

GRADE 12

AGRICULTURAL SCIENCES P1

SEPTEMBER 2009

MARKS: 150

TIME: 2½ hours

This question paper consists of 19 pages and an answer sheet.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. 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 make sure you answer what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Write neatly and legibly.

SECTION A**QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and make a cross 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 awarded if more than one cross (X) appears for an answer.

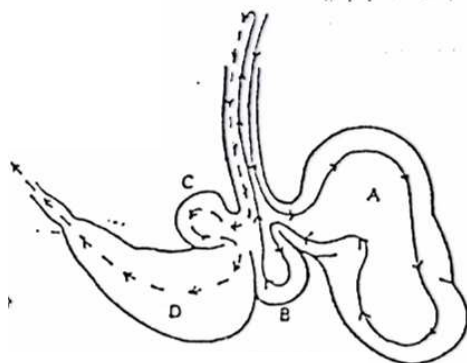
Example:

1.1.11	☒ A	B	C	D
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- 1.1.1 The process that pushes food through the alimentary canal by the relaxation and contraction of muscles in the wall of the alimentary canal is called ...

A assimilation.
B absorption.
C peristalsis.
D digestion.

- 1.1.2 The following diagram represent the movement of food through the stomach of a ...



A chicken.
B horse.
C pig.
D cow.

- 1.1.3 The substances that are released during the digestion of roughages by micro-organisms in the rumen:
- fatty acids
 - methane
 - oxygen
 - cellulose

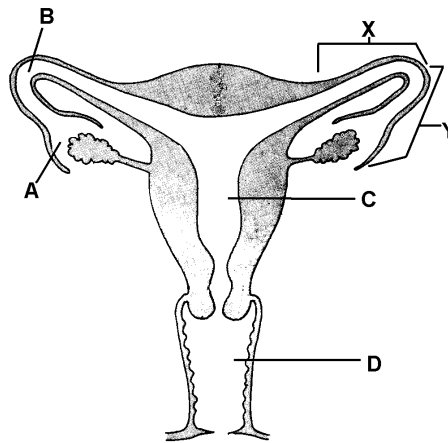
A i and ii
B i, ii and iii
C i, ii, iii and iv
D ii and iii

- 1.1.4 A ration for beef cattle has 60% digestible non-nitrogen substances and a digestible protein value of 12%. The nutritive ratio of this ration is ...
- A ideal for maintenance.
 - B wide.
 - C narrow.
 - D ideal for animals which are not producing.
- 1.1.5 A concentrate could be defined using the following characteristic:
- A Has a large volume per unit mass.
 - B Has a high crude fibre value.
 - C Has a small volume per unit mass.
 - D Has a low percentage of digestible nutrients.
- 1.1.6 The dry material intake by an animal was 12kg and the dry mass of the manure was 4kg. The coefficient of digestibility of this feed is approximately ...
- A 50%.
 - B 60%.
 - C 67%.
 - D 70%.
- 1.1.7 A dairy farmer runs an intensive dairy production unit and decided to erect cow houses for the cows in his herd. He erected sheds with open sides over the feedlot area where the cows were kept. Which of the following statements with regard to this production enterprise is true?
- i Temperature control was provided to the animals
 - ii The milk production of this dairy increased after the cow houses were erected
 - iii Rotational grazing is practiced on this farm
 - iv This enterprise is capital intensive (lots of capital invested)



- A i, ii, iii and iv
- B iii and iv
- C i and iii
- D i, ii and iv

- 1.1.8 The part labeled ... in the diagram below represents the structure in which the fetus attach and grow during pregnancy.



A **A**
B **B**
C **C**
D **D**

- 1.1.9 The picture below represents a sheep with metabolic disease condition that is caused by 'n mineral deficiency (severely deformed front legs are visible). The mineral deficiency represented in the picture could be prevented by adding ... to a ration for these animals.



A bone meal
B salt
C iron sulphate
D copper sulphate

- 1.1.10 The picture below represents a cow and calve very soon after calving (parturition). The cow provides protection against disease to the young calve ...



- A by licking the young animal clean.
 - B breathing into the young animal and exchanging organisms.
 - C by providing nutritious colostrums (beestings) to the young calve.
 - D by hiding the calve from the rest of the herd.
- (10 x 2) (20)

- 1.2 In the table below, a statement and two possible answers is given. Decide whether the statement 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 in the appropriate block next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET. .

