basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2023

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.

2. Answer ALL the questions in the ANSWER BOOK.

3. Start EACH question on a NEW page.

4. Number the answers correctly according to the numbering system used in this question paper.

5. You may use a non-programmable calculator.

6. Show ALL calculations, including formulae, where applicable.

7. 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 write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B.

1.1.1 ONE of the following is NOT part of the fore-stomach compartments of a ruminant:

A Rumen
B Omasum
C Abomasum
D Reticulum

1.1.2 An example of a protein-rich concentrate:

A Maize meal
B Oat meal
C Wheat meal
D Carcass meal

1.1.3 Tubular indentations of the epithelium between the villi that secrete succus entericus:

A Islets of Langerhans
B Pancreatic ducts
C Glands of Lieberkühn
D Bile ducts

1.1.4 A nutritive ratio of 1 **:** 4 implies that:

(i) The feed has high protein content
(ii) The feed is suitable for growth and reproduction
(iii) For every one part of carbohydrates, there are four parts of protein
(iv) For every one part of protein, there are four parts of non-nitrogenous compounds

Choose the CORRECT combination:

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

1.1.5 A farmer producing crops or livestock to generate profit using highly advanced technologies:

A Commercial farmer
B Nomadic farmer
C Subsistence farmer
D Communal farmer

1.1.6 The following are the requirements for an ideal poultry housing facility:

(i) Lengthwise orientation should be in a north-south direction.
(ii) The roof must be high and insulated.
(iii) Side walls should keep running water away from the house.
(iv) Side walls should not allow air movement through the house.

Choose the CORRECT combination:

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

1.1.7 The microscopic organisms that live outside the body of the host, which cause the crusted skin leading to a loss of wool:

A Blue ticks
B Mites
C Bont ticks
D Lice

1.1.8 ONE of the following is NOT a sign of poor health in farm animals:

A Rough and dull coat with hair loss
B Too soft faeces and discoloured urine
C Bright eyes with pink membranes
D High body temperature and increased pulse rate

1.1.9 A sign of a cow approaching parturition:

A Sniffs and mounts other cows
B Milk production drops drastically
C Follows the bulls and other cows
D Urinates and defecates often

1.1.10 A factor that results in infertility in cows:

A Super ovulation
B Metritis
C Castration
D Cryptorchidism (10 x 2) (20)

1.2 Indicate whether each of the descriptions in COLUMN B applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN A. Write **A only**, **B only**, **both A and B** or **none** next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 B only.

COLUMN A			COLUMN B
1.2.1	A:	Bile	Breaks down fats into fine droplets
	B:	Liver	
1.2.2	A:	Pharynx	An organ that helps farm animals to distinguish between different feeds
	B:	Tongue	
1.2.3	A:	Heterothermic	The ability of farm animals to maintain a constant body temperature
	B:	Homeothermic	
1.2.4	A:	Thorn apple	Poisonous plants that should be prevented by avoiding storing feeds under wet conditions
	B:	Poison bulb	
1.2.5	A:	Prostaglandin	Hormones used in synchronising oestrus in cows
	B:	Progesterone	

(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 numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

1.3.1 The enzyme that breaks down starch molecules, especially in pigs

1.3.2 The small area where sheep are kept under intensive conditions and fed for maximum production

1.3.3 A reproductive technique where semen is collected from a superior bull and deposited into the reproductive tract of a cow in oestrus

1.3.4 Cows that need to mate three or more times before conceiving

1.3.5 The inability of a bull to service cows that are in oestrus even though it has interest (5 x 2) (10)

1.4 Change the underlined word(s) in each of the following statements to make them TRUE. Write only the answer next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Digestible energy refers to the energy left after deducting energy loss through heat from metabolic energy.

