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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2025

MARKS: 150

TIME: 2½ hours

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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. Read the questions carefully.
4. Answer ONLY what has been asked.
5. Start EACH question on a NEW page.
6. Number the answers correctly according to the numbering system used in this question paper.
7. You may use a non-programmable calculator.
8. Show ALL calculations, including formulae, where applicable.
9. Write neatly and legibly.

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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.

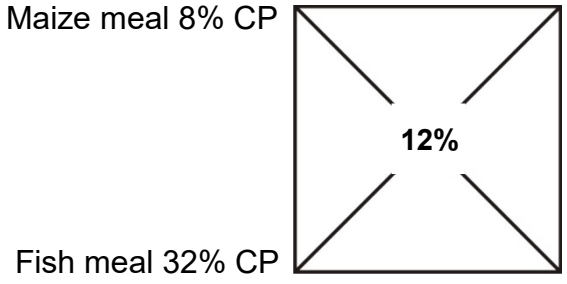
1.1.1 A thick-walled stomach which helps to grind food with small stones is found in …

A pigs.
B cows.
C fowls.
D goats.

1.1.2 The stomach compartments in ruminant animals that are responsible for microbial digestion:

A Rumen and omasum
B Rumen and reticulum
C Rumen and abomasum
D Reticulum and omasum

1.1.3 The following is the ratio to which two feeds should be mixed:



A 8 parts of maize meal to 32 parts of fish meal
B 20 parts of maize meal to 4 parts of fish meal
C 4 parts of maize meal to 20 parts of fish meal
D 32 parts of maize meal to 8 parts of fish meal

1.1.4 A new-born ruminant differs from a mature ruminant because:

(i) The forestomach is underdeveloped
(ii) Only the abomasum is functional
(iii) Milk flows through the oesophageal groove
(iv) The rumen is fully functional

Choose the CORRECT combination:

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

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1.1.5 The following is NOT normal behaviour for a large ruminant:

A Refuses to go towards the edge of a river
B Is comfortable when separated from others in a herd
C Shows stress by circling, droopy ears and sunken eyes
D Usually follows a leader in a herd

1.1.6 ONE of the following is NOT a basic guideline for transporting farm animals:

A The floor of the truck must not be slippery
B Allow animals to cross a road when it is not busy
C Load animals just before departure
D Transport different animals together in the same compartment of the truck

1.1.7 Diseases that are long lasting and occur repeatedly in the same animal:

A Chronic
B Acute
C Pre-acute
D Zoonotic

1.1.8 The following are preventative measures for internal parasites:

(i) Remove manure from the animal kraal
(ii) Spraying of medication
(iii) Resting infested pastures
(iv) Rotational grazing

Choose the CORRECT combination:

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

1.1.9 A part that is located between the body of the uterus and the vagina:

A Vulva
B Ampulla
C Tunica serosa
D Cervix

1.1.10 The scrotum encloses the primary reproductive organ that …

A produces the carrier fluid for spermatozoa.
B is the smallest reproductive organ.
C produces spermatozoa and testosterone.
D secretes all the reproductive fluids. (10 x 2) (20)

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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:	Vitamin B_2	The deficiency causes the deformation and ulceration of the cornea of an eye leading to blindness
	B:	Vitamin B_1	
1.2.2	A:	Grinding	Improves the digestibility of grain feeds
	B:	Roasting	
1.2.3	A:	Infra-red light	Equipment used to provide warmth for piglets
	B:	Thermometer	
1.2.4	A:	Bright eyes	A sign of poor health in animals
	B:	Alert and lively	
1.2.5	A:	Allantois	Contains the fluid that protects the foetus from injuries
	B:	Amnion	

(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 A protein that contains all essential and non-essential amino acids at required levels

1.3.2 A system where egg layers are kept in small wire cages for their entire production period

1.3.3 Defects that new-born animals inherit from their parents

1.3.4 The release of milk from the udder through the action of oxytocin

1.3.5 The stage of parturition when the cervix, vagina and vulva dilate, causing the foetus to move into the birth canal (5 x 2) (10)

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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 Sucrase digests cellulose and hemicellulose into acetic, butyric and propionic acids.

