



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

FEBRUARY/MARCH 2011

MARKS: 150

TIME: 2½ hours

This question paper consists of 21 pages and an answer sheet.



INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Answer SECTION A (QUESTION 1) on the attached ANSWER SHEET.
3. Answer SECTION B (QUESTIONS 2 to 4) 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. You may use a non-programmable calculator.
9. Write neatly and legibly.

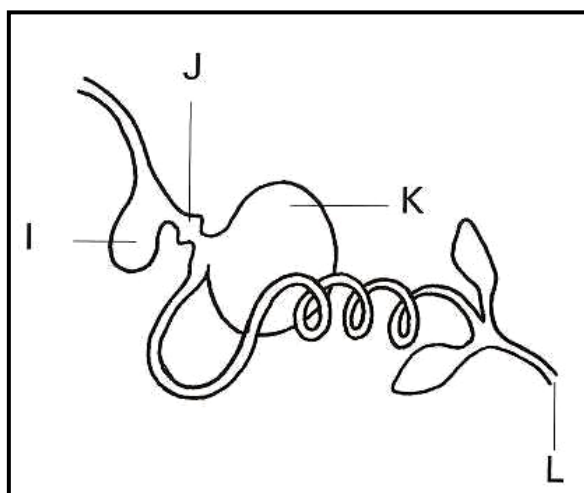
SECTION A**QUESTION 1**

- 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
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- 1.1.1 The diagram below represents the digestive system of a ...

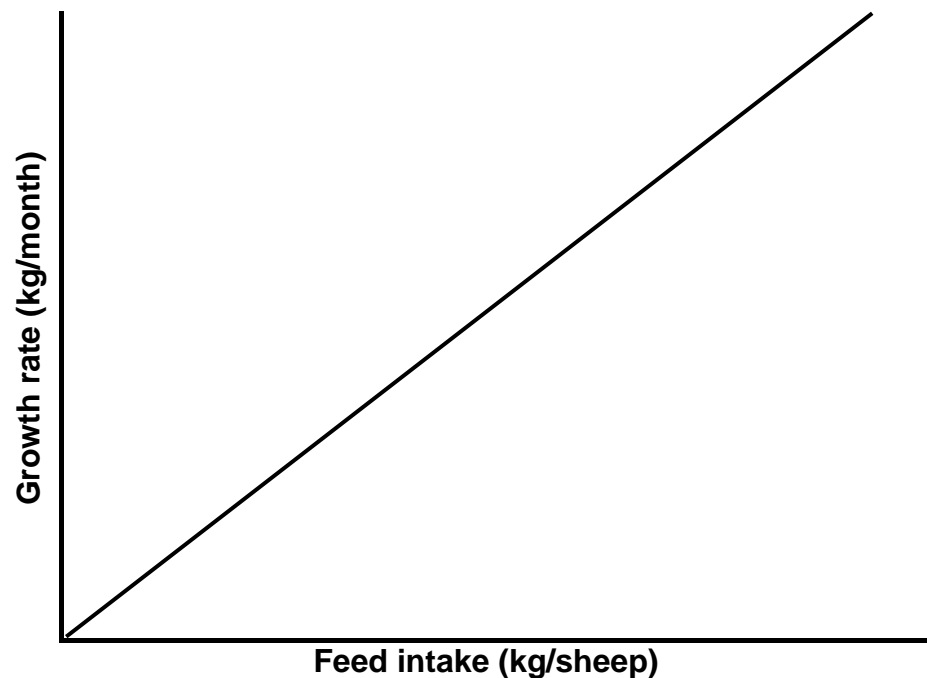


- A cow.
B fowl.
C horse.
D pig.
- 1.1.2 One of the gases that is produced during the digestion of cellulose is ...
- A nitrogen.
B methane.
C water vapour.
D oxygen.
- 1.1.3 During a 20-day trial period some layers excreted 35 kg of manure with a moisture content of 55%. The dry material content of the manure is ... kg.
- A 1,75
B 19,25
C 15,75
D 2,75

1.1.4 The type of ration that would be utilised by the animal for work performance, growth, fattening, milk and meat production, is known as the ... ration.

- A maintenance
- B production
- C marketing
- D fattening

1.1.5 The graph below represents a projected growth rate for sheep in a feedlot compared to feed intake.



The following statement represents the data reflected in the graph:

- A The growth rate decreases proportionally to the feed intake
- B The growth rate increases proportionally to the feed intake
- C A higher feed intake leads to a lower growth rate
- D A lower feed intake leads to a higher growth rate

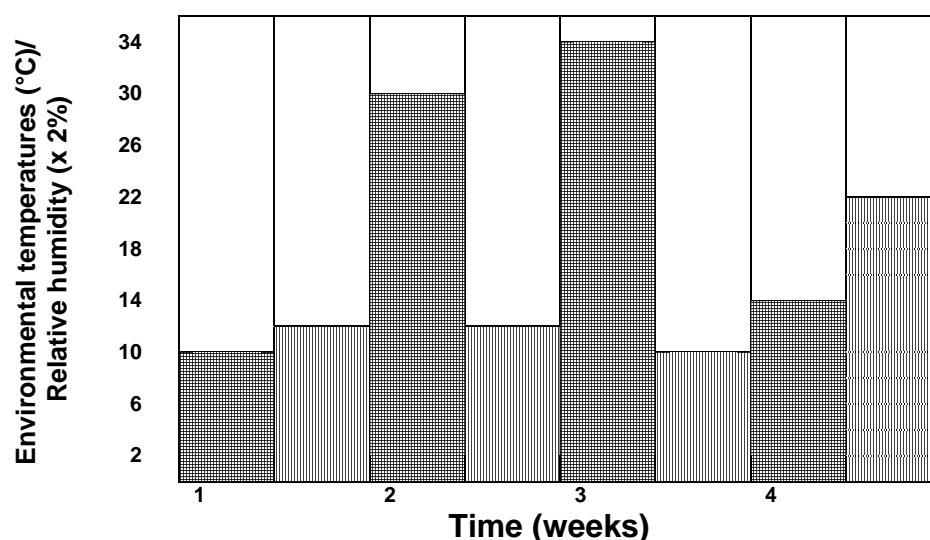
1.1.6 Which ONE of the following statements is INCORRECT with regard to the normal advantage of shelter provisioning in livestock production?