1.4.2 The introduction of natural enemies to control parasite infestation is a chemical method.

1.4.3 The centriole releases an enzyme that assists the sperm cell to penetrate the ovum.

1.4.4 Di-oestrus happens when sexually mature female animals show no signs of standing heat.

1.4.5 Gestation period refers to the period in cows between two lactations.

(5 x 1) (5)

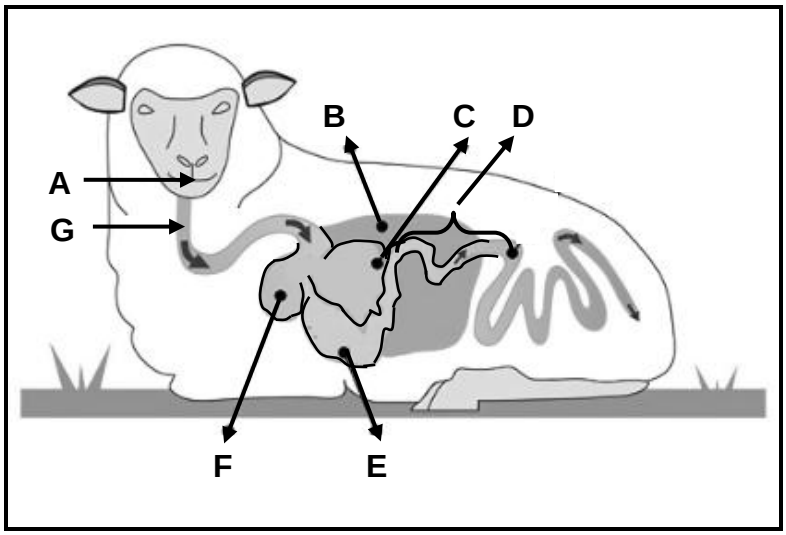
TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The picture below shows the alimentary canal of a sheep.



2.1.1 Identify in the picture above only the LETTER of the PART where EACH of the following occurs:

(a) Microbial fermentation (1)

(b) Mechanical digestion (1)

(c) Chemical digestion (1)

2.1.2 Name ONE function of the small intestine. (1)

2.1.3 Compare the structure of the oesophagus in sheep with that of fowl. (2)

2.2 The biological value of protein is determined by the amino acid composition and some other factors. Animals need amino acids that their bodies cannot produce, but in ruminant animals the protein quality of feeds is of less importance.

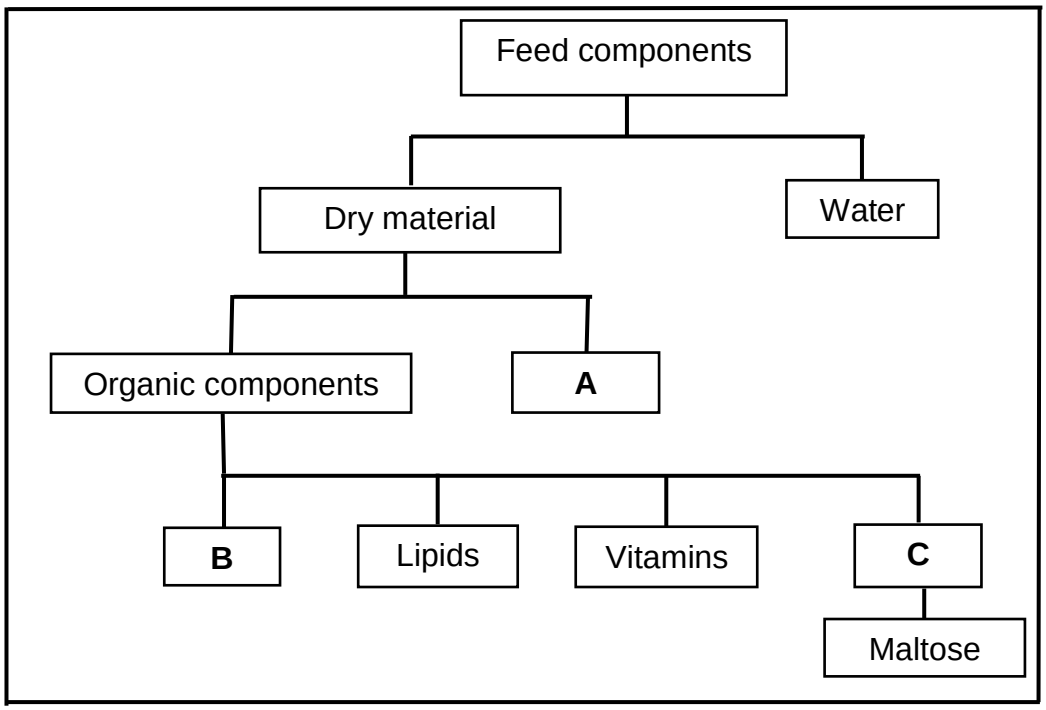
2.2.1 Give a collective name for the amino acids that cannot be produced in animal bodies. (1)