1.4.2 Salt is a source of non-protein nitrogen that becomes poisonous to animals when consumed in large quantities.

1.4.3 The accumulation of fluids in and around the brain, which enlarges the skull, leading to difficult birth is hydro-foetus.

1.4.4 The stage of mating in bulls that occurs after ejaculation is copulation.

1.4.5 The Graafian follicle is a structure that develops in the ovary after ovulation. (5 x 1) (5)

TOTAL SECTION A: 45

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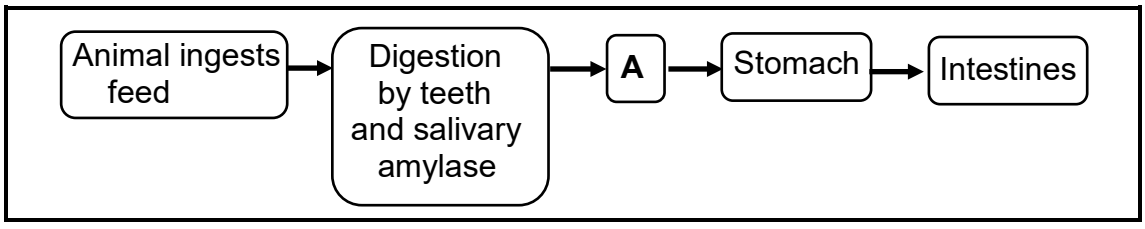
SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The flow chart below illustrates the intake, digestion and flow of feed through the alimentary canal of a farm animal.



2.1.1 Name the farm animal with the digestive system illustrated above. (1)

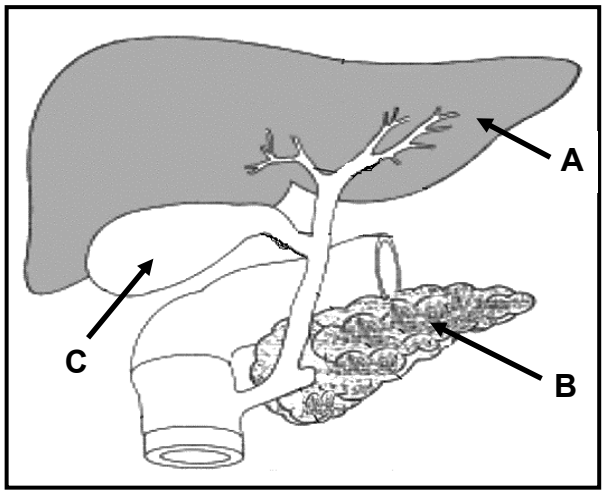
2.1.2 Give a reason for the answer to QUESTION 2.1.1. (1)

2.1.3 Identify ONE part that will assist with the ingestion of feed by the animal named in QUESTION 2.1.1. (1)

2.1.4 Name part **A**. (1)

2.1.5 Indicate ONE function of hydrochloric acid in digestion. (1)

2.2 The diagram below shows the accessory glands of the digestive system in a farm animal.



2.2.1 Identify part **B** in the diagram above. (1)

2.2.2 Name ONE enzyme found in part **B** that plays a role in digestion. (1)

2.2.3 State ONE function of part **A**. (1)

2.2.4 Explain the importance of fat emulsification by the liquid stored in part **C**. (2)

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2.3 The table below shows the organic and inorganic components of feed and their average values.

COMPONENTS	AVERAGE VALUES per kg
Protein	8,5 g
Carbohydrates	12,3 g
Fibre	0,0 g
Sodium	110 mg
Calcium	308 mg

2.3.1 Identify, in the table above, the mineral nutrient that controls the intake of stock lick by farm animals. (1)

2.3.2 State the importance of protein in the feed. Give TWO points. (2)

2.3.3 Indicate ONE other organic component of feeds that is NOT included in the table above. (1)

2.3.4 The feed in the table above could be recommended to prevent osteomalacia in animals. Justify this statement. (2)

2.4 The diagram below shows the digestibility of a feed in a dairy cow.

2.4.1 Calculate the dry matter of the feed that is absorbed by the animal. (3)

2.4.2 State ONE animal factor that might have influenced the digestibility of the feed above. (1)

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2.5 A feed has total digestible nutrients (TDN) of 89% and digestible protein (DP) of 15%. The formula to calculate the nutritive ratio is:

