GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2026

AGRICULTURAL SCIENCES

AGRICULTURAL SCIENCES P1

C2641E

TIME: 2½ hours

MARKS: 150

17 pages

X05

INSTRUCTIONS AND INFORMATION

1. This 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.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct 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 A.

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 When there is insufficient ... in the diet, it can cause the thyroid gland to swell.

A calcium
B iodine
C sodium
D selenium

1.1.3 Micro-organisms in the rumen digest cellulose to produce the following products:

(i) Carbon dioxide
(ii) Butyric acid
(iii) Pepsin
(iv) Methane

Choose the CORRECT combination:

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

1.1.4 As the environmental temperature increases above the normal comfort levels, ruminant animals tend to:

A Eat less and drink more water
B Eat more and drink less water
C Eat more and drink more water
D Eat less and drink less water

1.1.5 Standing behind the … encourages the animal to move forward, while standing in front of it prompts the animal to back up.

A flight zone
B blind spot
C point of balance
D danger zone

1.1.6 Which of the following is a guideline when transporting farm animals?

A Load bulls, cows in oestrus and calves together.
B Transport all the pregnant animals together.
C Load animals within a reasonable time before departure.
D Spray animals with water while transporting them.

1.1.7 Diseases that are typically limited to a specific geographic area or region:

A Zoonotic
B Metabolic
C Pandemic
D Endemic

1.1.8 The statements below are correct with regard to the life cycle of a one-host tick.

(i) The eggs hatch into larvae.
(ii) The larvae develop into nymphs.
(iii) The larvae and nymphs live on an intermediate host.
(iv) The nymphs develop into adults.

Choose the CORRECT combination:

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

1.1.9 The accumulation of cerebrospinal fluid in the brain of a foetus, leading to a difficult parturition:

A Hydrocephalus
B Metritis
C Flexion
D Hydrops foetus

1.1.10 A process where superior cows are treated with hormones to produce many more ova during a single oestrus cycle:

A Synchronisation
B Flushing
C Insemination
D Superovulation (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:	Production ration	The feed given to an animal to do work and synthesise output
	B:	Maintenance ration	
1.2.2	A:	Popping	A method of improving the digestibility of grain by dry heating, causing it to expand
	B:	Pelleting	
1.2.3	A:	Backyard	A system of keeping each layer hen in her own small wire cage for the entire productive cycle
	B:	Deep litter	
1.2.4	A:	Mastitis	Disease caused by bacteria
	B:	Tuberculosis	
1.2.5	A:	Nucleation	The removal of the nucleus from the ovum during nuclear transfer
	B:	Enucleation	

(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 digestive gland that secretes the enzyme amylase

1.3.2 A non-protein nitrogen substance that is safer to use because it is less soluble

1.3.3 A condition that, by law, must be reported by farmers to the government or to the proper officials

1.3.4 The process in which female animals in a herd are made to come into oestrus simultaneously

1.3.5 The ideal foetal presentation during parturition (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 Renin is an enzyme that breaks down fats during digestion.

1.4.2 The villi are tiny, finger-like projections that act as heating rods to increase the surface area of the rumen wall.

1.4.3 Thyroid regulators are used to calm and soothe the nervous system of farm animals for examination or transportation purposes.

1.4.4 The female animal secretes hormones to attract bulls.

1.4.5 The oestrogen hormone prevents the growth and ripening of the Graafian follicle. (5 x 1) (5)

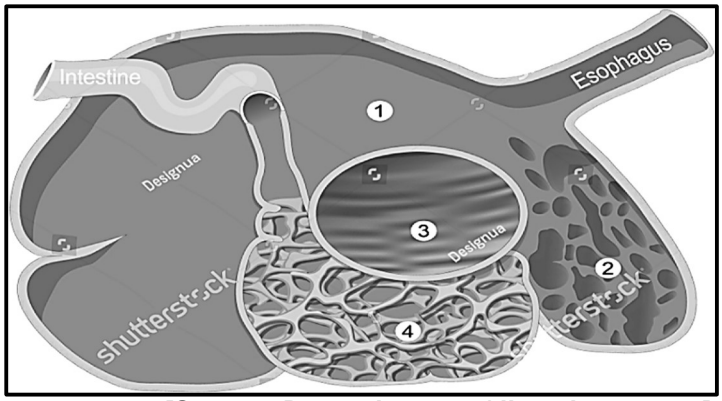
TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The diagram below represents the digestive system of a farm animal