2.2.2 Explain why the protein quality of feeds in ruminant animals is of less importance. (2)

2.3 An ox was fed 24 kg dry matter and excreted 7 kg manure with 81% dry material.

Calculate the digestibility coefficient of the feed. Show ALL calculations, including the formula. (5)

2.4 The schematic representation below shows the components of a feed.

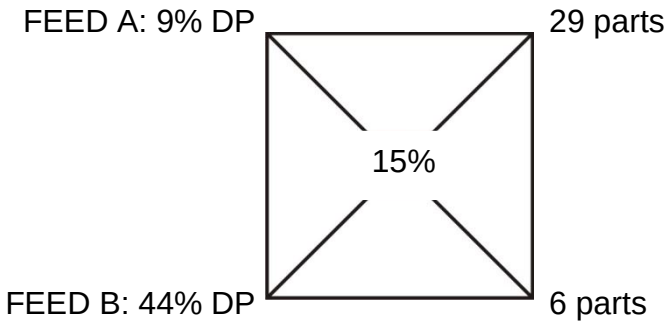


2.4.1 Provide the labels for feed components **A** and **C** respectively. (2)

2.4.2 State TWO functions of water. (2)

2.4.3 Write down the letter that represents the component suitable for feeding young animals for growth. (1)

2.5 A farmer mixed soya bean oilcake meal and oatmeal to obtain a ration with the desired protein content, as shown below.



2.5.1 Refer to the Pearson square above to indicate the parts of this ration that represent EACH of the following:

(a) Soya bean oilcake meal (1)

(b) Oatmeal (1)

2.5.2 Calculate the percentage of oatmeal in the given mixture. Show ALL calculations. (3)

2.6 The table below shows a fodder flow programme on the provision and feed requirements for beef cattle over a period of one year.

MONTH OF THE YEAR	VELD (TON)	TEFF HAY AVAILABLE (TON)	LUCERNE AVAILABLE (TON)	ANIMAL FEED REQUIRED (TON)
January	31		20	50
February	35		15	50
March	30	10	12	50
April	25	20		50
May		30	10	55
June		20	30	60
July		20	40	65
August		20	45	65
September		20	55	60
October	10		45	50
November	12		30	55
December	20		25	50

2.6.1 Calculate the quantity of feed required (in kg) during the first six months of the year. Show ALL calculations. (3)

2.6.2 Give TWO reasons why fodder flow planning is important. (2)

2.6.3 Use the data in the table above to draw a line graph on quantities of feed required by beef cattle and the production of lucerne from August to December. (6)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The pictures below refer to a production system in pigs.

PICTURE A

PICTURE B

3.1.1 Indicate:

(a) The production system used by the pig farmer represented by picture **A** above (1)

(b) An example of the pig production system represented in picture **B** above (1)

3.1.2 Identify the animal handling facility in picture **A**. (1)

3.1.3 Give ONE reason for housing pigs in the facility in picture **A**. (1)

3.1.4 Deduce TWO factors from picture **A** that contribute to increased production. (2)

3.2 Choose an explanation from the list below that matches the animal behaviour in QUESTIONS 3.2.1 to 3.2.5. Write only the letter (A–E) next to the question numbers (3.2.1 to 3.2.5) in the ANSWER BOOK.