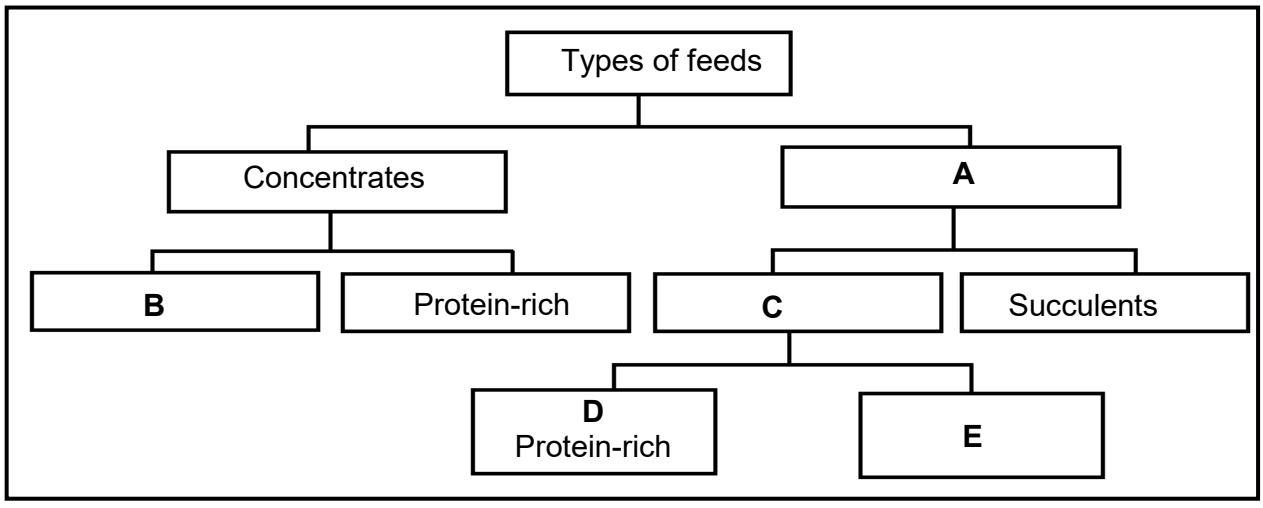
$$\text{Nutritive ratio} = 1 : \frac{\text{\% digestible non-nitrogenous substances (DNNS)}}{\text{\% digestible protein (DP)}}$$

2.5.1 Use the above formula to calculate the nutritive ratio (NR) of this feed. Show ALL calculations including the formula. (3)

2.5.2 State the purpose of feeding animals with the feed containing the nutritive ratio calculated in QUESTION 2.5.1. (1)

2.5.3 Give a reason for the answer to QUESTION 2.5.2. (1)

2.6 The schematic representation below shows the types of feeds and their subdivisions.



2.6.1 Identify **A** and **C**. (2)

2.6.2 Indicate the importance of **A** for young ruminants. (1)

2.6.3 Give ONE example of EACH of the following:

(a) **B** (1)

(b) **D** (1)

2.7 A lactating dairy cow was fed 30 kg of fish meal with a gross energy (GE) value of 21 MJ/kg of dry matter. The following energy losses occurred in the dry matter consumed:

- 35% in the faeces
- 5% in the urine
- 5% in the fermentation gases
- 10% in body heat

2.7.1 Calculate the digestible energy value of fish meal consumed by the cow. Show ALL calculations, including the formula. (4)

2.7.2 Name the energy that remains after all energy losses from gross energy. (1)

[35]

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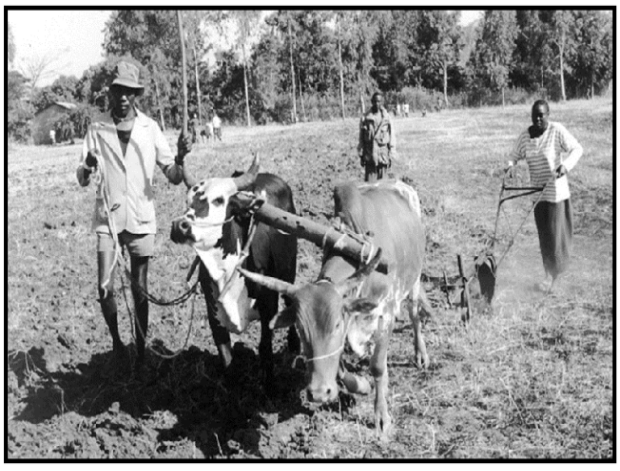
QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