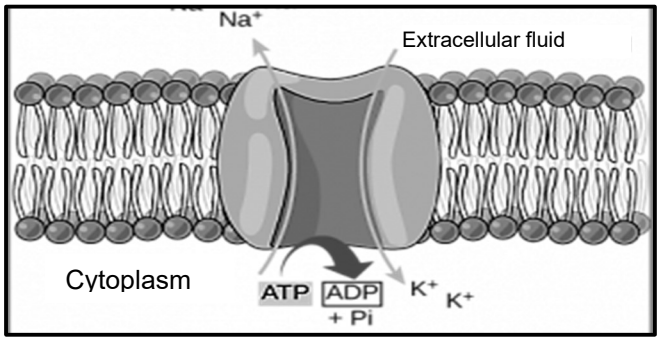
[Source: *Dreamtime.com/digestive system*]

2.1.1 Identify the type of farm animal with the stomach shown in the diagram above. (1)

2.1.2 Justify the answer to QUESTION 2.1.1 by giving TWO reasons. (2)

2.1.3 Name TWO fluids that are secreted into the small intestines. (2)

2.2 The diagram below illustrates the absorption of substances through a cell membrane.



[Source: *https://rwu.pressbooks.pub/bio*]

2.2.1 Indicate the type of absorption process that is represented above. (1)

2.2.2 Describe the process mentioned in QUESTION 2.2.1. (2)

2.3 An experimental trial was conducted with sheep to determine the digestibility of a newly developed lucerne cultivar. During the experimental period, the mass of feed intake as well as the mass of excretion were measured. The total feed intake of a sheep was 7 kg lucerne and the mass of excreted manure was 2 kg. The table below shows the data from this experimental trial.

FEED COMPONENT	LUCERNE FEED (%)	MANURE (%)
Moisture	8	4
Dry material	92	96

2.3.1 Classify lucerne hay as a feed. (1)

2.3.2 Calculate the co-efficient of digestibility of this experimental lucerne hay. Show ALL calculations. (5)

2.3.3 Explain the difference in protein requirements between an older sheep and a lamb. (2)

2.3.4 Suggest THREE methods that can improve the digestibility of feeds for a farm animal. (3)

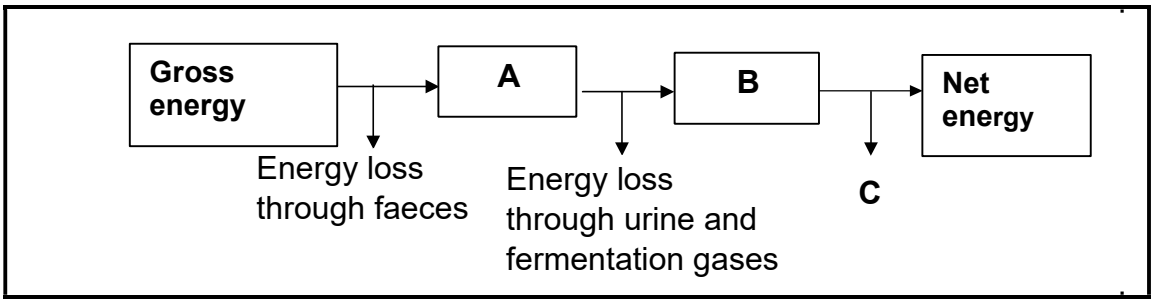
2.4 The table below indicates the nutritional information of selected feeds.

FEED	DIGESTIBLE PROTEIN (DP) %	TOTAL DIGESTIBLE NUTRIENTS (TDN) %
Lucerne hay	25	62
Maize meal	9,5	80

2.4.1 Calculate the nutritive ratio of lucerne hay. Show ALL calculations (3)

2.4.2 Justify the suitability of lucerne hay for the fattening of matured animals with reference to the calculation in QUESTION 2.4.1. (2)

2.5 The schematic representation below indicates energy loss in the animal body.



2.5.1 Name the labels represented by **A** and **C** in the above schematic representation. (2)

2.5.2 Give THREE reasons why it is important to know the net energy value of a feed. (3)

2.6 The information below shows various animal feeds.

A. Fish meal	**B. Maize**	**C. Lucerne hay**	**D. Lick block**

Write down the letter (A – D) of the feed in the table above that can be recommended for farm animals under each of the following conditions:

2.6.1 Finishing cattle for the abattoir (1)

2.6.2 To correct mineral deficiencies (1)

2.6.3 To improve fertility in male animals (1)

2.6.4 To supply bulkiness in rations of ruminant animals (1)

2.7 A strategic plan for livestock farmers to ensure sufficient feeds on the farm to meet the requirements of all the animals

2.7.1 Provide a suitable term for the above statement. (1)

2.7.2 State ONE principle of the description mentioned in QUESTION 2.7.1 (1)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The picture below shows a farming system.



[Source: *Google.com/farming systems*]

3.1.1 Identify the farming system represented by the picture above. (1)

3.1.2 Give TWO reasons to justify the answer to QUESTION 3.1.1. (2)

3.1.3 Indicate THREE factors that would increase animal production. (3)

3.2

Farmer A:
In a rural area of the country a farmer operates a dairy enterprise with 30 cows on a 580 ha farm. The cows are milked by hand with limited facilities. Milking takes place under a tree next to the homestead.

Farmer B:
This farmer is one of the largest dairy producers in South Africa. The farmer owns 1 600 cows on a 400 ha farm. The farm is situated close to a major metropolitan area. The housing facilities are equipped with the latest technology for environmental control, such as ventilation systems to ensure optimum production levels.

3.2.1 Identify the farmer (**A** or **B**) that operates on a small scale. (1)

3.2.2 Give ONE reason to support the answer to QUESTION 3.2.1. (1)

3.2.3 Name the production system practised by Farmer **B**. (1)

3.2.4 Justify the answer to QUESTION 3.2.3 by stating TWO reasons. (2)

3.2.5 Predict the effect of extreme temperatures (very high temperatures and very low temperatures) on feed intake. (2)

3.2.6 Indicate TWO possible measures that are taken by Farmer **B** to control high temperatures in his dairy production unit. (2)

3.3 Moving animals is a common practice in a livestock production enterprise. This is done to move animals to different grazing fields, to bring them into handling facilities and to transport them to markets.

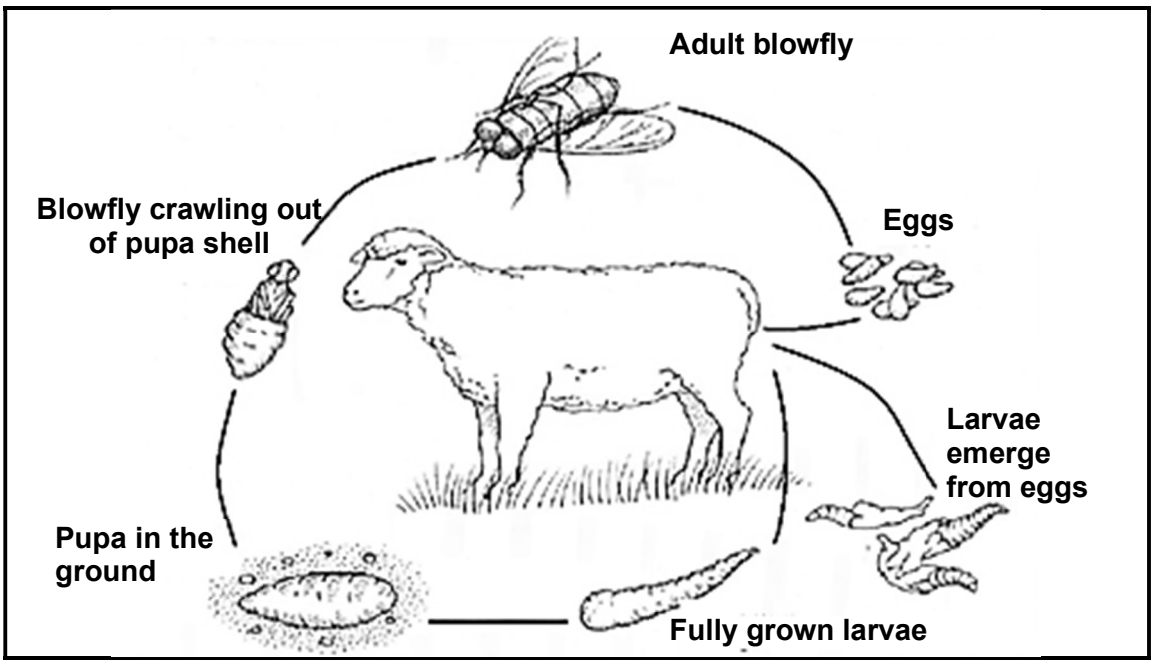
Indicate THREE requirements for the movement or transportation of animals on public roads, as required by government regulations or legislation. (3)