A See shadow on their path or vision area
B Normal maternal behaviour
C Normal animal behaviour
D Animals establish their dominance in the flock
E Normal reproductive behaviour

3.2.1 Female animals in the herd mount other females and allow other animals to mount them (1)

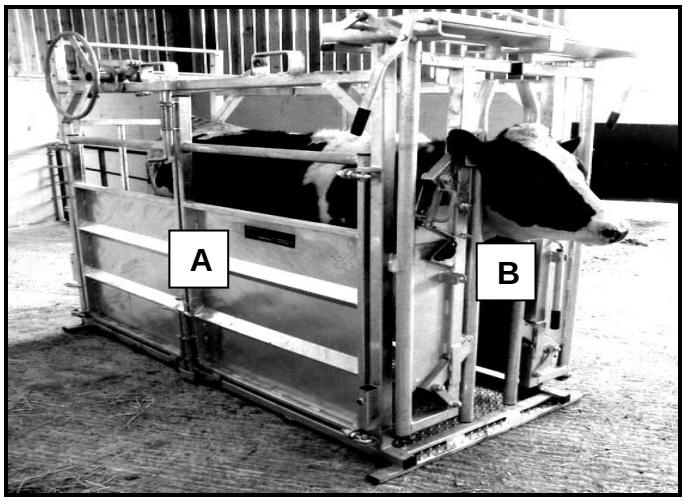
3.2.2 A flock of farm animals looks healthy and graze calmly on natural pasture (1)

3.2.3 Animals head-butting each other (1)

3.2.4 Animals do not want to enter a gate leading to a passage area (1)

3.2.5 Animals become aggressive after giving birth (1)

3.3 The facilities below are used for handling farm animals.



3.3.1 Identify facilities **A** and **B** above. (2)

3.3.2 Indicate the purpose of using facility **B**. (1)

3.3.3 Give TWO reasons for handling farm animals using the facilities above. (2)

3.4 State TWO basic requirements for transporting farm animals. (2)

3.5 A mosquito-borne viral disease that affects sheep, cattle and goats causes abortion, blood-stained nasal discharge and diarrhoea which may lead to the death of farm animals. People can get infected if they handle blood, tissues or other body fluids of animals that are infected with this disease. Farmers should alert authorities if they suspect that animals are infected with the disease on their farms.

3.5.1 Name the disease described in the scenario above. (1)

3.5.2 Identify an example of EACH of the following in the scenario above:

(a) Vector (1)