- A Protects animals against optimum temperatures
- B Protects animals against cold temperatures
- C Protects animals against strong wind
- D Protects animals against rainfall

1.1.7 Removing the testicles of a young animal is known as ...

- A docking.
- B detesting.
- C gestation.
- D castration.

1.1.8 In an intensive pig production unit the environmental conditions were measured per week over a period of a month. The bar graph below represents these values. Electrical fans and electrical heating units are used to keep the temperatures as close as possible to the optimal temperature of 28 °C.



Key:



Environmental temperatures



Relative humidity (values times 2)

The week in which this farmer used the most units of electricity for environmental control in the pig unit was ...

- A week 1.
- B week 2.
- C week 3.
- D week 4.

1.1.9 The average length of the oestrus period of a cow is ...

- A 24 hours.
- B 8 hours.
- C 12 hours.
- D 18 hours.

1.1.10 The tapeworm (*Taenia solium*) depends on ... as its hosts.

- A cattle and humans
- B cattle and swine
- C humans and swine
- D humans and dogs

(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:	Maize meal	An example of concentrate that is rich in proteins
B:	Fish meal	

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:	Oats	Contain(s) a small percentage of digestible nutrients and a high crude fibre content
	B:	Silage	
1.2.2	A:	Branding	The marking of animals for identification purposes
	B:	Freeze burning	
1.2.3	A:	FSH	Responsible for the ripening of the Graafian follicles and to maintain pregnancy
	B:	LH	
1.2.4	A:	Fungi	Pathogens that mainly cause mild diseases in animals and are easily treated with antiseptic medication on affected areas
	B:	Viruses	
1.2.5	A:	Impotence	The condition that refers to successful mating without fertilisation taking place
	B:	Infertility	

(5 x 2) (10)

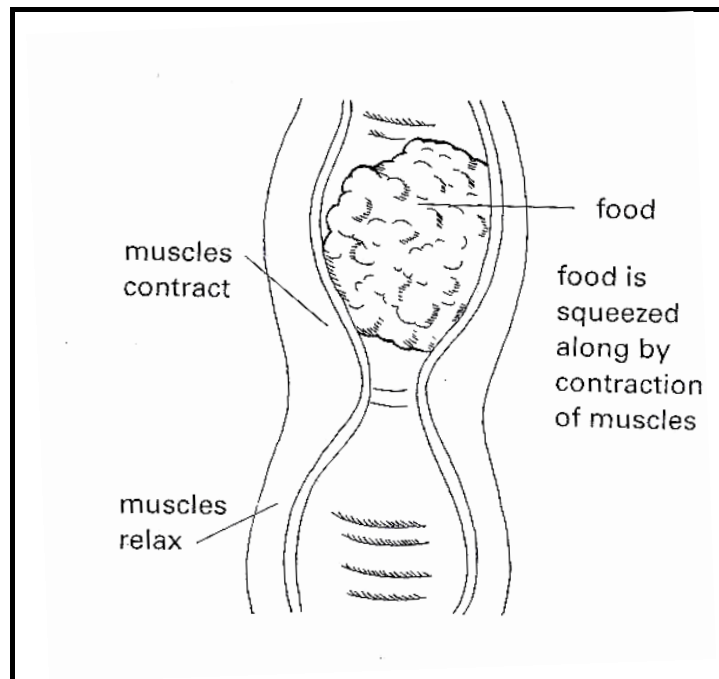
- 1.3 Give ONE word/term for each of the following descriptions. Write only the term/phrase next to the question number (1.3.1 – 1.3.5) on the attached ANSWER SHEET.
- 1.3.1 The part of the stomach of the fowl that contains glands which secrete digestive juices
- 1.3.2 The vitamin that keeps the mucus membranes in a healthy condition
- 1.3.3 A restricted area where a large number of animals are kept and fed with high-concentrate feeds prior to slaughtering for optimal production purposes
- 1.3.4 The place where imported animals are kept in isolation for a fixed period of time to enable officials from veterinary services to test for and detect diseases
- 1.3.5 The primary reproductive organ of a bull where the hormone testosterone is secreted (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 liquid that is produced by the liver and released into the small intestine to assist in the digestion of lipids, is called saliva.
- 1.4.2 A greenhouse is a structure that provides shade and protects livestock against cold and strong wind.
- 1.4.3 A basic structure required by dairy farmers for milking cows is a dipping tank.
- 1.4.4 The condition where the testicles remain behind in the abdominal cavity of the animal is called hypoplasia.
- 1.4.5 Dairy farmers make use of an intravenous injection of calcium borogluconate to treat mastitis. (5 x 1) (5)
- TOTAL SECTION A: 45**

SECTION B

Start this question on a NEW page.