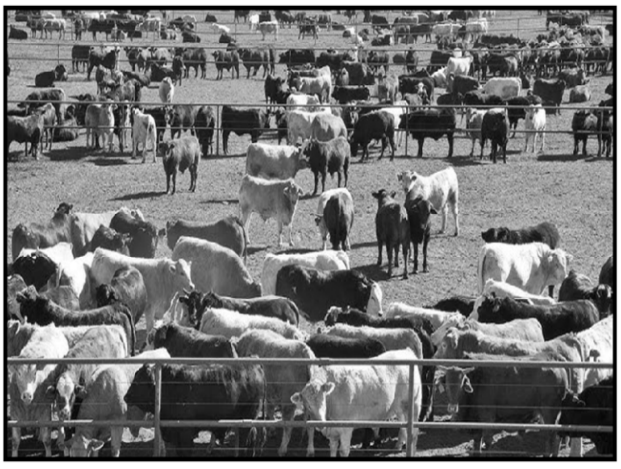
Start this question on a NEW page.

3.1 The pictures below show farm animals in different farming systems.

PICTURE A



PICTURE B



3.1.1 Identify the farming system represented in EACH of the following:

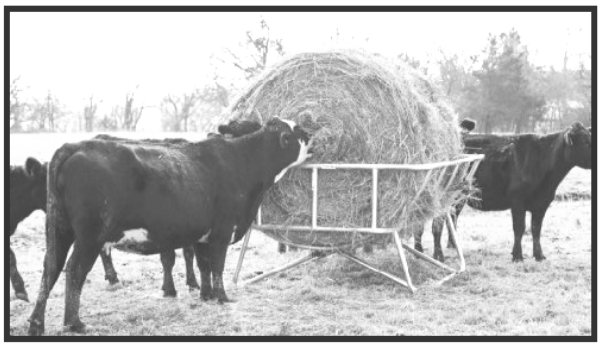
(a) PICTURE B (1)

(b) PICTURE A (1)

3.1.2 Give a reason for the answers to QUESTIONS 3.1.1(a) and (b). (2)

3.2 The pictures below depict some of the factors that are to be considered for increased production in farm animals.

PICTURE A



PICTURE B

3.2.1 Identify the factors represented in PICTURE A and PICTURE B, which would result in increased production if properly managed. (2)

3.2.2 State TWO other factors that would adversely affect the young calf in an extensive animal production system. (2)

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3.3 The pictures below show different facilities used in animal production.

PICTURE A

PICTURE B

PICTURE C

PICTURE D

3.3.1 Identify the facility in:

(a) PICTURE A (1)

(b) PICTURE B (1)

3.3.2 Indicate the use of bedding in PICTURE B. (1)

3.3.3 Differentiate between the facilities in PICTURE C and PICTURE D, based on their purpose. (2)

3.4 Below is a list of tools and equipment that are used to handle farm animals.

prodder; plastic shaker; plywood board; casting harness; nose pliers; halter

Choose the tool or equipment from the list above that is used to handle farm animals under EACH of the conditions below:

3.4.1 Makes a loud noise to steer pigs in a particular direction (1)

3.4.2 Is placed around the head, muzzle and behind the ears of an animal to restrain or lead it (1)

3.4.3 Delivers a mild electric shock when handling large animals (1)

3.4.4 Is tied around the head of a large animal to make it lie down (1)

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3.5 State ONE basic guideline for handling sheep. (1)