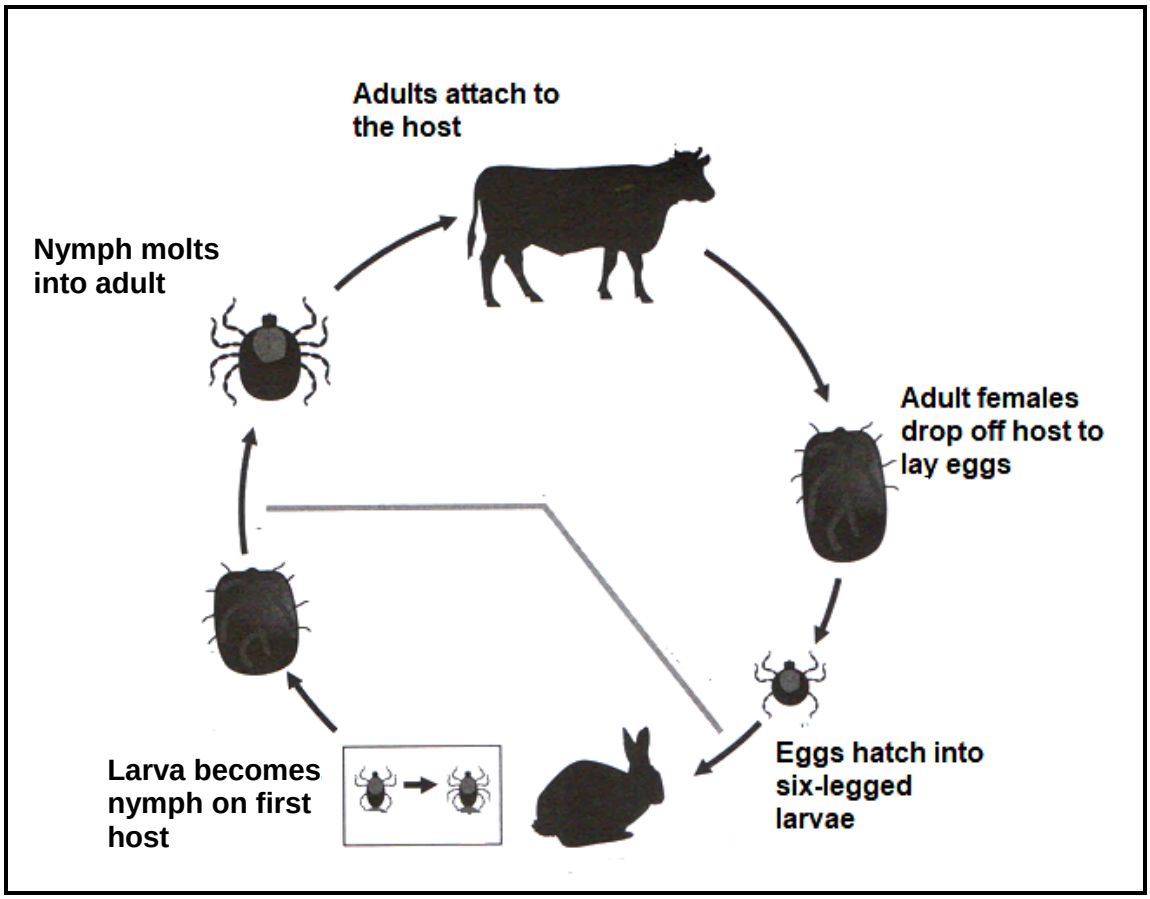
(b) Pathogen (1)

3.5.3 The disease in the scenario above is deemed notifiable. Justify this statement. (1)

3.5.4 Give a term for the description which indicates that the disease can infect people if they handle infected blood, tissues and other body fluids. (1)

3.5.5 Suggest TWO economic implications of animal diseases to a farmer. (2)

3.6 The diagram below shows the life cycle of a parasite.



3.6.1 Classify the parasite above according to the life cycle. (1)

3.6.2 Give a reason for the answer to QUESTION 3.6.1 by referring to the diagram above. (1)

3.6.3 Identify THREE stages in the life cycle of the parasite above. (3)

3.7 Below is a list of internal parasites that affect farm animals.

tapeworm; liver fluke; roundworm

Choose the parasite above that matches EACH of the following descriptions:

(a) Causes nodules in the liver (1)

(b) Does not need an intermediate host (1)

(c) Heavy infestation causes a potbelly and the appearance of proglottids in faeces (1)

3.8 State TWO basic principles of good health that a farmer can apply to control internal parasites. (2)

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QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The diagrams below show male and female reproductive organs.

