GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2025

AGRICULTURAL SCIENCES

AGRICULTURAL SCIENCES P1

C2641E

X05

TIME: 2½ hours

MARKS: 150

15 pages

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 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 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 Mechanical digestion of food in a fowl takes place in the:

A Crop
B Cloaca
C Proventriculus
D Ventriculus

1.1.2 A cost-effective protein supplement for a ruminant animal is:

A Fish meal
B Cottonseed oil-cake meal
C Urea
D Carcass meal

1.1.3 The ratio of maize meal to sunflower meal is 22 : 7. The percentage of maize meal in this mixture is:

A 24,1%
B 67,8%
C 75,9%
D 7,59%

1.1.4 It is important to feed roughage to a fully grown ruminant because it:

(i) Prevents the accumulation of gases when grazing on lucerne
(ii) Stimulates the development of the rumen
(iii) Supplies bulkiness to the ration
(iv) Ensures that digestion takes place properly

Choose the CORRECT combination:

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

1.1.5 The flight zone of a bull refers to the space:

A Closer to the crush
B Between two gates
C Around the side of the bull
D In front of the bull's head

1.1.6 The following must be taken into consideration when designing housing for a dairy farm:

(i) The use of durable materials in the construction of the building
(ii) The importance of proper ventilation
(iii) The breed of dairy cattle
(iv) The availability of money

Choose the CORRECT combination:

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

1.1.7 The picture below illustrates ... as a reason for handling farm animals.



[Source: *https://www.agriculture.com/family/living-the-country-life/docking-lamb-tails*]

A weighing
B castration
C trimming
D docking

1.1.8 The effects of external parasites may be reduced by:

A Applying less concentrated pesticides regularly
B Dosing animals frequently using smaller dosages
C Exposing animals to the parasite to develop resistance
D Reducing the strength of the pesticide to save money

1.1.9 The following are examples of protozoan diseases, except:

A Anthrax
B Anaplasmosis
C Redwater
D Coccidiosis

1.1.10 Twins developing from two different ova and fertilised by two different spermatozoa are called:

A Monozygotic
B Dizygotic
C Maceration
D Freemartin

(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:	Oat straw	High crude fibre content
	B:	Teff hay	
1.2.2.	A:	NR of 1 : 6	The feed ratio suitable for the growth of farm animals
	B:	NR of 1 : 10	
1.2.3	A	Chin-ball marker	Method dairy farmers can adopt to assist with the identification of cows on heat
	B:	Pedometer	
1.2.4.	A:	Subcutaneous	Injecting animals between the layers of the skin
	B:	Intradermal	
1.2.5.	A:	FSH	The hormone released by the corpus luteum to ripen the cervix and relax the pelvis ligaments for birth
	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 rhythmic contraction and relaxation of the muscles in the alimentary canal for the movement of food

1.3.2 A plan where a farmer ensures that the animal feed requirements are met throughout the production cycle

1.3.3 A tendency by animals to come close to each other on hot days in an attempt to seek shade

1.3.4 The condition where the testes of male animals remain inside the abdominal cavity

1.3.5 The accumulation of liquid in and around the brain of a foetus, causing a difficult birth (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 Pepsin is an enzyme in the saliva of pigs that changes starch into maltose.

1.4.2 Mineral lick is the method of supplementing minerals where an animal takes in as much minerals as required.

1.4.3 Rift Valley fever is a viral disease that causes blister-like lesions on the tongue and lips.

1.4.4 Maceration is the hardening and drying out of a dead foetus after the skeleton has been formed.

1.4.5 A dilutant is a yellowish, salty, creamy liquid secreted from the mammary glands at parturition and provides antibodies.