EXAMPLE:

COLUMN A		COLUMN B
A:	Maize meal	an example of concentrate that is rich in protein
B:	Fish meal	

ANSWER:

The statement refers to:			
Only A	Only B	A and B	None
A	~~B~~	C	D

COLUMN A/Answers			COLUMN B/Statements
1.2.1	A	Rumen	the part of the stomach where enzymatic digestions mainly occurs
	B	Duodenum	
1.2.2	A	Milk fever	vitamin A deficiency disease
	B	Night-blindness	
1.2.3	A	Lucerne hay	an example of a juicy roughage
	B	Silage	
1.2.4	A	Stimulate the ovaries to produce eggs	the main function of the hormone(s) produced by the Corpus Luteum
	B	Delay the secretion of FSH	
1.2.5	A	Dosing	the method of application used to apply the bark from some tree species which is chopped up and boiled in water to make an indigenous medicine extract used to treat internal parasites
	B	Injecting	

(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 ANSWER SHEET.

- 1.3.1 The enzyme in the saliva of the pig which causes the chemical change from starch to simple sugars
- 1.3.2 Finger-like outgrowths that absorb nutrients inside the small intestines
- 1.3.3 The colour of the flag which is carried by the handlers when animals are moved along a roadside to warn oncoming traffic of these animals
- 1.3.4 The phenomenon where the testes remain in the abdominal cavity
- 1.3.5 The process by which the ripe ovum is released into the infundibulum

(5 x 2)

(10)

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

1.4.1 Protozoa and bacteria are aerobic microorganisms found in the rumen of the ruminant.

1.4.2 Urea is a white, water-soluble, crystalline substance used to supplement carbohydrates in a ration for ruminants.

1.4.3 The membrane that surrounds the unborn calve and which is responsible for the removal of urine is the placenta.

1.4.4 Ticks live and feed on its host and could therefore be described as a disease.

1.4.5 The chemical produced by the animal body to provide protection against disease is called antibiotics. (5 x 1) (5)

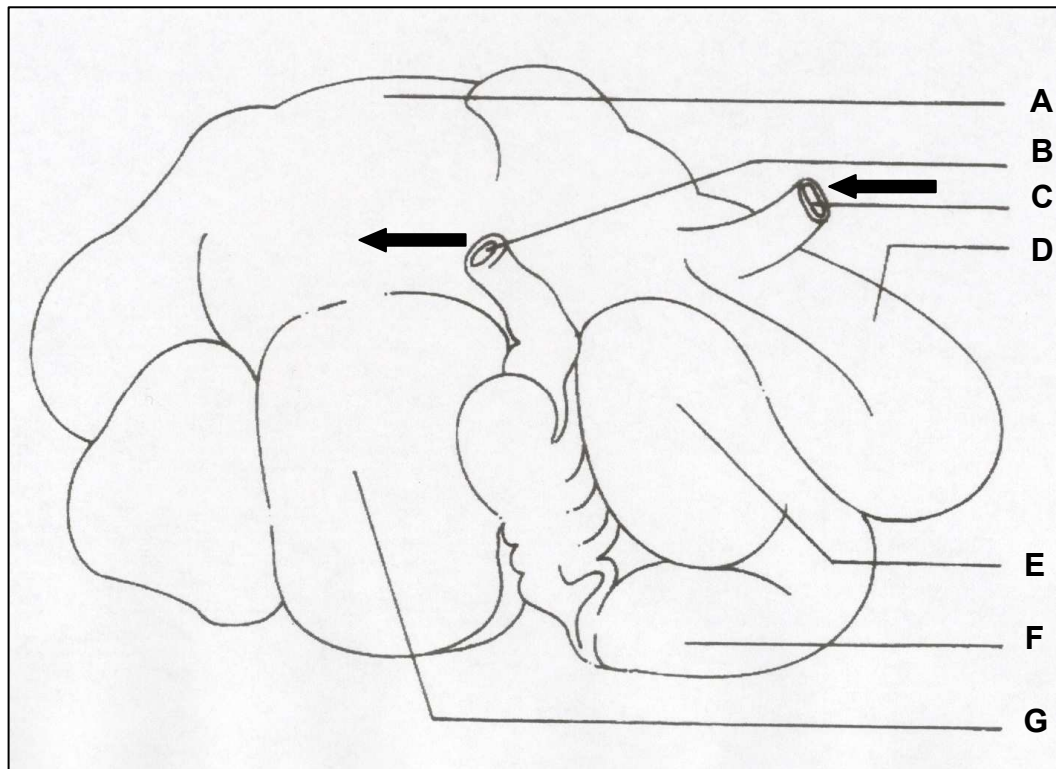
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page in the ANSWER BOOK.