DIAGRAM 1

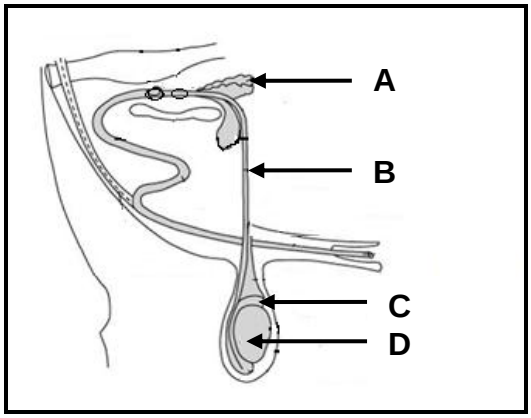
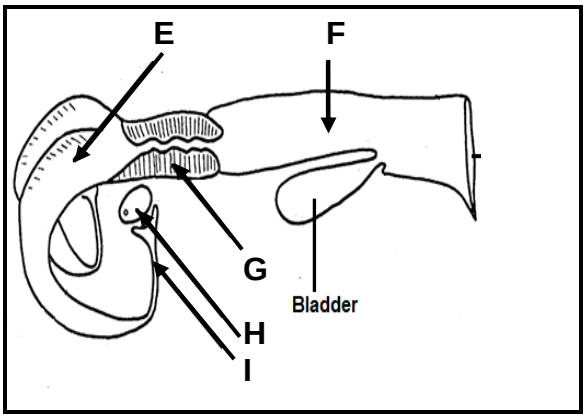


DIAGRAM 2



4.1.1 Label **B**, **C** and **G** in the diagrams above. (3)

4.1.2 Identify the LETTER (**A**–**I**) of the part in DIAGRAM 1 and DIAGRAM 2 where EACH of the following occurs:

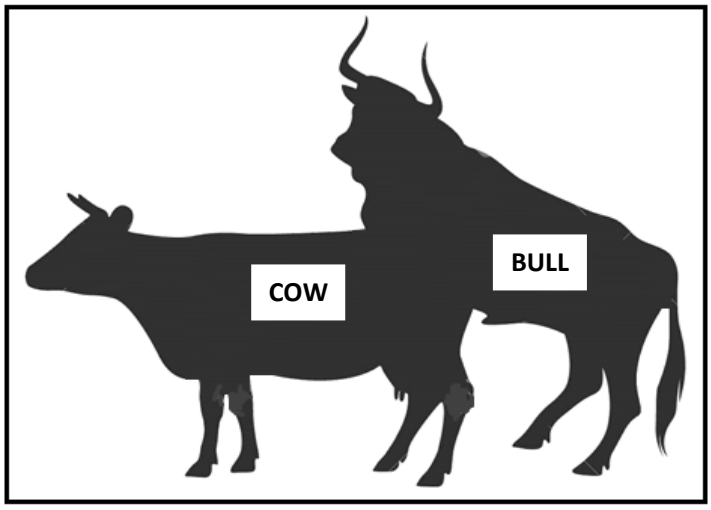
(a) Site where spermatogenesis occurs (1)

(b) Serves the function of implantation (1)

(c) Site where fertilisation occurs (1)

(d) Secrets a sticky liquid that provides energy to the sperm cells (1)

4.2 The picture below shows a cow and a bull during a reproductive process.



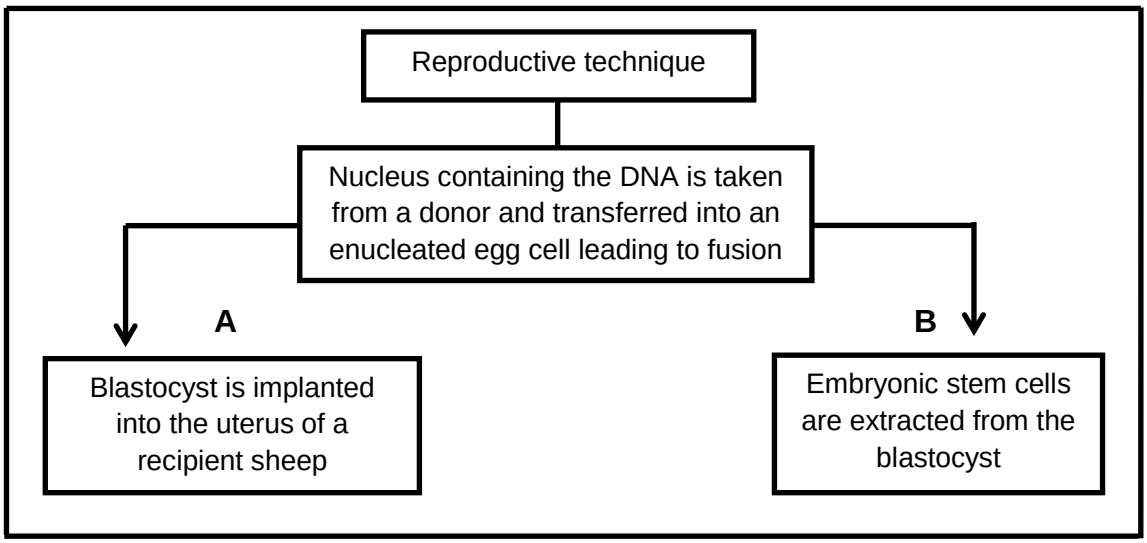
4.2.1 Identify the reproductive process represented in the picture above. (1)