(5 x 1) (5)

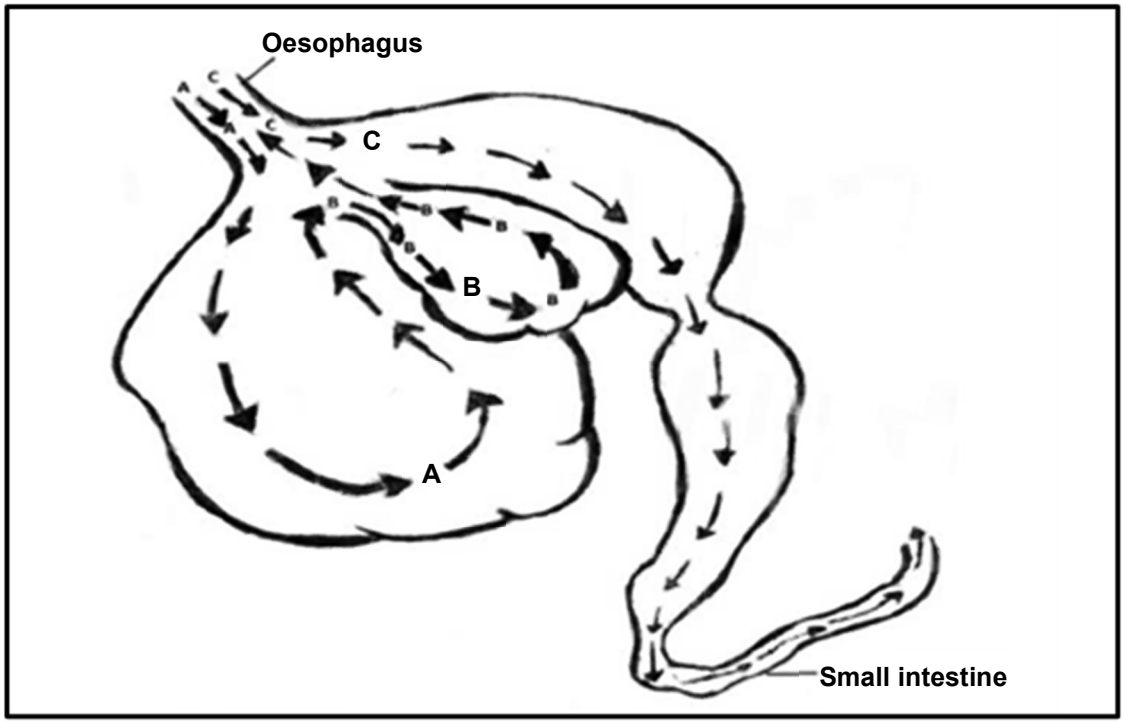
TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The diagram below shows the path in the stomach of a farm animal.



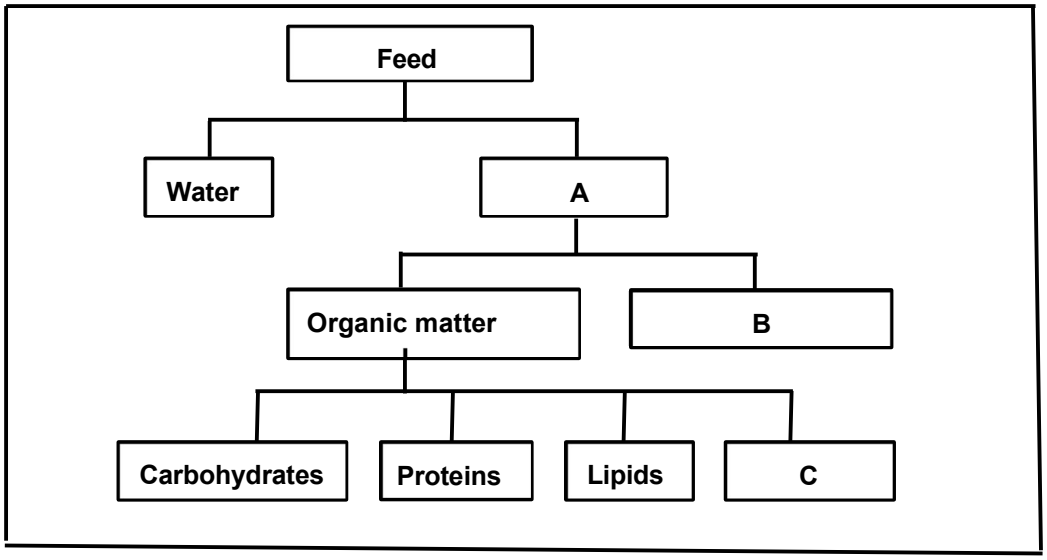
[Source: GDE Agricultural Sciences 2017, Animal Nutrition worksheets]