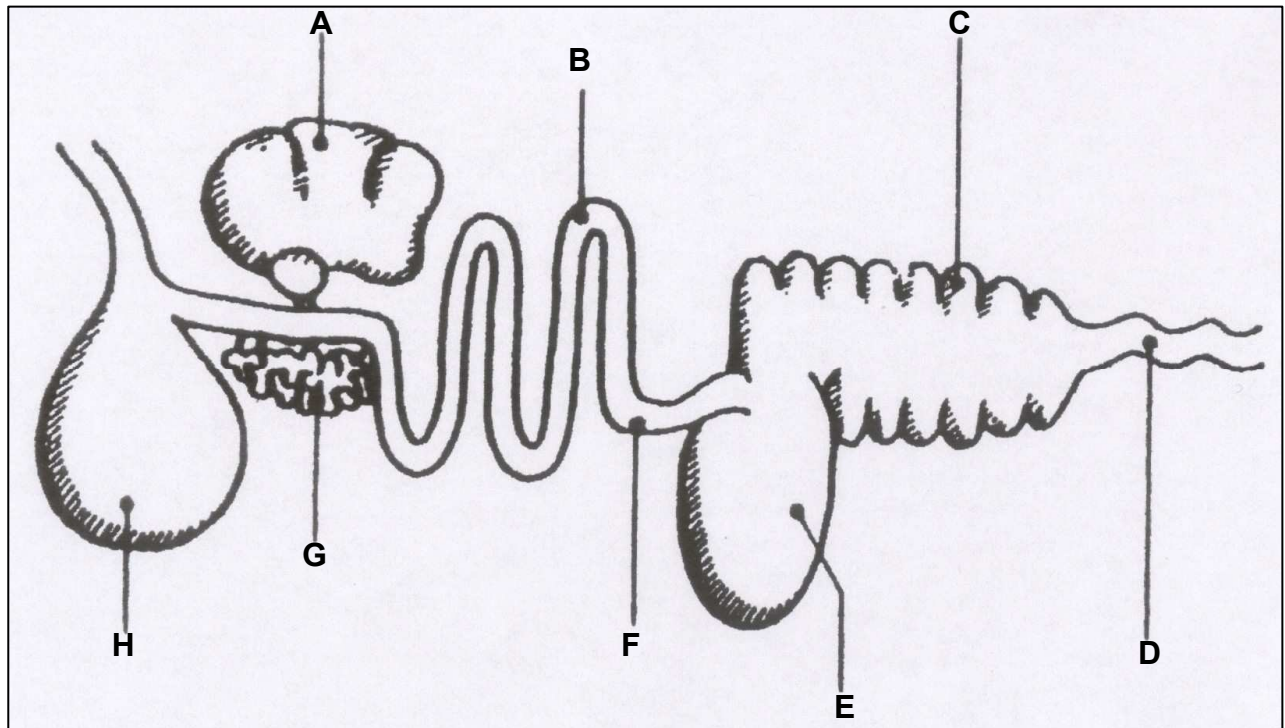
QUESTION 2: ANIMAL NUTRITION

- 2.1 The diagram below represents the stomach parts of a special group of farm animals.

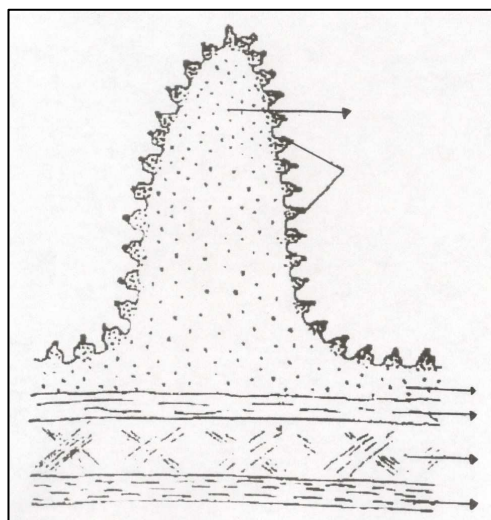


- 2.1.1 Identify the group of farm animals represented by the type of stomach illustrated above. (1)
- 2.1.2 Briefly describe the appearance and condition of food particles entering through positions labeled C and B respectively. (2)
- 2.1.3 Briefly describe the main difference in appearance of the stomach between a young and adult animal with this type of stomach illustrated above. (2)
- [5]