4.2.2 Indicate the actual stage of the process in QUESTION 4.2.1 represented in the picture. (1)

4.2.3 State TWO sexual behavioural signs that are displayed by bulls before the process in QUESTION 4.2.1. (2)

4.2.4 State TWO factors that regulate the action in bulls during the process identified in QUESTION 4.2.1. (2)

4.3 The schematic representation below illustrates the processes of a reproductive technique in farm animals.



4.3.1 Identify the type of reproductive technique illustrated in **A** and **B** above. (2)

4.3.2 Indicate the purpose of EACH type of reproductive technique in QUESTION 4.3.1. (2)

4.3.3 State TWO disadvantages of the reproductive technique illustrated in the representation above. (2)

4.4 The diagrams below illustrate two different processes that occur in farm animals.

DIAGRAM 1

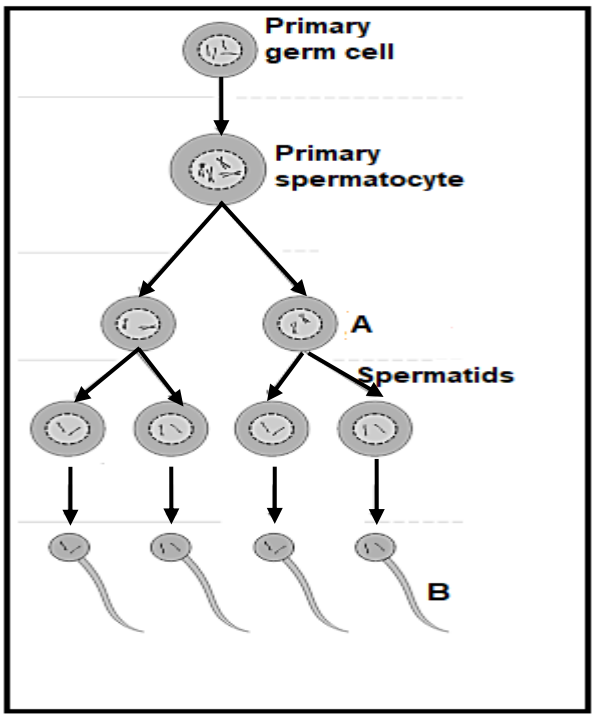
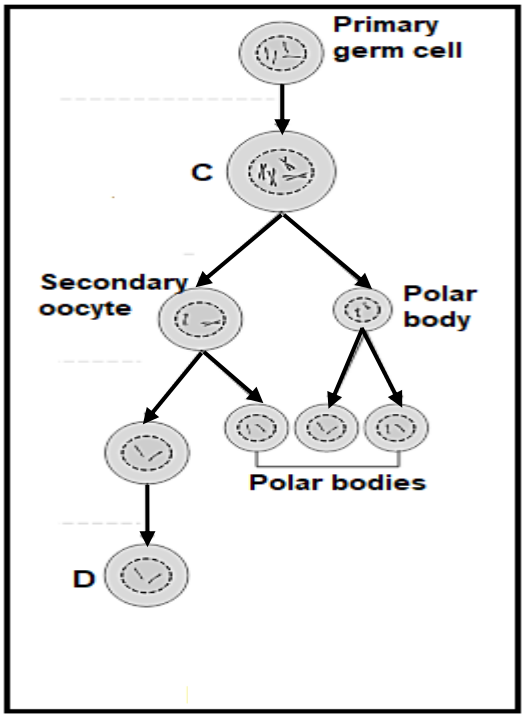