3.6 The diagrams below show the life cycles of two different parasites.

DIAGRAM A

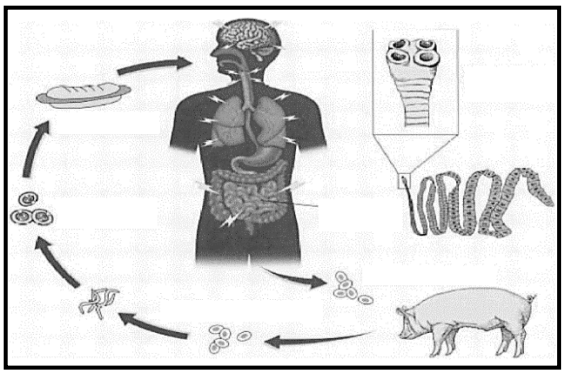
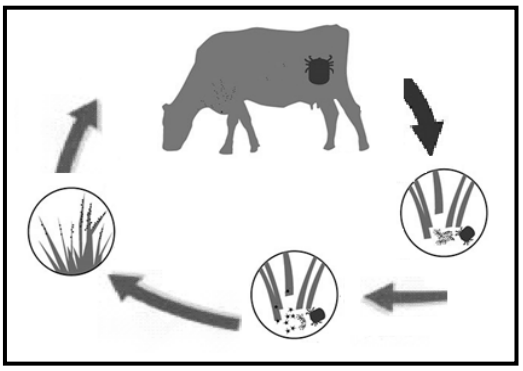


DIAGRAM B



3.6.1 Identify the parasite in DIAGRAM A. (1)

3.6.2 Classify the parasite in DIAGRAM B, based on where it occurs. (1)

3.6.3 Differentiate between the parasites in DIAGRAM A and DIAGRAM B, based on their life cycles. (2)

3.6.4 State TWO economic implications of the parasite in DIAGRAM A. (2)

3.7 Poisonous plants can pose a serious challenge to the health of farm animals.

3.7.1 State TWO measures the farmer can take to treat animals suffering from plant poisoning. (2)

3.7.2 Give TWO roles of the state in animal health. (2)

3.8 A list of diseases that can affect farm animals is given below.

lumpy wool; bluetongue; paralysis; brucellosis; mastitis; redwater; heartwater; foot-and-mouth disease

Choose the disease from the list above that can be associated with EACH of the following statements:

3.8.1 The occurrence of round blisters that later develop into sores on the mucous membranes of the mouth, tongue and between the hooves (1)

3.8.2 Is characterised by brown to dark urine and is transmitted by blue ticks (1)

3.8.3 Causes hard scabs that affect the fleece and also occur on the ears, face and lips (1)

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3.8.4 Signs are high fever, nervousness, grinding of the teeth, watery diarrhoea and is transmitted by a bont tick (1)

3.8.5 Inflammation of the udder which results in thick and flaky milk with clots (1)

3.9 Name TWO methods of administering medication to farm animals. (2)
[35]

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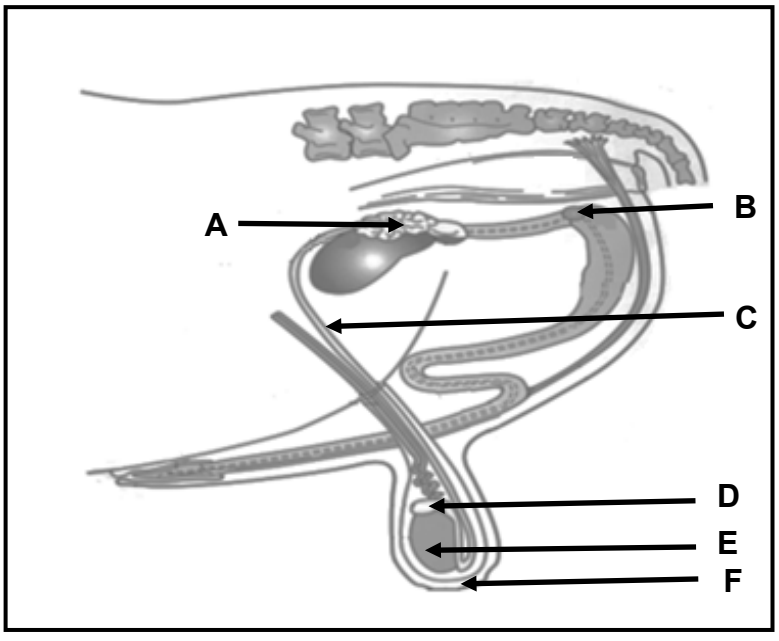
QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The diagram below represents the reproductive system of a farm animal.