2.2 The diagram below represents the alimentary canal of a farm animal.



- 2.2.1 Identify the possible farm animal represented in the diagram above. (1)
- 2.2.2 Name of the parts labeled B, C and H. (3)
- 2.2.3 The structure labeled A produce a digestive liquid. Identify this liquid and indicate the main function of this digestive liquid. (2)
- 2.2.4 Identify the structure illustrated in the diagram below and supply the letter of the part of the digestive system above where this structure would be found. (2)

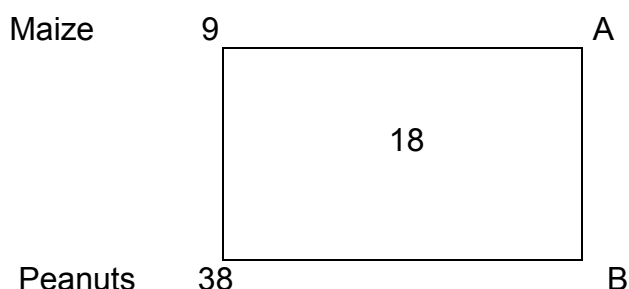


- 2.2.5 Describe THREE adaptations visible in the structure indicated in question 2.2.4 that would increase the rate of absorption of digested food particles.

(3)
[11]

- 2.3 A farmer has maize and raw peanuts available for a balanced ration to prepare for his dairy cows. They need 18% protein in their ration for milk production. Maize has a protein content of 9% and peanuts have a protein content of 38%.

Use this square method below to calculate your answers in the questions that follow.



- 2.3.1 Determine the ratio in which the available feeds should be mixed to get the required protein value in the ration for these cows.

(4)

- 2.3.2 Identify the type of feed component source represented by maize and peanuts respectively.

(2)

- 2.3.3 Justify the nutritive requirement needed for these animals.

(3)

[9]

- 2.4 'The digestive coefficient is that part of a feed that is not excreted but absorbed by the animal.'

The moisture content of the lucerne hay is 10%.

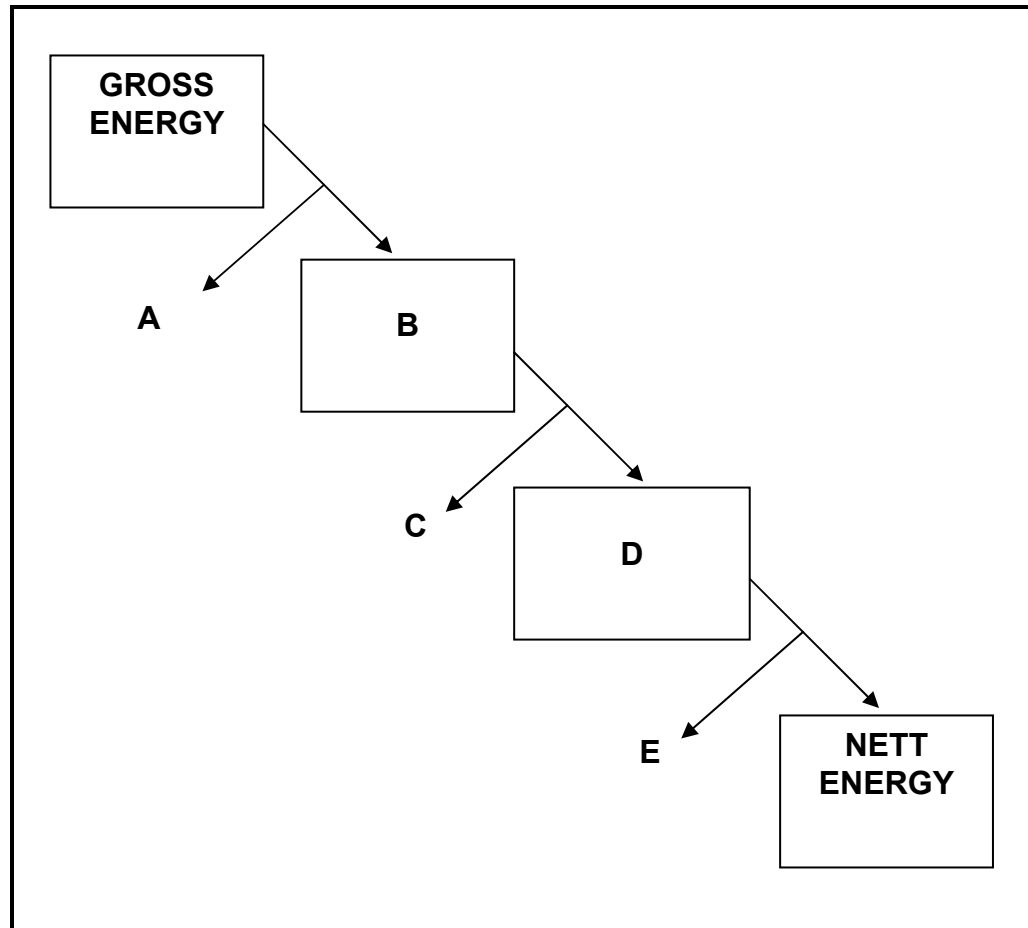
A goat consumed 10 kg of the lucerne hay and 4 kg (dry mass) is excreted in the manure.