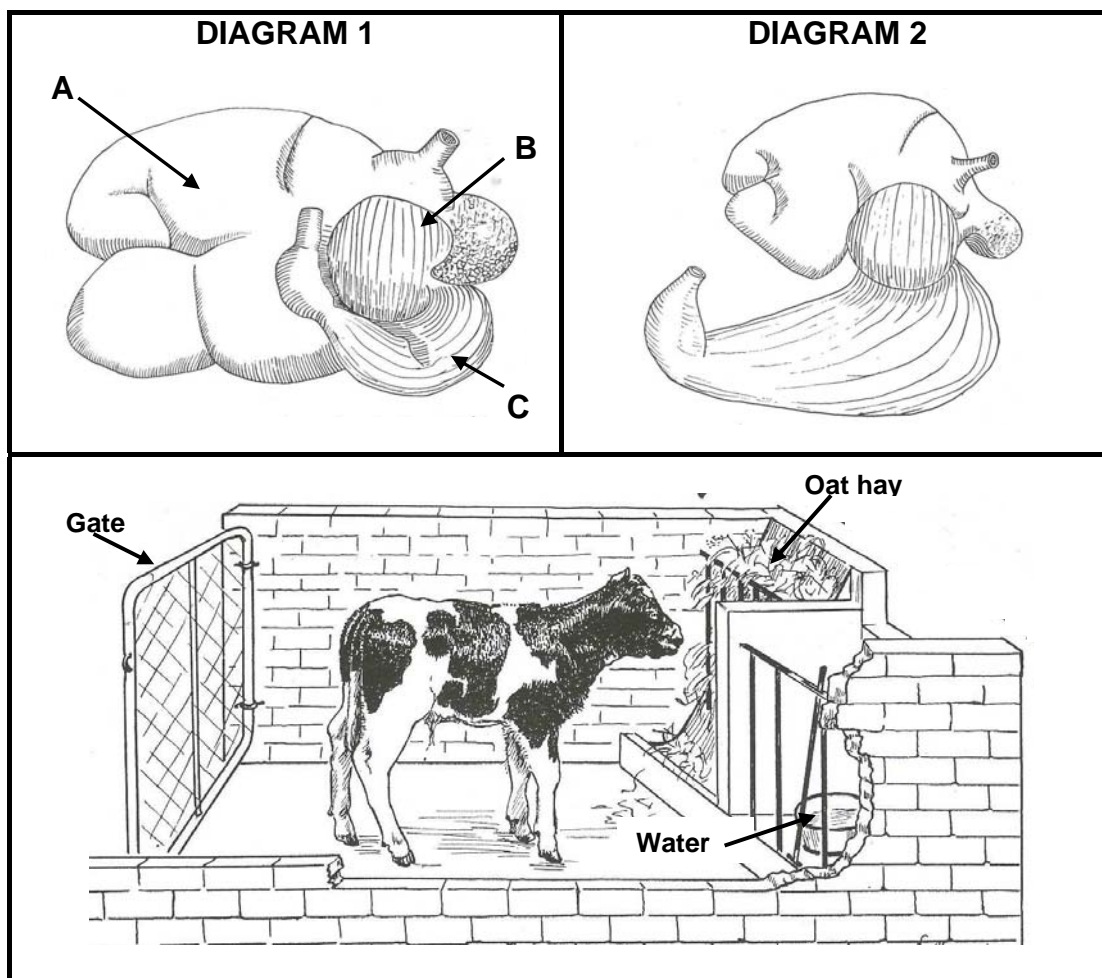
QUESTION 2: ANIMAL NUTRITION

- 2.1 The diagram below shows chewed food particles that have just been swallowed by a ruminant animal. After mechanical digestion in the mouth, the food is swallowed and it moves towards the stomach for further digestion.



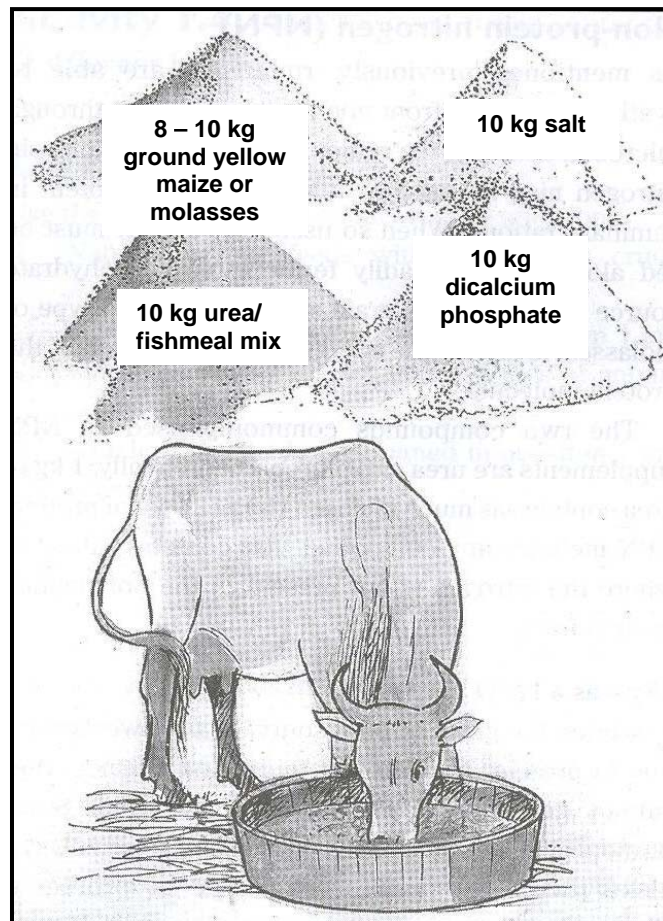
- 2.1.1 Give the specific name of the food that passes through the long tube towards the stomach after mechanical digestion in the mouth. (1)
- 2.1.2 Identify the tube that is responsible for this special movement of food. (1)
- 2.1.3 Name the process that is demonstrated in the diagram above. (1)
- 2.1.4 Name the enzyme that is found in the swallowed food. (1)
- 2.1.5 Describe the chemical change created by the enzyme mentioned in QUESTION 2.1.4. (2)

- 2.2 The diagrams below illustrate the digestive systems of farm animals (indicated as DIAGRAMS 1 and 2) and a calf in a cage.



