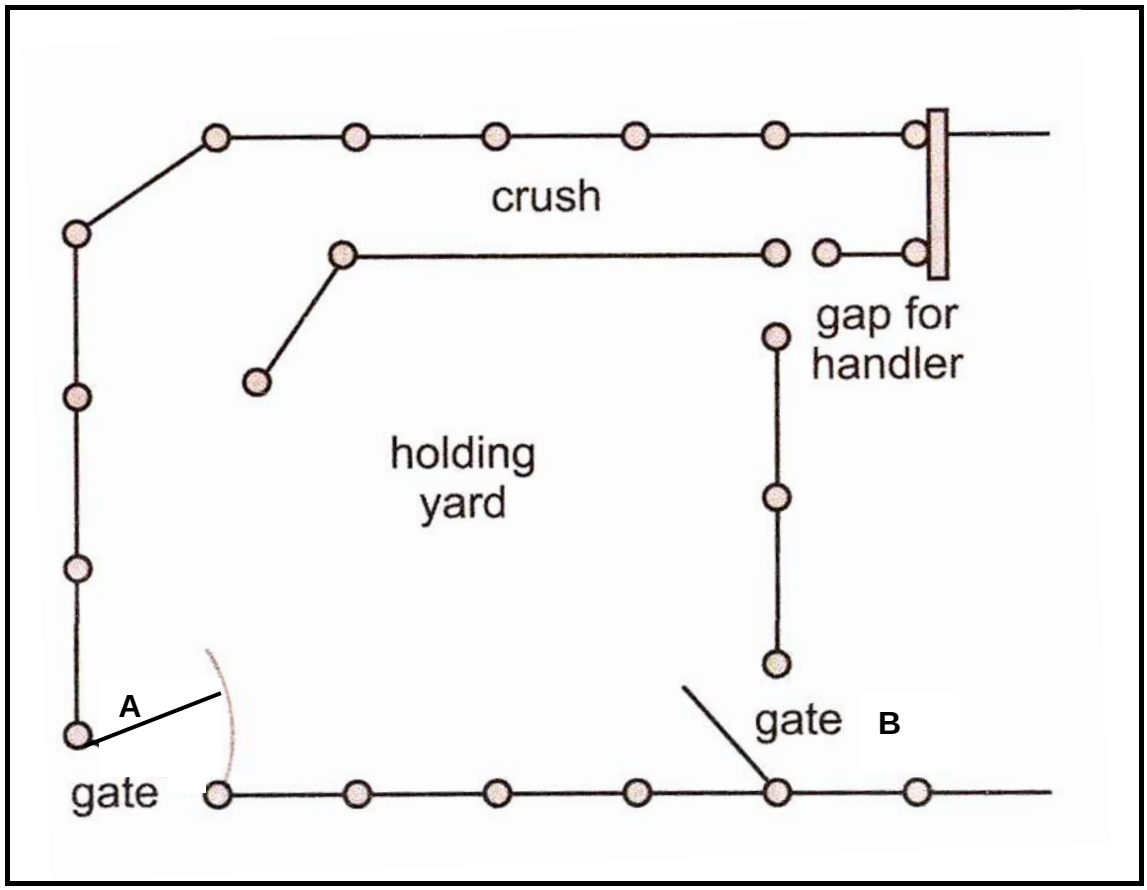


3.1.1 Give TWO possible reasons why this young farmer limited the movement of these goats. (2)

3.1.2 Compare the effective use of pastures according to the method used in DIAGRAM A and the method used in DIAGRAM B. (2)

3.1.3 Name ONE alternative method of controlling the movement of goats during grazing that is not illustrated above. (1)

3.2 The illustration below represents a handling facility for cattle.



3.2.1 State TWO factors that should be considered when designing and building a handling facility like the one in the above diagram. (2)

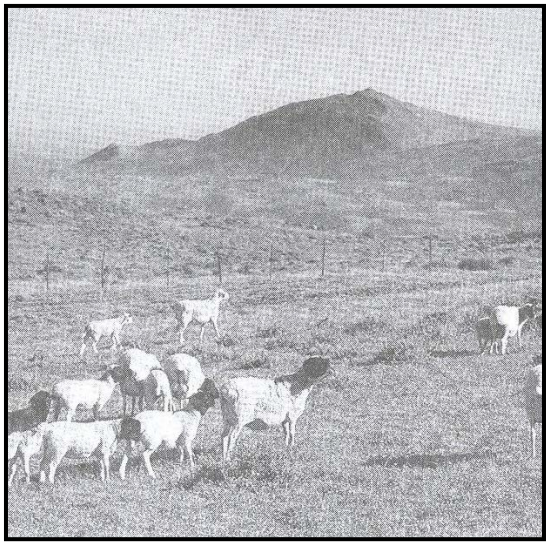
3.2.2 Give TWO reasons why it is important to have a crush in a handling facility. (2)