Refer to the information above and calculate the digestive coefficient (as a %) of the lucerne hay.

Show ALL the calculations.

(5)

- 2.5 The schematic representation below illustrates the relationship between the different types of energy or measures of energy in a feed. Redraw the schematic representation and complete the missing information indicated by A to E.



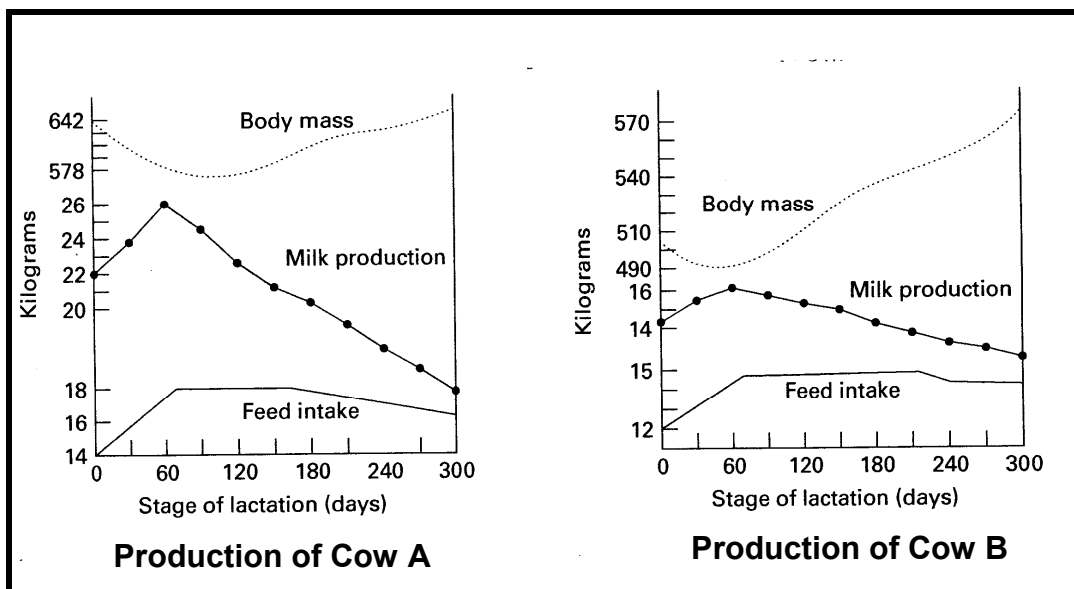
(5)

[35]

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 3: ANIMAL PRODUCTION

- 3.1 The following graphs illustrate the milk production of two cows (Cow A and Cow B) over a period of a year.



- 3.1.1 Describe and compare the milk production of Cow A with that of Cow B. (4)
- 3.1.2 Explain the changes in body mass for cow A over the period of 300 days. (2)
- 3.1.3 Identify the cow that would be most suited to use in a dairy production unit. Give a reason to support your answer. (2)
- 3.1.4 Indicate a cost item visible in the graphs above that would contribute to the expenses of a dairy farmer. (1)

[9]

3.2

SCENARIO

Indigenous knowledge has played an important role in Agriculture in South Africa. Animal keeping was not only for meat and milk production in the past. Ancestors used dry cow dung to make fire, fresh dung for cleaning floors of huts and to produce kraal manure which was used as a fertiliser. Oxen were used for ploughing. Clothes were produced from hides and skins of animals.