- 2.2.1 Name the parts marked **A**, **B** and **C** in DIAGRAM 1 above. (3)
- 2.2.2 Identify the diagram that would represent the digestive system of the calf from the diagrams above. Give a reason visible in the diagrams above to support your answer. (2)
- 2.2.3 Name TWO possible sources of nutrition that are visible in the cage above, supplied to this calf. (2)
- 2.2.4 Explain the main reason why the roughage component is still limited in the ration of this calf. (2)
- 2.2.5 The calf is still consuming milk as part of its daily ration. Give a reason why the intake of clean water is controlled in the feeding of this calf. (1)

- 2.3 Urea is one of the non-protein sources provided to animals to make their own protein. A lick containing urea can be prepared as shown in the diagram below.



- 2.3.1 Name the season during which a supplementary concentrate mixture containing urea is mainly provided as a lick. Give a reason to support your answer. (2)
- 2.3.2 Name the chemical element that is supplied by urea. (1)
- 2.3.3 Give TWO reasons for supplying a lick (like the one above) to farm animals. (2)
- 2.3.4 Name the principle that is used to ensure that urea is utilised by rumen microbes. (1)

- 2.4 Lucerne is one of the most widely produced hay crops. It provides six or more cuttings per season and it is one of the highest yielding hay crops.

The average composition under irrigation is as follows:

13% digestible protein (DP)
75% total digestible nutrients (TDN)
30% crude fibre content

- 2.4.1 Use a formula to calculate the nutritive ratio of the lucerne hay mentioned above. Show ALL your calculations. (3)

- 2.4.2 Deduce, from the value calculated in QUESTION 2.4.1, the suitability of using this lucerne hay for the fattening of old ewes. Motivate your answer. (2)

- 2.4.3 The lucerne is cut at an early flowering stage to produce the highest quality hay. Give a reason to support this statement. (1)

- 2.5 A farmer has maize and peanut oilcake meal available for blending a balanced mixture for a dairy ration. The digestible protein requirement for these dairy cattle is 25%. The digestible protein content of maize is 9% and that of peanut oilcake meal is 38%.

Use the Pearson square method to determine the ratios of the maize and peanut oilcake meal in a mixture that will be used to meet the feeding requirements of the dairy cattle. (4)

- 2.6 The table below compares the content of feed components of two feed samples, A and B.

FEED COMPONENT	A	B
Protein	Relatively high	Relatively low
Carbohydrates	Relatively low	Relatively high
Fats	Relatively low	Relatively high
Sodium	Relatively low	Relatively high
Potassium	Relatively low	Relatively high

- 2.6.1 Which of the above feeds would you recommend for young growing animals? Give a reason to support your answer. (2)

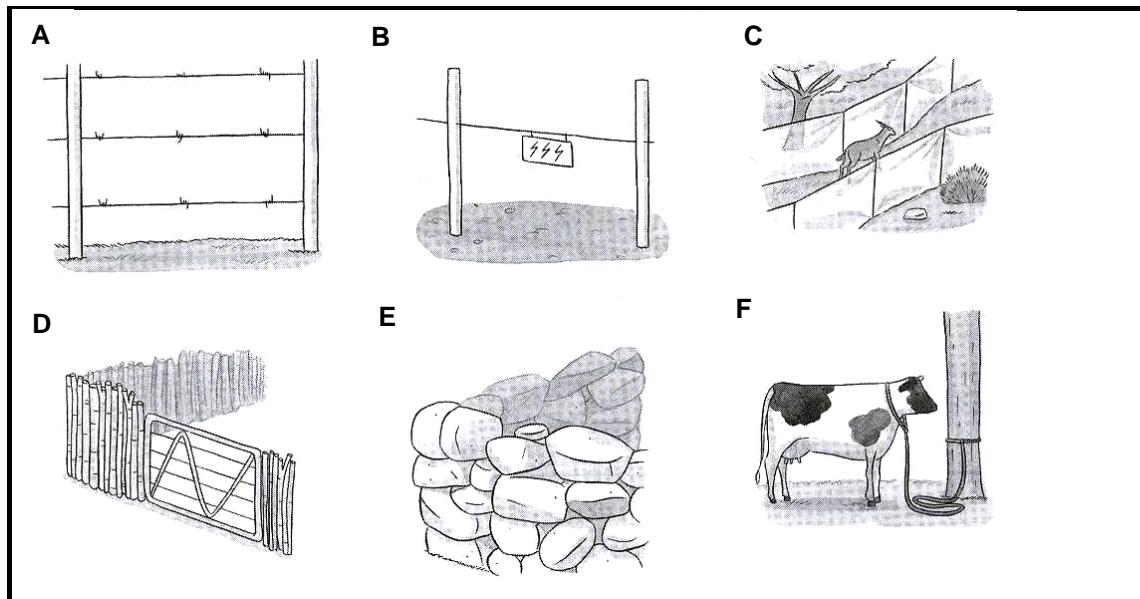
- 2.6.2 Identify the feed component in the above table that would be supplemented by salt in a lick. (1)

[35]

Start this question on a NEW page.

QUESTION 3: ANIMAL PRODUCTION

- 3.1 The diagrams below show various structures used to control the movements of animals. Choose a diagram, from those marked A – F, that matches a description. Write down only the letter (A – F) next to the question number (3.1.1. – 3.1.5).



- | | | |
|-------|--|-----|
| 3.1.1 | A sophisticated method to capture wild animals | (1) |
| 3.1.2 | A method which allows animals to graze in a circular area | (1) |
| 3.1.3 | A structure for use next to a busy road to keep animals away from the road | (1) |
| 3.1.4 | A temporary structure to control the daily grazing of dairy cattle | (1) |
| 3.1.5 | A structure without poles or wire that was used in indigenous practices to control the movement of animals | (1) |

3.2

Many people have the idea that exotic breeds are superior to indigenous breeds. The Drakensberger's strong hind legs allow it to cope with various harsh walking conditions. It is a strong walker, whereas other breeds succumb easily to exhaustion, and it can handle extreme heat. 'It is an indigenous breed bred for local harsh conditions, hardy and disease resistant with a wonderful temperament,' says Dr Fourie.