3.4 During an experiment, a group of heifers was injected with a growth stimulant to test the effectiveness of a newly developed stimulant. The results of the growth responses of the heifers in the experiment were tabulated in the table below.

GROWTH STIMULANT (VOLUME IN ml)	GROWTH RESPONSE (kg)
0	120
5	250
10	340
15	395
20	410
25	415
30	420

Draw a line graph to illustrate the volume of growth stimulant and the resulting growth response of the heifers. (6)

3.5 The diagram below shows a life cycle of a parasite that affects a farm animal.



[Source: Agricultural Sciences Handbook & Study Guide]

3.5.1 Identify the parasite shown in the life cycle above. (1)

3.5.2 Indicate the most harmful stage in the life cycle of this parasite. (1)

3.5.3 Identify the condition caused by the stage in QUESTION 3.5.2 that occurs in the wounds of farm animal. (1)

3.5.4 Give the term used for the removal of the wool around the tail and near the leg areas. (1)

3.5.5 List THREE non-chemical management practices used to control infestation by this parasite. (3)

3.6 The picture below represents a toxic plant that can affect animals in various ways.



[Source: *istockphoto.com/photos/weeds*]

3.6.1 Identify the plant shown in the picture above. (1)

3.6.2 State TWO measures that farmers can implement to treat animals suffering from plant poisoning. (2)

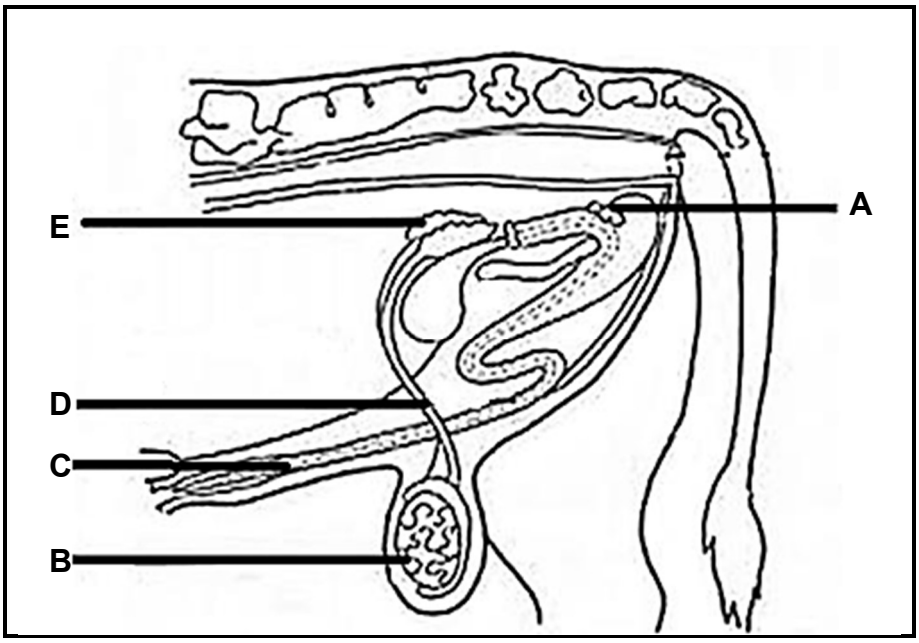
3.6.3 Give ONE role that the state fulfills in ensuring animal health. (1)

[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

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



[Source: Grade 12 Workbook]

4.1.1 Identify the letter representing the part where each of the following occurs:

(a) Transportation of sperm cells to the urethra (1)

(b) Secretion of a sticky liquid that provides energy for the sperm cell (1)