2.1.1 Name the farm animal that has the stomach shown in the above diagram. (1)

2.1.2 Indicate the processes illustrated by arrows **A**, **B** and **C** respectively. (3)

2.1.3 The process illustrated by arrow **B** has advantages for this farm animal. Justify this statement by stating TWO advantages. (2)

2.2 The schematic representation below shows the components of feed.



2.2.1 Identify the substances represented by **A, B** and **C**. (3)

2.2.2 Distinguish between an *oil* and a *fat*. (2)

2.2.3 State the end-product of the digestion of the following nutrients in pigs:

(a) Carbohydrates (1)

(b) Proteins (1)

2.2.4 State TWO functions of water during the digestion of feeds. (2)

2.3 The table below shows minerals and vitamins and their deficiency symptoms.

MINERAL/VITAMIN	DEFICIENCY SYMPTOMS
A	rough, thick skin and hair loss, especially in pigs
Selenium	**B** (deficiency in pregnant cows)
Vitamin E	**C** (deficiency in lambs)

2.3.1 Refer to the table above and write down the missing information at **A**, **B** and **C**. (3)

2.3.2 Indicate the method of supplementing each of the following:

(a) Vitamin A (1)

(b) Soluble minerals (1)

2.4 The moisture content of hay for cattle in a feedlot is 8%. A herd of beef weaners consumes 30 kg of hay on average and excretes 12 kg of dry manure every day.

2.4.1 Calculate the digestibility coefficiency of the feed. (5)

2.4.2 Explain the implication of the calculated feed in QUESTION 2.4.1. (2)

2.5 A cow was given a feed with a total digestible nutrient (TDN) value of 75% and a digestible protein (DP) value of 20%. Calculate the following:

2.5.1 The percentage of digestible non-nitrogenous substances of this feed (2)

2.5.2 The nutritive ratio (NR) of this feed (3)

2.6 Farm animals have certain fodder requirements at various stages of growth and production. The table below represents feed requirements and resources available over a twelve-month period.

ITEM	FIRST 6 MONTHS (RAINY SEASON)	LAST 6 MONTHS (DRY SEASON)	TOTAL
Need per cow per day	12 kg	15 kg	
Feed requirements in 6 months	108 000 kg	…	…
Resources available per month	1,5 ton/ha	0,15 ton/ha	415 800 kg per year
Total area for camps (ha)	42	42	42
Number of animals	50	30	

Calculate the total feed required by the animals for a year. Show ALL calculations. (3)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The picture below shows a production system.



[Source: Agricultural Sciences Answer series, Pg 51]

3.1.1 Identify the type of poultry production system above that is normally used by rural communities. (1)

3.1.2 Name TWO advantages of the production system in QUESTION 3.1.1. (2)

3.1.3 State TWO problems that could be associated with this type of production system. (2)

3.2 A farmer erected a broiler unit equipped with the following specialised equipment for environmental control:

A	Foot baths at all the entrances
B	Foldable side walls
C	Electric heaters
D	Fans in the roof and walls
E	Insulation material on the roof

Match the above-mentioned equipment with the most suitable statement below. Write ONLY the letter (A – E) next to the question numbers (3.2.1 to 3.2.4) in the ANSWER BOOK.