The Drakensberger cow is said to be very fertile with strong maternal instincts and high milk production with a strong protective instinct.

[Source: *Farmers' Weekly*, 6 November 2009]

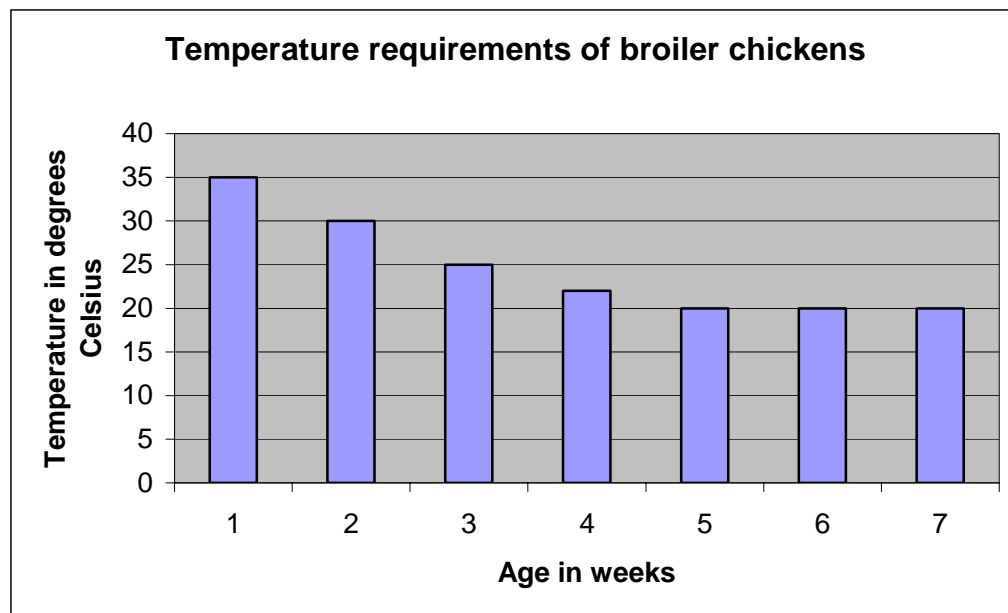
3.2.1 Name a characteristic of the Drakensberger that will make it suitable for each of the following production conditions:

- (a) High radiation levels from the sunny African conditions (1)
- (b) Sparse vegetation as nutrition in dry areas (1)
- (c) High pressure of external parasites (1)

3.2.2 Name TWO facts from the information provided above to prove that the Drakensberger cow is a good producer. (2)

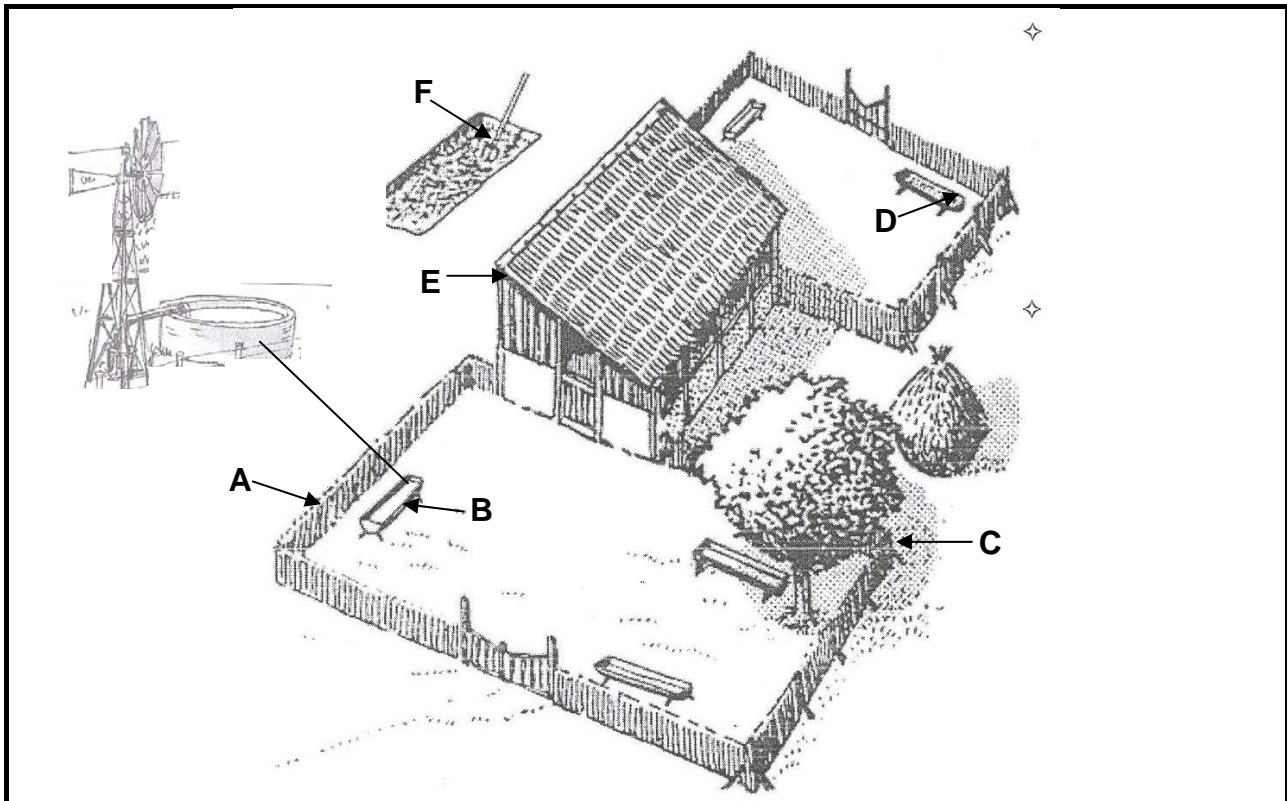
3.2.3 How will the provision of shelter influence their production output? (2)

- 3.3 The bar graph below shows the temperature needs of broiler chickens at various ages.