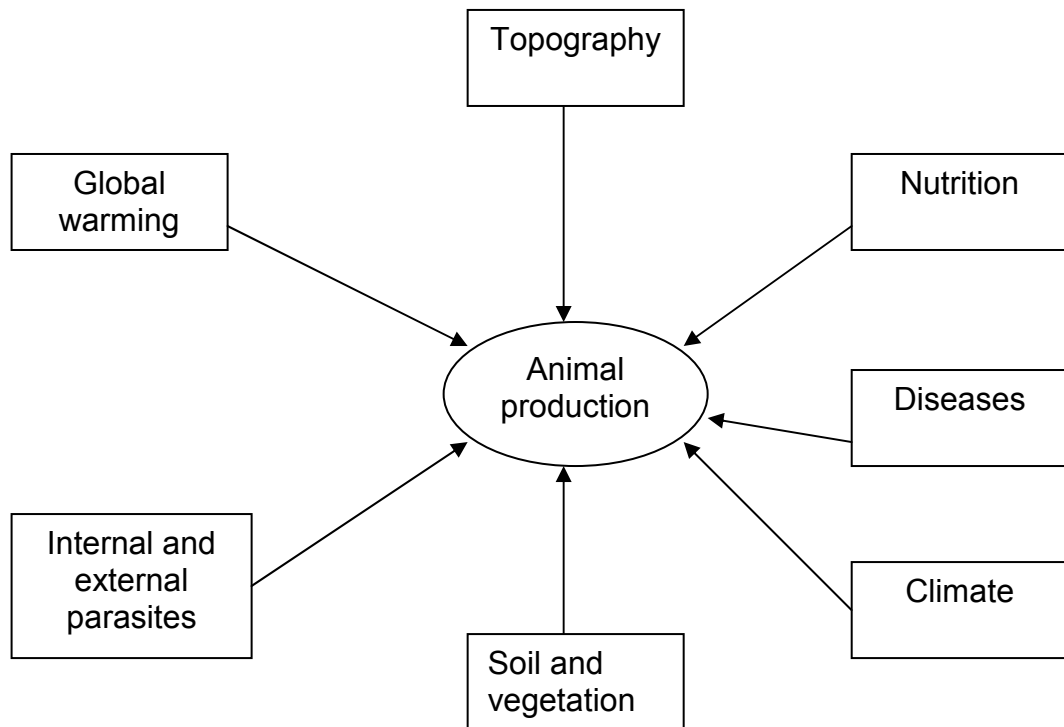
These indigenous practices are still relevant in farming enterprises today.

- 3.2.1 Identify TWO products from the scenario above that were produced from animals other than milk and meat. (2)

3.2.2 Suggest TWO uses for keeping animals in the past which are not mentioned in the scenario.

(2)
[4]

3.3 Below is a schematic representation that illustrates some environmental factors that affect the production of farm animals.



3.3.1 Briefly explain the TWO major effects of global warming on climate and the environment of an animal production enterprise.

(2)

3.3.2 Name any FOUR factors from the schematic representation that can be controlled by the farmer to improve animal production.

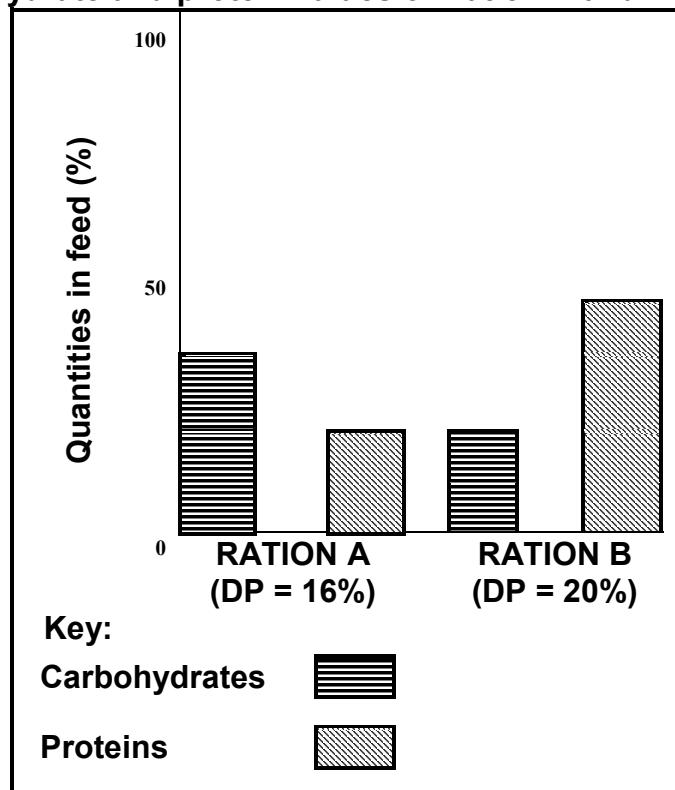
(4)

3.3.3 Describe TWO effects that external parasites have on animal production.

(2)
[8]

- 3.4 The following rations marked A and B have been analysed for carbohydrates and protein content. A digestible protein (DP) value for each ration is also included.