3.2.3 Describe FOUR basic principles that need to be implemented when handling cattle in a facility like the one indicated above. (4)

3.2.4 State TWO consequences or implications of not following the basic principles mentioned in QUESTION 3.2.3. (2)

3.3 The following pictures illustrate two production systems. PICTURE A shows a sheep farming enterprise in the Karoo and PICTURE B shows a farmer working in a layer unit.

A



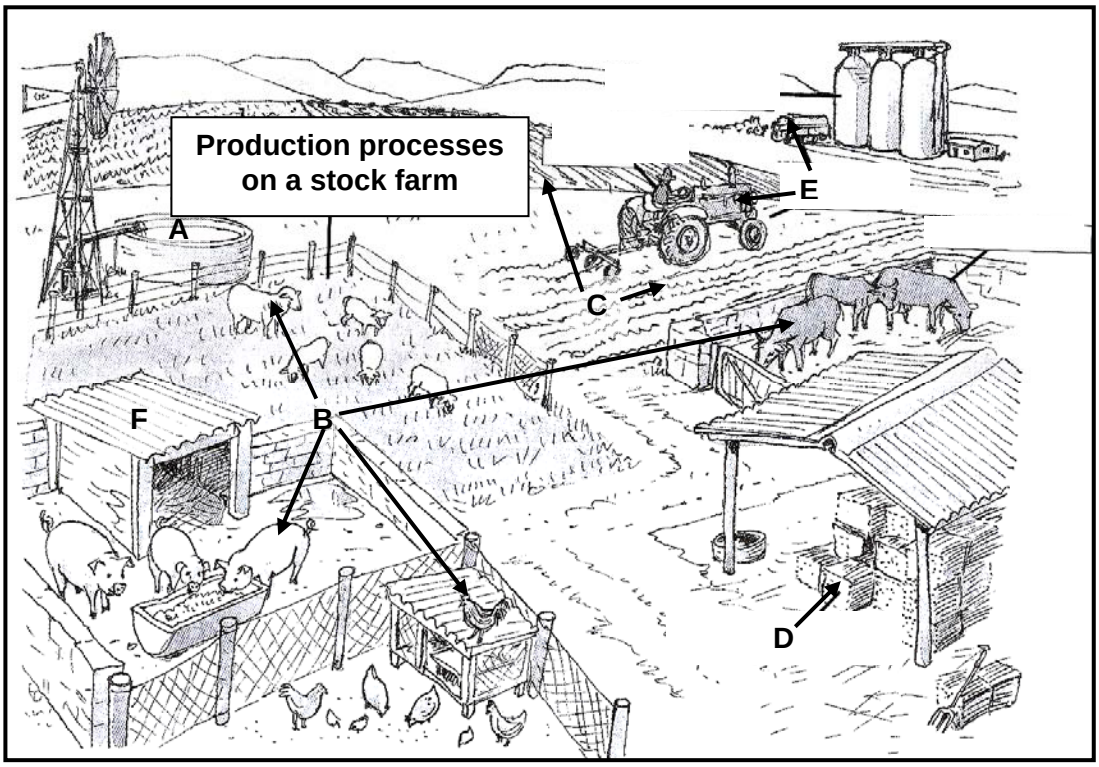
B

3.3.1 Identify whether PICTURES A and B above represent intensive or extensive production systems. (2)

3.3.2 Tabulate TWO differences between the production systems mentioned in QUESTION 3.3.1. (4)

3.3.3 Name a farming enterprise, related to the pictures above, which has the highest risk factor with regard to climate. Justify your answer. (2)

3.4 The picture below represents some actions in the production process on a stock farm.



Use the picture above and indicate the letter (A – F) that represents the actions that are used in this animal production enterprise with regard to the following:

3.4.1 Storage of feeds (1)

3.4.2 Animal populations (1)

3.4.3 Planted pastures (1)

3.4.4 Water provision (1)

3.5 The farmer in the picture below has measured the milk yield of each dairy cow in the herd. The table on the right gives the average yield per cow measured on a monthly basis over the lactation period of 9 months.