- 3.3.1 Name the ideal temperature for broiler chickens at the age of one week. (1)
- 3.3.2 Name the age that would be most suitable at a temperature of 22 °C (degrees Celsius). (1)
- 3.3.3 Deduce, from the graph, the trend of temperature requirements for broiler chickens at different ages. (2)
- 3.3.4 Use the bar graph to draw a line graph to indicate the temperature required by broiler chickens at different ages, as indicated in the bar graph. (4)
- 3.4 There are different types of abnormal animal behaviour that are often seen in farm animals. Name TWO of these types of behaviour. (2)

- 3.5 The diagram below represents a production unit for keeping goats. Structures are labelled A – F.



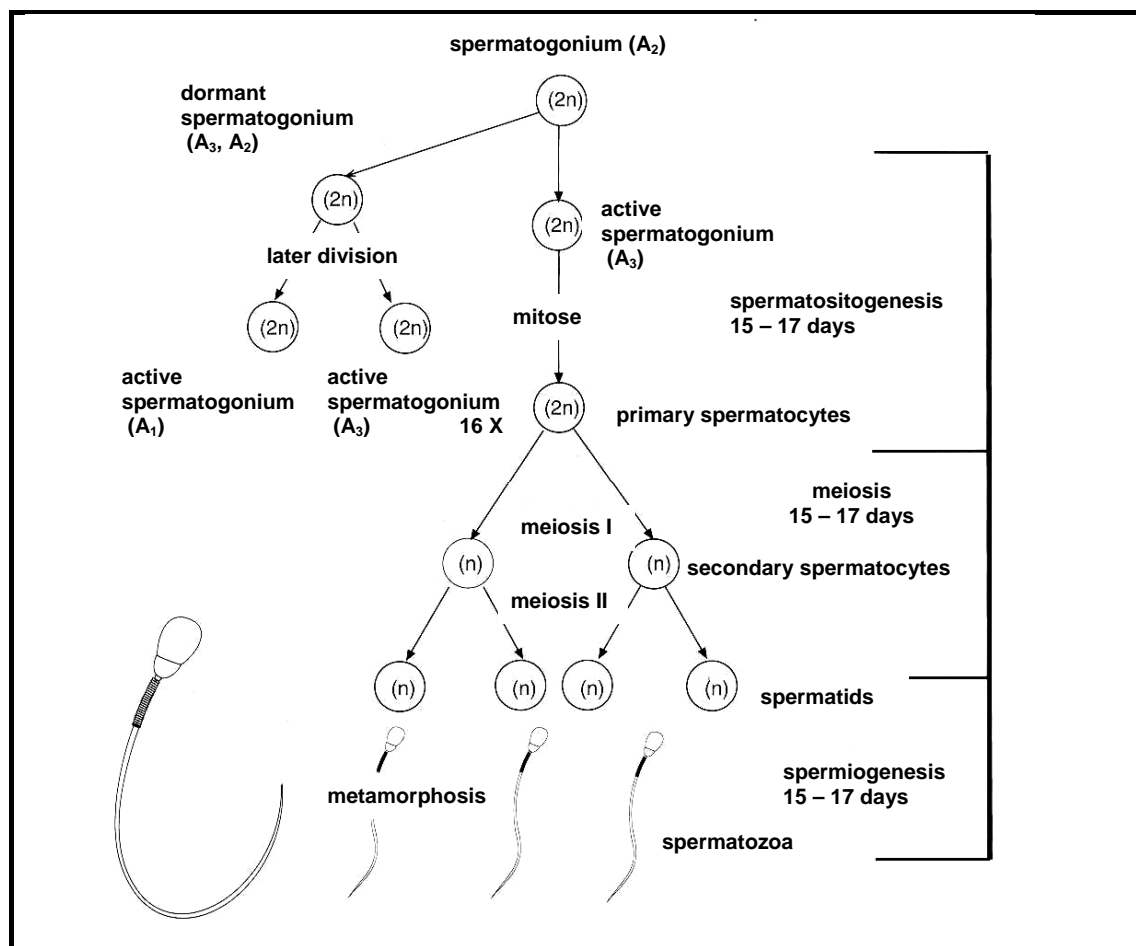
- 3.5.1 Is the unit illustrated above an intensive production unit? Give a reason to support your answer. (2)
- 3.5.2 Identify the letter (A – F) that represents the structure in the diagram above that has the following function for the successful production of goats:
- (a) Protection of the ewes and young lambs during lambing (1)
 - (b) Supplying the rations to the animals (1)
 - (c) Protection against radiation from the sun (1)
 - (d) Prevents animals from becoming dehydrated (1)
 - (e) Keeps animals in an enclosed area (1)
- 3.5.3 Briefly describe the possible waste-management practice that takes place in this goat unit. (1)
- 3.6 Losses arising from injury, bruising and death amongst cattle in transit between farms and the abattoir are substantial. This must be avoided for legal, humanitarian and financial reasons. It is imperative that cattle should be handled as sympathetically as possible to minimise these losses.
- 3.6.1 State THREE basic aspects that should be considered when transporting beef cattle to the abattoir. (3)
- 3.6.2 Name TWO effects that the poor handling of animals may have on the quality of meat. (2)

[35]

Start this question on a NEW page.