The carbohydrate and protein values of Ration A and Ration B:



- 3.4.1 Identify the ration from the ones above which would be most suitable for each of the following situations. Write down only the letter of the ration and give a reason to support your answer.

- (a) A well balanced ration for horses in training (2)
- (b) A high-energy ration for growing pigs (2)
- (c) A carbohydrate-rich ration for the fattening of old ewes (2)

- 3.4.2 The following is a list of feeds used on a stock farm:

Fish meal Maize meal

Choose the feed source that would be most dominant in each of the rations marked A and B above. Briefly motivate your answer.

(4)
[10]

- 3.5 The table below represents the lower critical temperatures of some farm animals.

Farm animal	Lower critical temperature (°C)
A	2
B	10
C	27
D	18
E	15
F	10
G	21
H	15
I	7

Draw a bar graph to compare the lower critical temperatures of the different farm animals with each other.

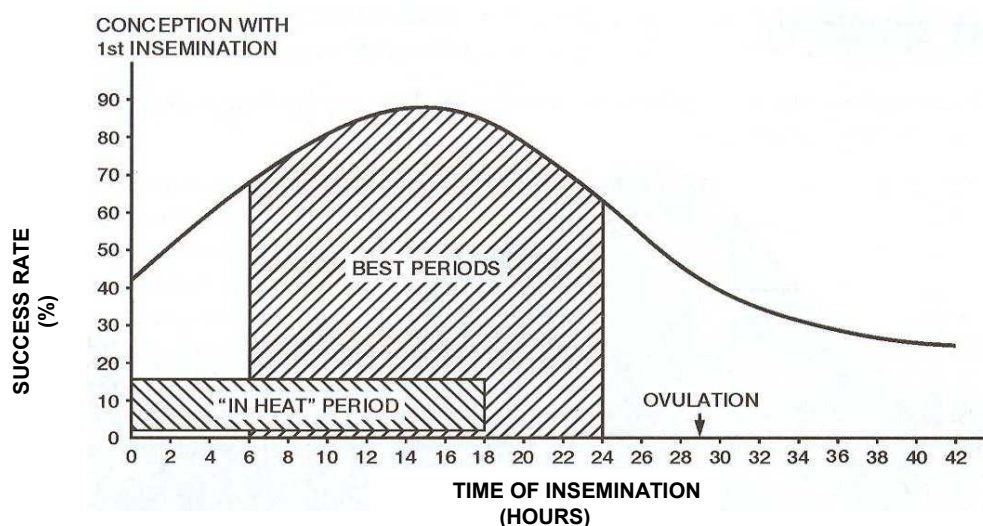
(4)

[35]

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

- 4.1 A crucial factor in the insemination technique is to do the procedure at the correct time in the oestrus period. The following graph depicts the optimal time for Artificial Insemination (AI):



- 4.1.1 Indicate the time in hours during which the cow will be on heat. (1)
- 4.1.2 Deduce from the graph the best time to inseminate a cow for optimal results. (1)