4.1.2 Indicate the role played by part **C** in reproduction. (1)

4.1.3 State TWO congenital defects of part **B** that may cause a complete loss of fertility in bulls. (2)

4.2 The diagrams below illustrate the development of twins in a cow.

DIAGRAM A

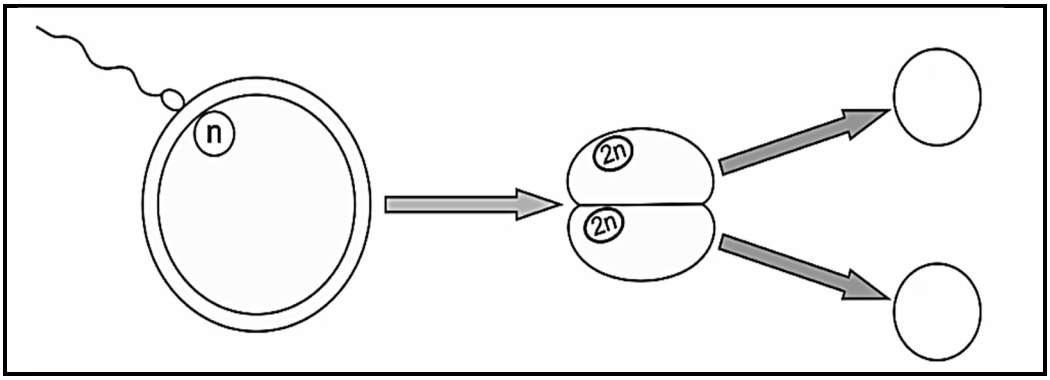
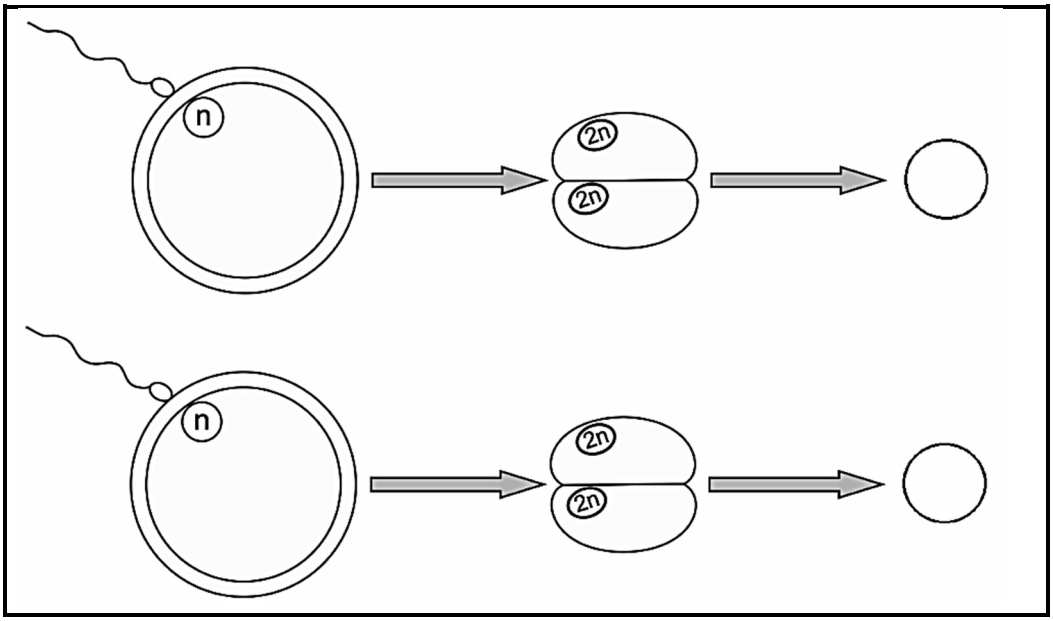


DIAGRAM B



[Source: Agricultural Sciences Handbook & Study Guide]