DIAGRAM 2



4.4.1 Identify the processes represented in DIAGRAM 1 and DIAGRAM 2 above. (2)

4.4.2 Label **A**, **B** and **C**. (3)

4.4.3 Name the type of cell division that resulted in **C**. (1)

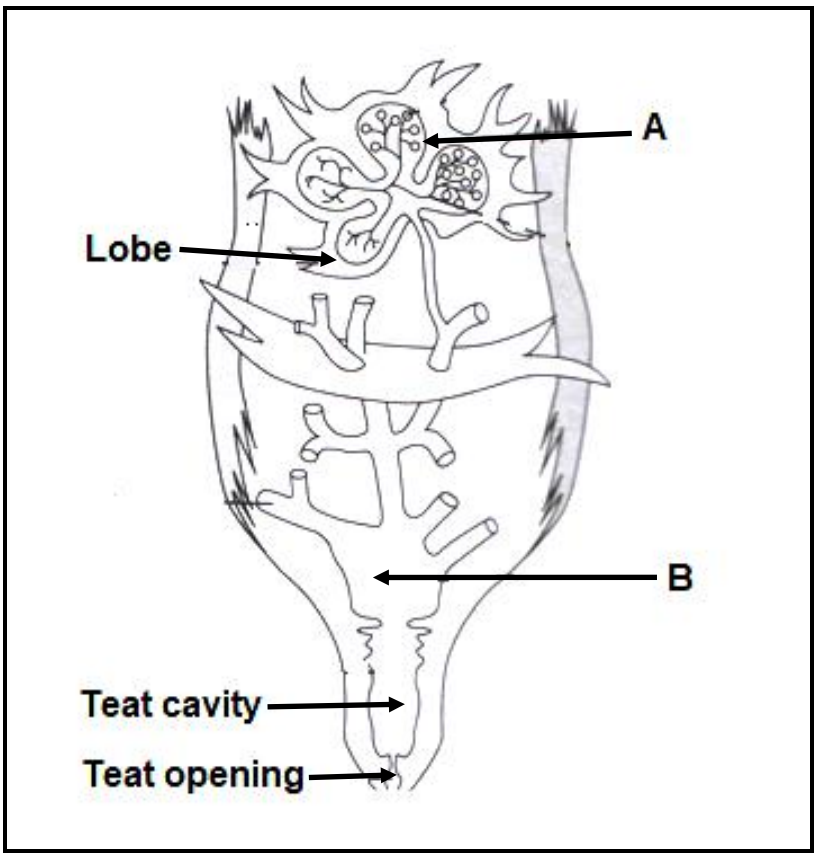
4.5 It is important for the farmer to observe the cow prior, during and after parturition because this process can be negatively affected by many factors.

4.5.1 Give the term that refers to birth difficulty in cows. (1)

4.5.2 State TWO problems associated with the foetus that may interfere with the normal parturition process. (2)

4.5.3 State TWO factors that may cause retention of the placenta. (2)

4.6 The diagram below represents the udder of a cow.



4.6.1 Identify parts **A** and **B**. (2)

4.6.2 Indicate the LETTER that represents the part where milk is produced. (1)

4.6.3 Name the hormone responsible for EACH of the following functions:

(a) Synthesis of milk (1)

(b) Milk let down process (1)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150