4.1.1 Identify part **D**. (1)

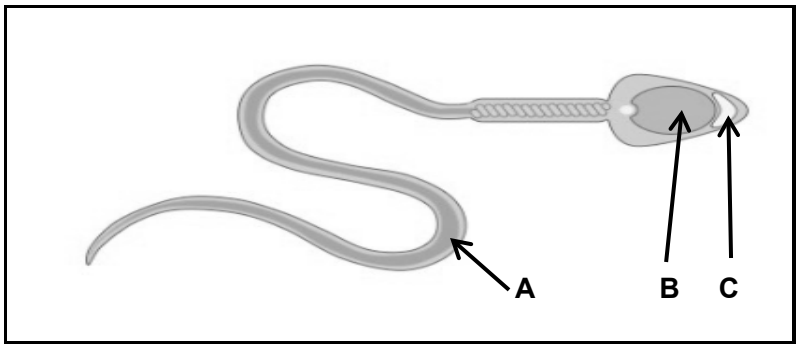
4.1.2 State ONE function of EACH of the following:

(a) Fluid in part **A** (1)

(b) Part **C** (1)

4.1.3 Name the congenital defect associated with part **E**. (1)

4.2 The diagram below represents a sperm cell.



4.2.1 Name the process through which the sperm cell is formed. (1)

4.2.2 Identify the letter of the part that releases an enzyme that helps the sperm cell to penetrate the female gamete. (1)

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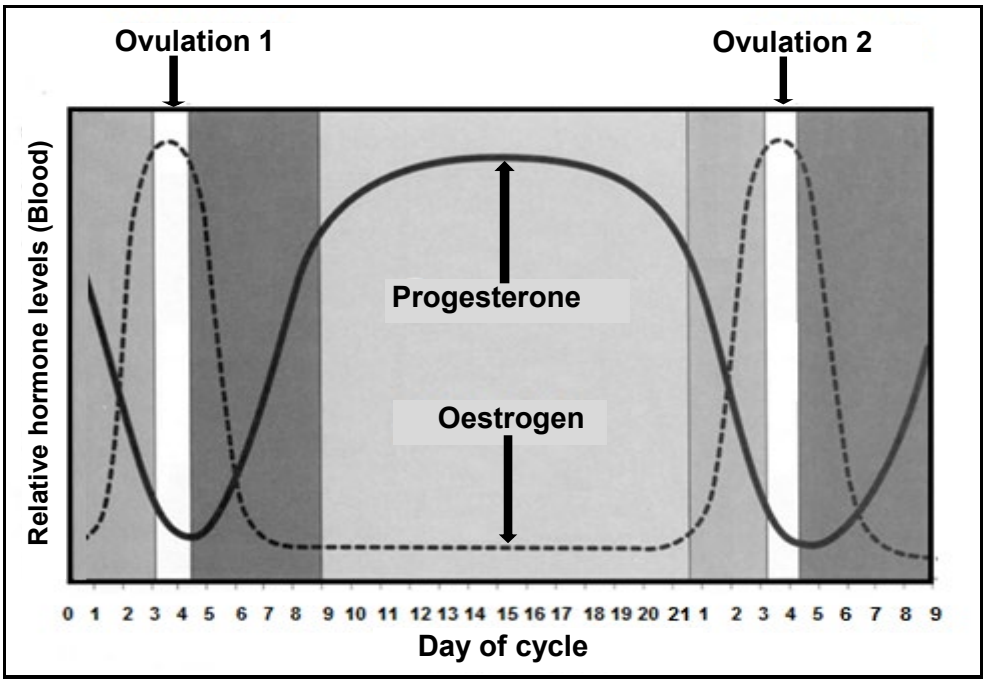
4.2.3 Name the cell division that results in:

(a) Secondary spermatocytes (1)

(b) Primary spermatocytes (1)

4.3 The graph below provides information regarding the hormonal levels during the reproductive cycle of a cow.



4.3.1 Identify the time (in days) when the levels of oestrogen and progesterone are equal towards the onset of the second ovulation. (1)

4.3.2 Give an explanation, based on the graph above, that indicates the cow was NOT pregnant after Day 1. (2)

4.3.3 Describe what could have happened to the corpus luteum of the cow shown in the graph above, after Day 15. (1)

4.3.4 Indicate the stage of the oestrus cycle between Day 5 and Day 8. (1)

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4.4 The table below shows the semen volume per ejaculate and the sperm cell concentration per ejaculate in different farm animals.