3.2.1 To keep the temperature inside the broiler unit constant day and night (1)

3.2.2 To increase the temperature inside the broiler unit during a sudden drop in the environmental temperature (1)

3.2.3 To decrease the temperature in the broiler unit on a very hot day (1)

3.2.4 To reduce the possibility of bringing pathogens into the broiler unit (1)

3.3 The diagrams below illustrate the handling of large farm animals.

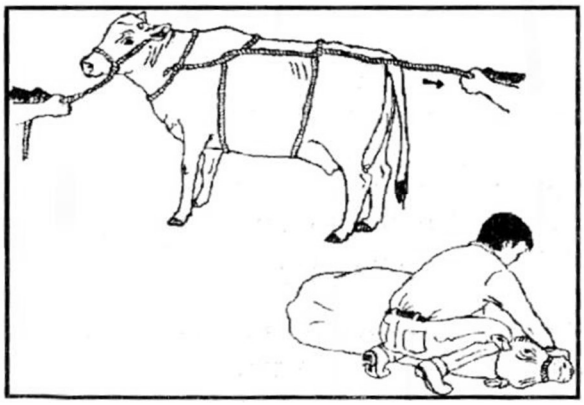


DIAGRAM A

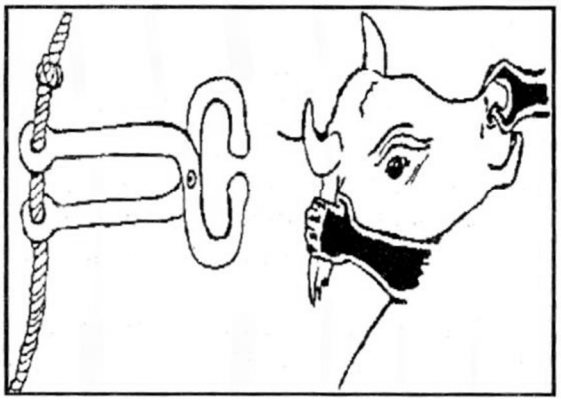


DIAGRAM B

[Source: https:/agricultural.vikaspedia.in/view content]

3.3.1 Identify the handling equipment used in DIAGRAM **A** and DIAGRAM **B**. (2)

3.3.2 State the purpose of handling the animal as illustrated in DIAGRAM **A**. (1)

3.3.3 Name the part of the head that is used to grip the animal as illustrated in DIAGRAM **B**. (1)

3.4 The table below represents the temperature ranges in farm animals and their expected growth rates, expressed as averages for their population.

GROWTH RATE (% as compared to the average)		**TEMPERATURE (°C)**
Cows	**Pigs**	
110	**130**	**35**
100	**90**	**25**
90	**50**	**15**
80	**25**	**5**
70	**5**	**0**

3.4.1 Use the data in the table above and draw a line graph to compare the growth rate of cows and pigs based on the temperature differences. (6)

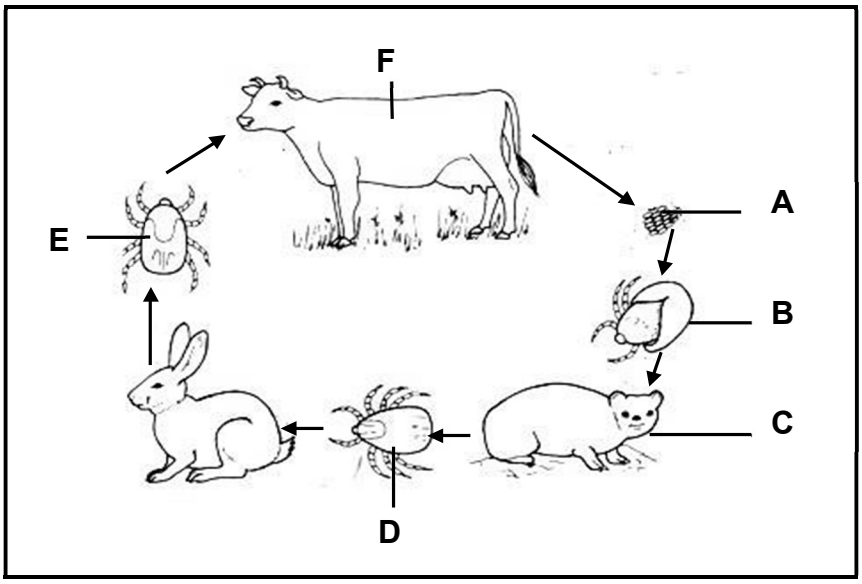
3.4.2 Select the type of farm animal, from the table above, that would require more environmental control measures in cold climatic conditions. Justify your answer. (2)

3.5 Complete the table below by writing down ONLY the missing information for **A**, **B**, **C**, **D** and **E**.

DISEASE	PATHOGENIC ORGANISM	MAIN SYMPTOMS	VECTOR
Mastitis	**A**	inflammation of udder	flies
Foot-and-mouth disease	virus	**B**	air, water and contaminated objects
Heartwater	**C**	nervousness, froth from mouth and nose	**D**
E	fungus	hair loss, itchy grey-white scabs	flies

(5)