4.1.3 Determine the time in hours when ovulation will occur. (1)

4.1.4 Provide the main reason for the increase of the commercial value of the herd when AI is used. (1)
[4]

4.2 The diagrams below indicate the reproductive structures of farm animals:

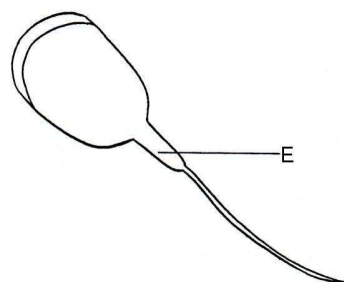


Diagram 1: A sperm cell from a bull

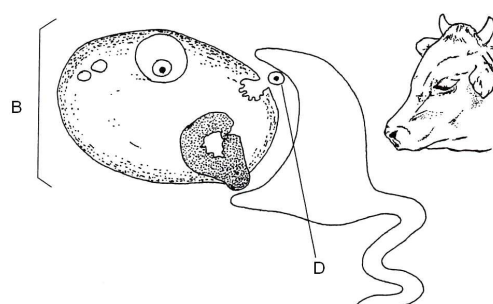


**Diagram 2:
The reproductive system of a cow**

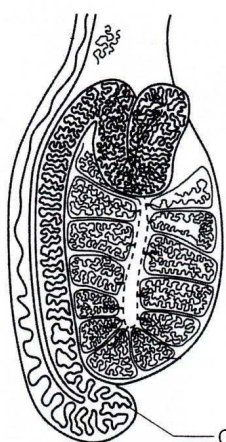


Diagram 3: Cross-section of a testis

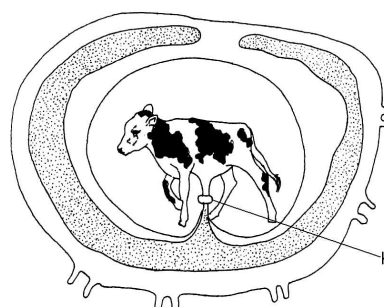


Diagram 4: The foetus of a calf

4.2.1 Identify the parts labeled C and E in the diagrams above. (2)

4.2.2 Name the process and indicate the product that would form when the structure in Diagram 1 fuses with the part labeled D in Diagram 2. (2)

4.2.3 Describe the process that occurs in Diagram 2 and refer to the main hormone that controls this process. (3)

4.2.4 Name the product that form in the tubules in the main structure indicated

by Diagram 3. (2)

4.2.5 Name the main function of the part labeled C in Diagram 3. (1)

4.2.6 Briefly describe the nutrition of the unborn calf as indicated by Diagram 4. (2)
[12]

4.3 The case study below refers to the drying up and resting of cows.

The ideal milk production system is to have a cow produce for ten months and then rest for two months. The cow is then served or artificially inseminated three months after calving. Milking of a cow is stopped two months prior to calving or when production is too low to be economical.

The rest period allows a cow to restore her body reserves which were broken down during the lactation period. The cow has to be kept in a good condition during the resting period to maintain the restoration period, as well as for development of the foetus. The cow, however, must not become too fat, as it will hinder calving.

4.3.1 How long is the ideal resting period of a producing cow in milk production? (1)

4.3.2 Briefly explain the necessity of the resting period. (2)

4.3.3 What beneficial effect will the resting period have on an unborn calf? (1)

4.3.4 Indicate a precautionary measure that the farmer should take during the resting period. (1)

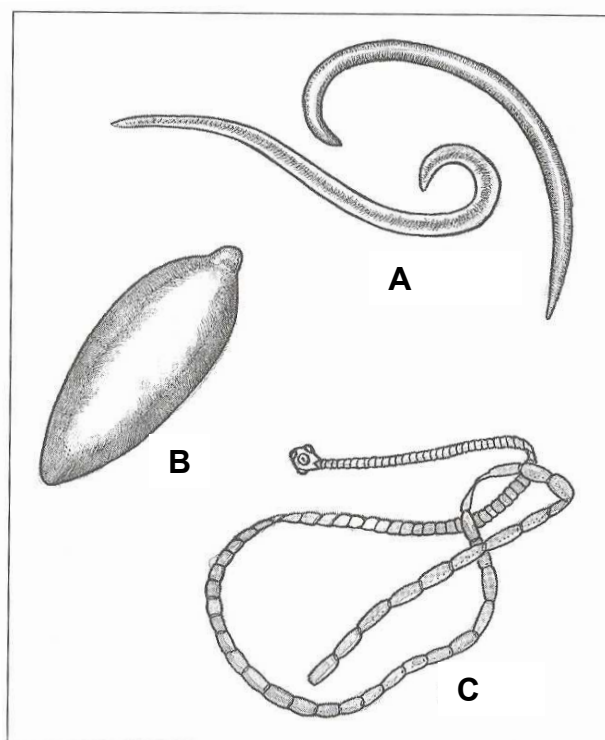
4.3.5 State the main reason for a more rapid drop in milk production in pregnant cows. (1)
[6]

- 4.4 The processes of normal parturition that can be observed by a farmer are listed in the table below and are marked A – F. Re-arrange the processes in the correct order as they occur in a normal parturition, by giving the correct sequence of the letters A – F.

A	The placenta is expelled.
B	Rhythmic contractions of the muscles of the uterus/womb.
C	The membranes break and the amniotic fluid flows from the vulva.
D	The foetus moves to the normal birth position.
E	The head and front legs of the foetus emerge from the vulva.
F	Expulsion of the foetus.

(6)

- 4.5 The diagrams represent some of the internal parasites found in livestock.



- 4.5.1 Identify the parasites that are labeled A – C. (3)

- 4.5.2 Select TWO of these parasites that need two hosts to complete their life cycles. (2)

4.5.3	Briefly state any TWO economic losses that may be caused by these parasites.	(2) [7]
		[35]
	TOTAL SECTION B:	105
	GRAND TOTAL:	150

SECTION A

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 & B	None
1.2.1	A	B	B	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

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