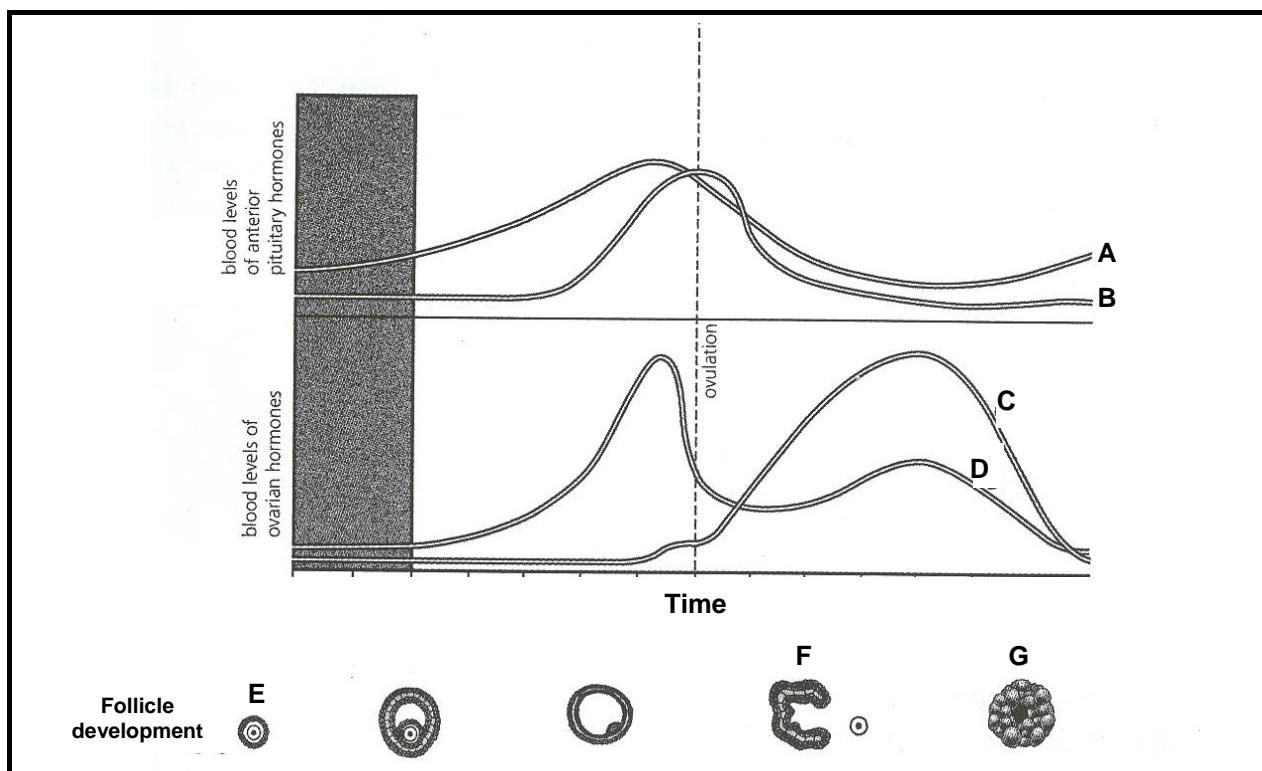
QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

- 4.1 The illustration below shows the process of spermatogenesis that takes place in the male reproductive system.



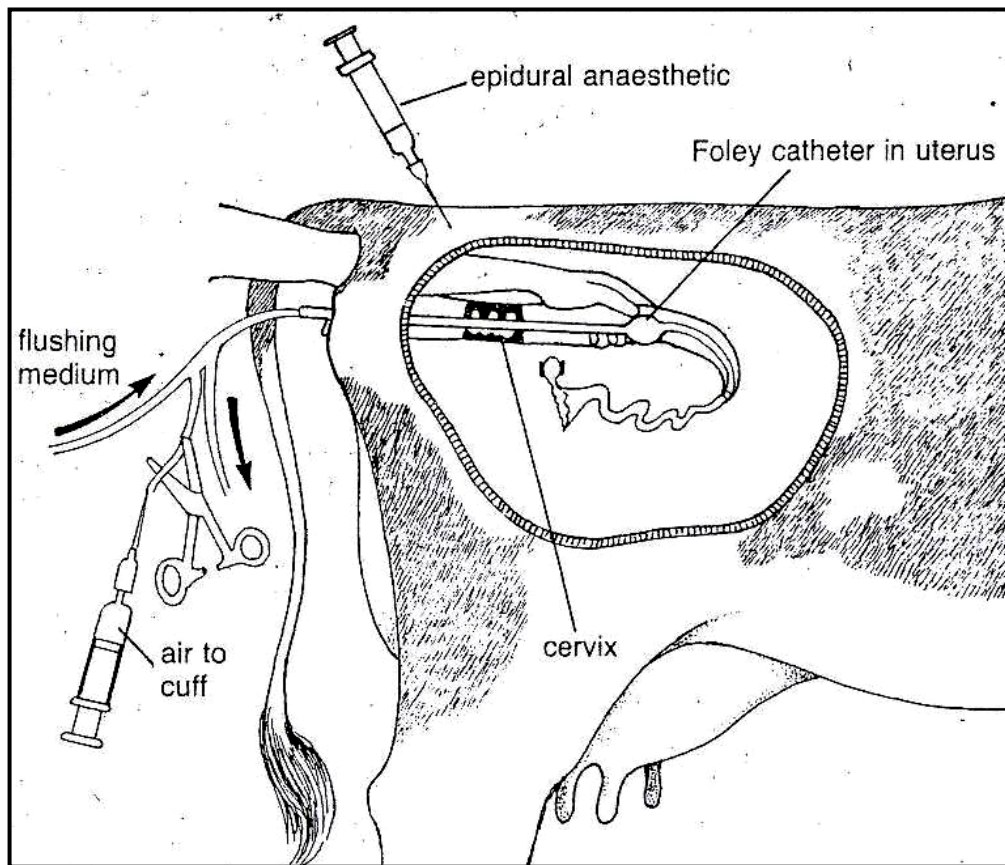
- 4.1.1 Briefly describe the process of *spermatogenesis*. (2)
- 4.1.2 Name the organ where this process takes place in the male animal. (1)
- 4.1.3 Name the phase in the spermatogenesis process where mitotic cell division occurs. (1)
- 4.1.4 Explain the role of meiosis in the spermatogenesis process. (2)
- 4.1.5 Name TWO congenital factors that may disturb the spermatogenesis process. (2)