3.6 The diagram below indicates the various stages in the life cycle of a parasite.



[Adapted from *https://www.researchgate.net*]

3.6.1 Identify and indicate the type of parasite represented above. (2)

3.6.2 Classify the parasite according to its life cycle as indicated in the diagram above. (1)

3.6.3 State TWO economic implications of this parasite for the farmer. (2)

3.7 Salt is an essential mineral for animals, but consuming large quantities can be fatal to livestock.

3.7.1 Indicate TWO symptoms of salt poisoning. (2)

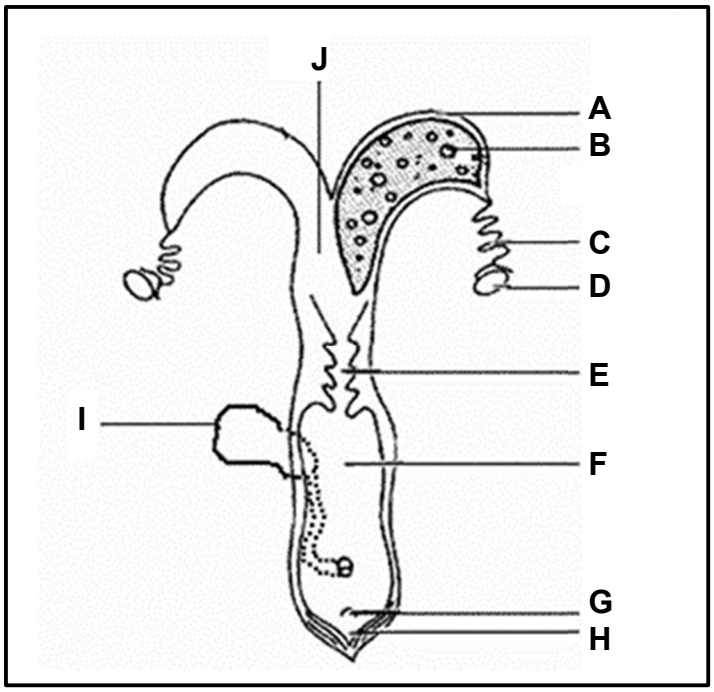
3.7.2 Suggest TWO measures a farmer can take to treat animals with salt poisoning. (2)

[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The diagram below illustrates the reproductive system of a cow.



[Source: *https://link.springer.com*]

4.1.1 Identify the parts of the reproductive system labelled **A**, **C**, **E** and **F**. (4)

4.1.2 Write down the letter (**A** – **J**) of the part in the diagram above that is associated with EACH of the following functions:

(a) Serves as the birth canal (1)
(b) Site of fertilisation (1)
(c) Organ not directly involved in reproduction (1)
(d) Deposition of semen during artificial insemination (1)

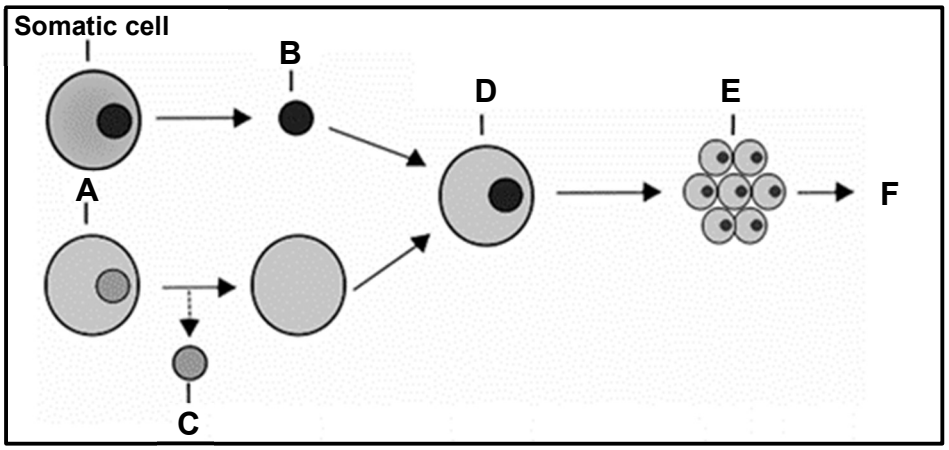
4.2 In animal reproduction the bull is essential for producing sperm cells to fertilise a cow. If the bull is unable to fertilise a cow, it may be either sterile or infertile.