FARM ANIMAL	SEMEN VOLUME PER EJACULATE (mℓ)	SPERM CELL CONCENTRATION PER EJACULATE (billion/mℓ)
Bull	8	1,5
Ram	5	3,0
Cock	2	1,0
Stallion	7	1,0
Buck	4	3,0

4.4.1 Use the data in the table above to draw a combined bar graph showing the semen volume per ejaculate and the sperm cell concentration per ejaculate in different farm animals. (6)

4.4.2 State ONE requirement for the storage of collected semen. (1)

4.5 Explain how EACH of the following works in detecting oestrus in cattle:

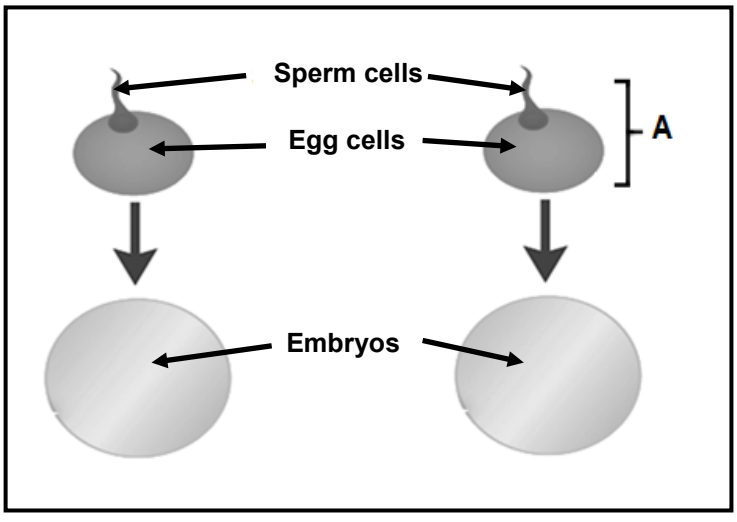
4.5.1 Pedometer (2)

4.5.2 Tail chalking (2)

4.6 Artificial insemination (AI) is a reproductive technique used by farmers.

Indicate the action the farmer would take if signs of heat (oestrus) were detected in the afternoon. (1)

4.7 The diagram below illustrates the formation of multiple births.



4.7.1 Explain the process of multiple birth formation shown in the diagram above. (2)

4.7.2 Name the reproductive process that occurs after **A** has taken place. (1)

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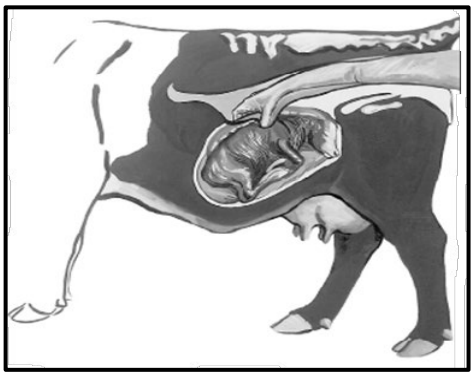
4.8 A practice was applied where the nucleus of a Holstein cow, that produced 100 litres of milk per day, was extracted from the somatic cells and inserted into the enucleated ovum of a Nguni cow that produced 14 litres of milk per day. The ovum with a somatic nucleus was then inserted back into the uterus of the Nguni cow where the embryo developed until birth.

4.8.1 Deduce the type of reproductive technique from the paragraph above. (1)

4.8.2 The calf that will be born from the Nguni cow will be a Holstein. Justify the statement. (2)

4.8.3 State ONE disadvantage of the reproductive technique in QUESTION 4.8.1. (1)

4.9 The picture below shows a stage of pregnancy in a cow.



4.9.1 Identify the stage of pregnancy in the cow represented in the picture above. (1)

4.9.2 Give TWO reasons why the stage of pregnancy identified in QUESTION 4.9.1 can be terminated before the normal duration. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

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