4.2 The illustrations below represent the hormone levels in a farm animal during the oestrus period.



- 4.2.1 Name the hormones which are represented by the curves marked **A** and **C** in the graphs above. (2)
- 4.2.2 Name the main function in the oestrus cycle of the hormone marked **D** in the graph above. (1)
- 4.2.3 Name the process that occurs at **F** in the diagram above. (1)
- 4.2.4 Name the source where the hormone, indicated as **C** in the graph above, is secreted. (1)
- 4.2.5 Name a hormone that you will use to make the female animal superovulate to produce many ova. (1)

4.3 The diagram below illustrates a technique used in animal reproduction.



- 4.3.1 Name the process that is illustrated in the diagram above. (1)
- 4.3.2 Explain the reasons for using a flushing medium in the technique illustrated above. Refer to the functions of the flushing medium and to the arrows indicated in the diagram above. (3)
- 4.3.3 State the main benefit of using this technique on female animals in a herd. (1)

4.4

Acaricide (miticide) chemicals are used to control mange. Their effectiveness to control this parasite is affected by poor penetration into the fur and skin. To improve this, goats are washed and vigorously scrubbed by hand in the infected areas.

There are also systemic drugs which are injected or poured on the skin and are able to move through the body, but they are expensive.

Indigenous knowledge gathered over time has also produced a viable alternative measure to control this condition in farm animals. Sandile learned from her grandfather that the castor bean (*Ricinus communis*) is a tropical plant that contains an insecticidal chemical known as ricin in the leaves and the stem.



- 4.4.1 Name THREE possible types of chemicals that can be used to control mange in goats by referring to the information above. (3)
- 4.4.2 Name TWO advantages of using the product with ricin to control animal pests. (2)
- 4.4.3 Name the pest that is associated with mange. (1)
- 4.4.4 Name the problem that farmers experience with the application of acaricide chemicals. (2)

4.5 Below is a label that is found on a product to treat animals against parasites.

FOR ANIMAL USE ONLY

WARNINGS:

Allow 7 days between last treatment and slaughter for human consumption. Keep out of reach of children, uninformed persons and animals. Although this remedy has been extensively tested under a large variety of conditions, failure thereof may ensue as a result of a wide range of reasons. If this is suspected, seek veterinary advice and notify the registration holder.

DIRECTIONS FOR USE:

Use only as directed. Shake well before use.
Sheep, goats and calves: Dose 1 ml per 4 kg.

Livemass	10 kg	20 kg	30 kg	40 kg
Dose in ml	2,5	5,0	7,5	10,0
No. of doses / pack	400	200	133	100

For animals under 20 kg live mass, **lintex-1** may be diluted with an equal volume of water.

The dose must then be doubled, e.g. 10 kg lamb dose 5 ml of the mixture.

Efficacy:**A. Tapeworms**

Animals	Tapeworm species	Efficacy
Sheep and goats	Milk Tapeworm (<i>Moniezia</i> spp).	Class I
	Narrow Tapeworm (<i>Avitellina</i> spp).	Class I
	Serrated Tapeworm (<i>Thysanotria</i> spp).	Class I
Calves	Milk Tapeworm (<i>Moniezia</i> spp).	Class I

B. Conical fluke

Animals	Worm species	Efficacy
Sheep and Goats	Immature Conical Fluke (<i>Paramphistomum microbothrium</i>)	Class A

Explanations:**A. Tapeworms**

- Class I: - 100% effective in more than 80% of the treated animals.
- Class II: - 100% effective in more than 60% of the treated animals.
- Class III: - 100% effective in more than 50% of the treated animals.
- Class X: - Ineffective.

B. Conical fluke

- Class A: - 80% effective in more than 80% of the treated animals.
- Class B: - 60% effective in more than 60% of the treated animals.
- Class C: - 50% effective in more than 50% of the treated animals.
- Class X: - Ineffective.

lintex-1[®]



Reg. No. G447 (Act 36 / 1947)
Namibia: NSR 6

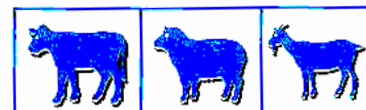
Liquid tapeworm remedy

Worm remedy against tapeworms
in sheep, goats, calves and immature
conical fluke in sheep and goats.
Safe for animals of all ages and
pregnant animals.

Store in a cool, dry place

Contains:
Niclosamide 20% m/v

1ℓ



For calves, sheep and goats



Registration Holder:
Bayer (Pty) Ltd, Animal Health Division
Reg. No. 1968/011192/07
27 Wrench Rd, Isando 1600
Tel: (011) 921 5736, Fax: (011) 921 5751
www.bayeranimalhealth.co.za

® is the registered Trademark of Bayer AG, Germany.



Bayer HealthCare
Animal Health

- 4.5.1 Identify the Act that requires this product to be registered for the purpose for which it was developed. (1)
- 4.5.2 Name a condition under which this product needs to be stored for maximum efficiency and long shelf life. (1)
- 4.5.3 Identify the effectiveness of this medication against conical fluke in a class C animal, measured as a percentage. (1)
- 4.5.4 Calculate the total quantity of medication needed to treat 80 sheep with an average body mass of 60 kg and 30 lambs with an average body mass of 20 kg. (3)
- 4.5.5 Name TWO possible methods that a farmer can use to control internal parasites organically. (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150

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