4.2.1 Differentiate between *sterility* and *infertility*. (2)

4.2.2 Name TWO congenital defects that may lead to sterility in bulls. (2)

4.2.3 State TWO conditions that may prevent a bull from copulating. (2)

4.3 The diagram below shows a process generally used in the reproduction of farm animals.



[Adapted from: *https://en.m.wikipedia.org*]

4.3.1 Identify the process illustrated in the diagram above. (1)

4.3.2 Identify **A**, **B** and **D** in the diagram above. (3)

4.3.3 Name the TWO different types of processes shown in the diagram above. (2)

4.4 Difficult births require more labour and attention. They may result in placenta retention and the death of both the cow and the calf. This is a heritable characteristic, occurring more frequently in heifers and bull calves. Proper management can help prevent and correct this issue.

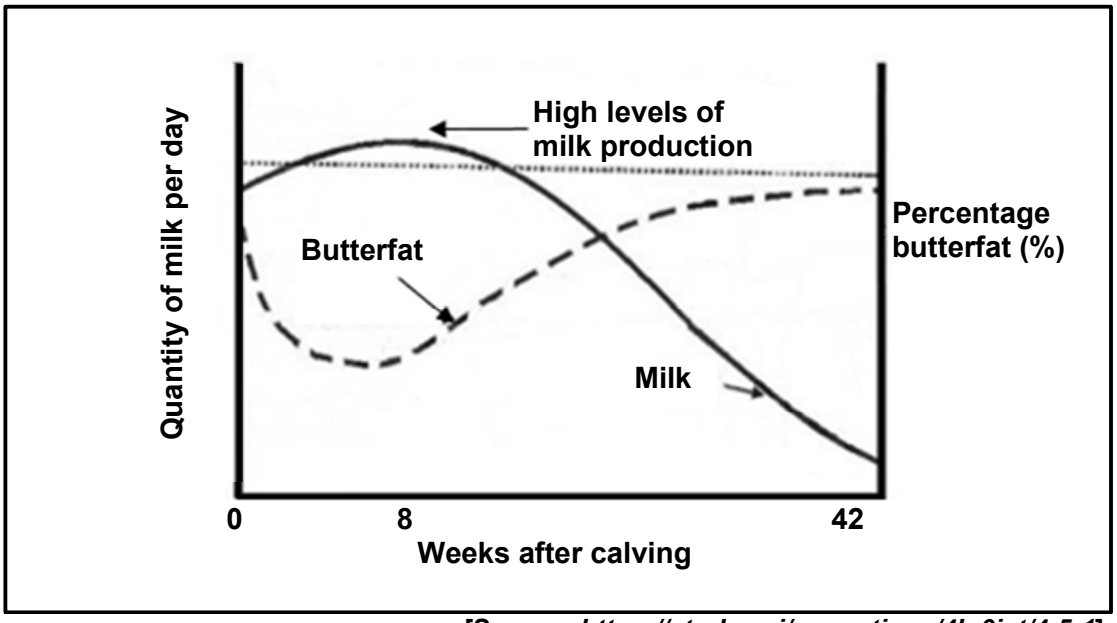
4.4.1 Give an appropriate term commonly used for difficult births. (1)

4.4.2 Explain THREE reasons for difficult births in heifers. (3)

4.4.3 Indicate TWO managerial measures to reduce the probability of difficult births. (2)

4.4.4 Define the term *placenta retention*. (2)

4.5 The graph below shows the normal lactation curve of a dairy cow.



[Source: *https://studyx.ai/quenstions/4lo0ict/4-5-1*]

4.5.1 Identify the week when the cow reached her maximum milk production from the lactation curve above. (1)

4.5.2 Indicate TWO benefits of the milk produced within the first 3 days of parturition for the calf. (2)

4.5.3 Explain the relationship between the percentage of butter fat content and the quantity of milk produced, as shown in the curve. (2)

4.5.4 Name the period in lactating cows that follows after 42 weeks. (1)

4.5.5 State the importance of this period for the cow. (1)

[35]

TOTAL SECTION B: 105

TOTAL: 150