TIME (MONTH)	MILK YIELD (kg)
1	600
2	650
3	620
4	590
5	560
6	530
7	500
8	480
9	460

3.5.1 Draw a line graph to represent the average monthly yield of these dairy cows over the 9 month lactation period. (4)

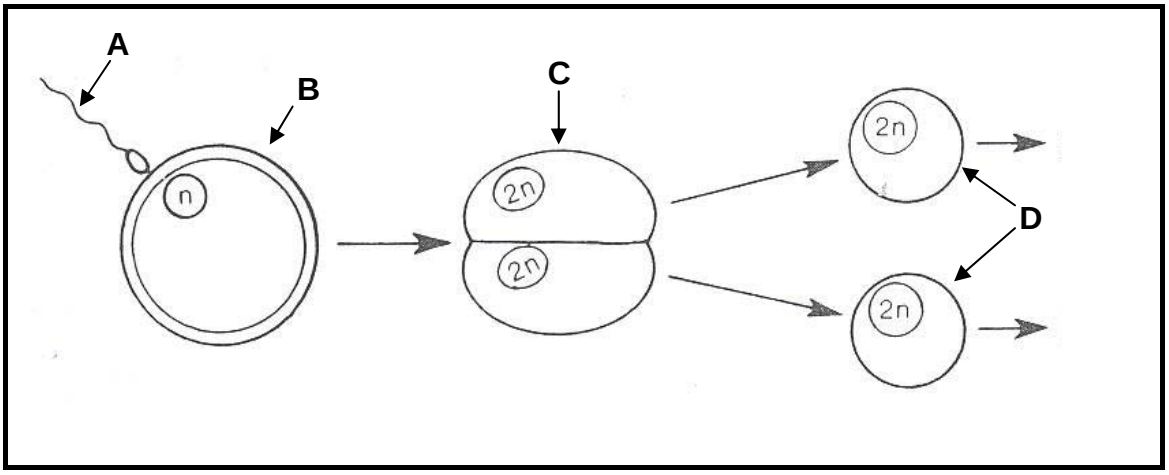
3.5.2 Name the instrument used by this dairy farmer to measure the quantities of milk. (1)

3.5.3 Calculate the total monthly average milk production over a lactation period of 9 months, as indicated in the table. (3)
[35]

Start this question on a NEW page.

QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

4.1 The diagram below illustrates a process that occurs during reproduction.

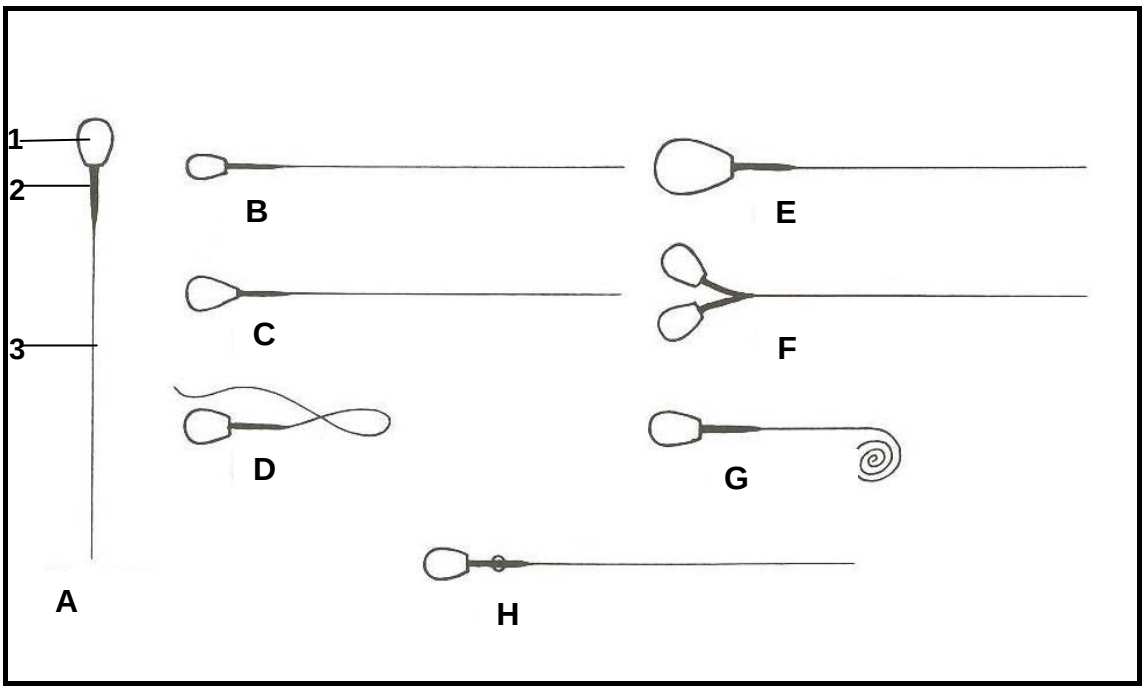


4.1.1 Name the process that takes place between parts **A** and **B**. (1)

4.1.2 Label parts **A** to **D**. (4)

4.1.3 Name the type of twins which develops in the diagram above. (1)

4.2 The diagrams below indicate morphological abnormalities of structures that play an important role in normal animal reproduction.



4.2.1 Identify the part labelled **2** in structure **A** above. (1)

4.2.2 Select the normal structure of a sperm cell from **A** to **H**. (1)

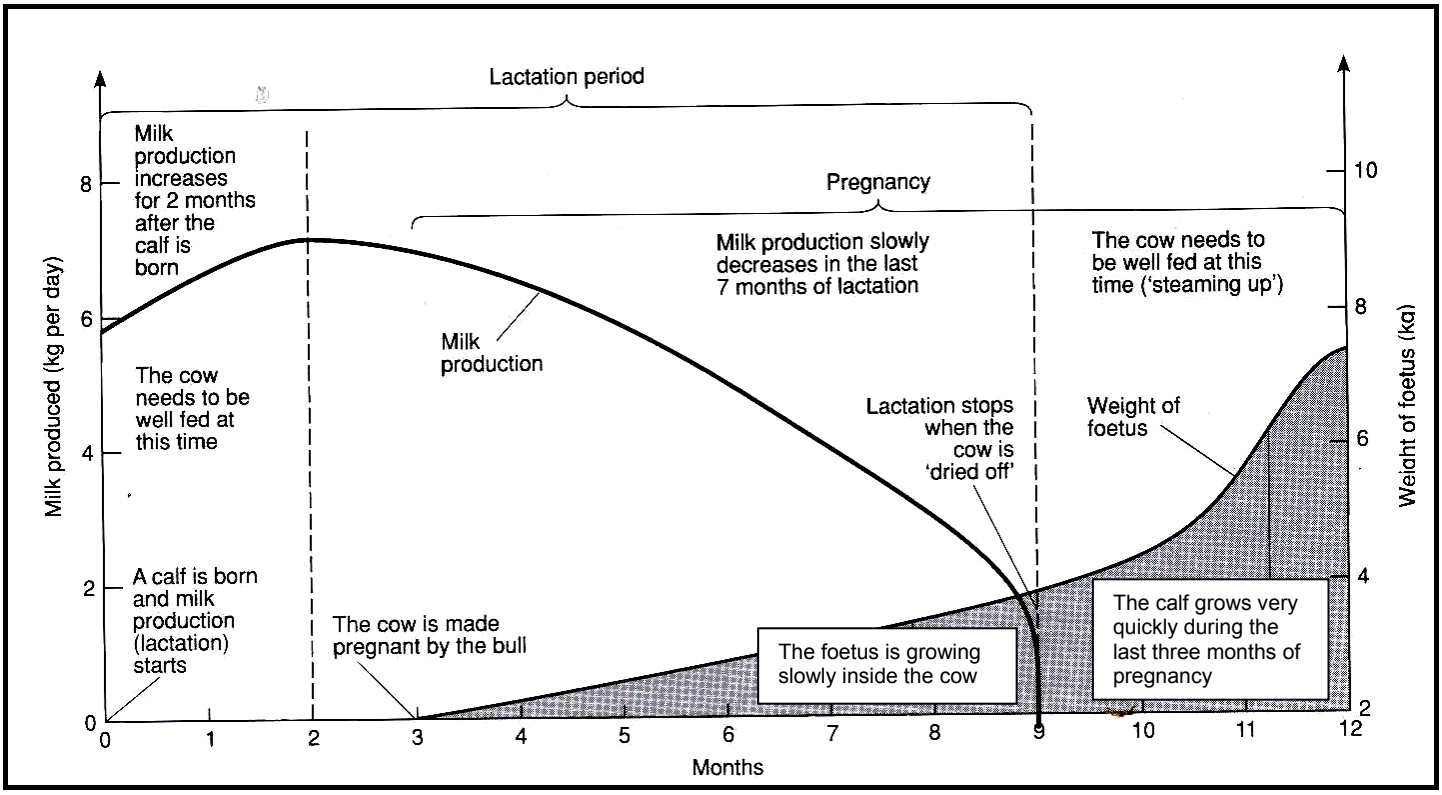
4.2.3 Name the section of the sperm that would be responsible for the following:

(a) Movement (1)

(b) Carrier of genetic information (1)

4.2.4 Name the organ where the structures illustrated on the previous page are formed. (1)

4.3 The graph below represents the annual reproductive aspects in the life of a dairy cow.



4.3.1 List THREE activities that occur in the first two months after calving in the life of this cow. (3)

4.3.2 Identify the month (indicated as **1** to **12**) when this cow will be inseminated. (1)

4.3.3 Name the TWO months when the calf foetus will grow at the fastest rate. (2)

4.3.4 Indicate the length of the following processes in months:

(a) Duration of the pregnancy period (1)

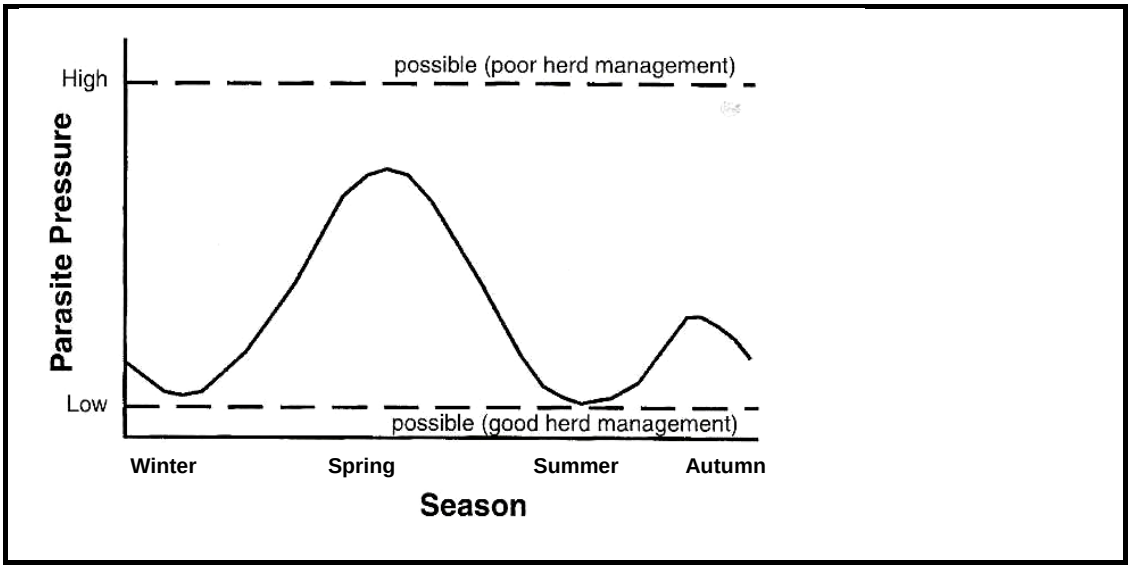
(b) Duration of the lactation period (1)

(c) Duration of the dry period (1)

4.3.5 Determine the approximate weight of the foetus at month 10. (1)

4.4 Name FOUR bacterial diseases that affect production in livestock. (4)

4.5 The figure below indicates the seasonal trends in the occurrence of parasites that vary with regard to season and management.



4.5.1 Name the season with the highest parasite pressure (infestation). (1)

4.5.2 Give a reason for the high parasite pressure (infestation) during the season mentioned in QUESTION 4.5.1. (1)

4.5.3 State TWO good herd management practices that may lead to less parasite pressure (infestation). (2)

4.5.4 Suggest a way of diagnosing parasite infestations. (1)

4.5.5 State THREE economic impacts of internal parasites. (3)

4.5.6 Identify TWO biological control measures of internal parasites. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

SECTION A

CENTRE NUMBER: | | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

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