4.2.1 Identify the TWO types of multiple births illustrated in diagram **A** and diagram **B**. (2)

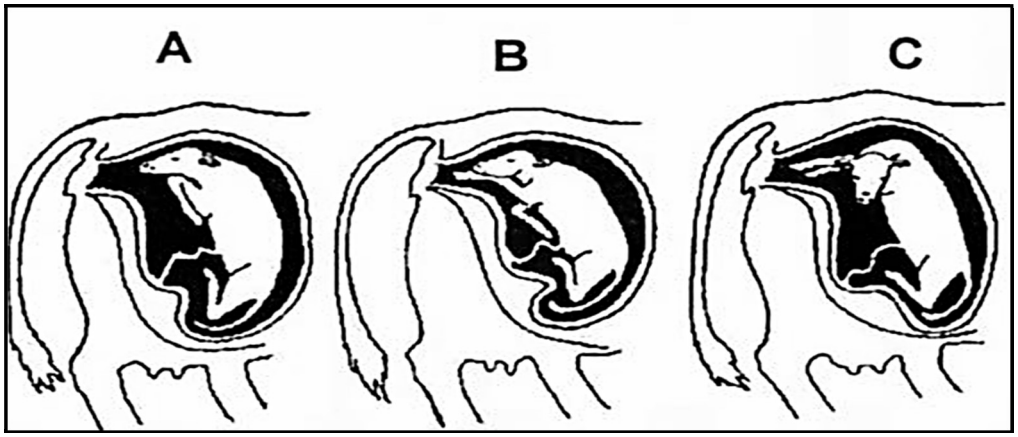
4.2.2 Motivate the answer to QUESTION 4.2.1. (2)

4.2.3 Indicate TWO characteristics of the twins illustrated in diagram **A** with regards to:

(a) Physical appearance (1)

(b) Gender (1)

4.3 The diagram below shows calves that are incorrectly positioned before and during the time of parturition which may cause difficult calving.



[Source: Agricultural Sciences Handbook & Study Guide]

4.3.1 Identify the parturition stage depicted in foetal positions (**A** – **C**) above. (1)

4.3.2 Give the correct scientific name for the calving difficulty that might be caused by foetal positions **A**, **B** and **C**. (1)

4.3.3 Suggest TWO actions that a farmer can take to save both the calf and the cow during calving difficulty. (2)

4.4 Oestrus cycles start at puberty, are mostly controlled by female hormones, and can only be disturbed or interrupted by pregnancy, disease and extreme climatic conditions.

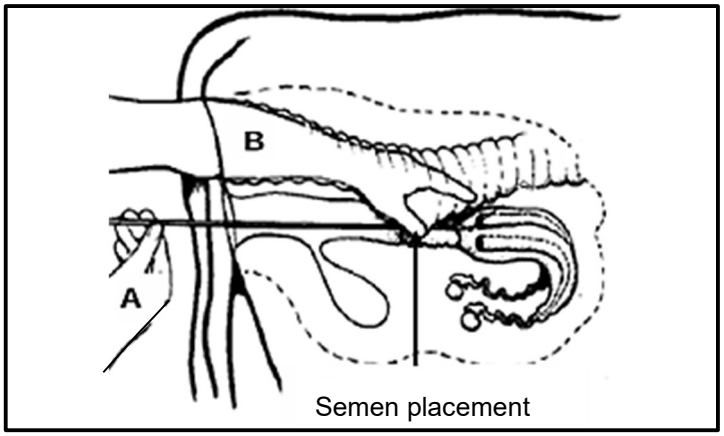
4.4.1 State the average number of days for the oestrus cycle in a cow. (1)

4.4.2 Apart from visible and behavioural signs that a cow may show, name TWO devices that a farmer may use to detect oestrus in a cow. (2)

4.4.3 Give FOUR reproductive hormones, in sequential order, that are produced by a cow during the four phases/stages of oestrus. (4)

4.4.4 State the importance of the relationship between the timing of insemination and ovulation. (3)

4.5 The diagram below illustrates a technique used by farmers to improve their cattle herds.



[Source: Agricultural Sciences Handbook & Study Guide]

4.5.1 Identify the technique illustrated in the diagram above. (1)

4.5.2 Name the apparatus held by hand **A** in the diagram above. (1)

4.5.3 State TWO characteristics of high-quality semen. (2)

4.5.4 Indicate the best time of the day for inseminating a cow that shows the first signs of oestrus in the morning. (1)

4.5.5 State ONE negative effect if an inexperienced person performs the technique identified in QUESTION 4.5.1. (1)

4.6 Understanding the lactation process in cows is vital for dairy farmers to optimise milk production and maintain cow health. Milk ejection is initiated by the stimulation of the central nervous system, which is brought about by the milking action of the milker.

4.6.1 Define the underlined term. (2)

4.6.2 Give TWO stimuli initiated by the milker during the milking process. (2)
[35]

TOTAL SECTION B: 105

TOTAL: 150