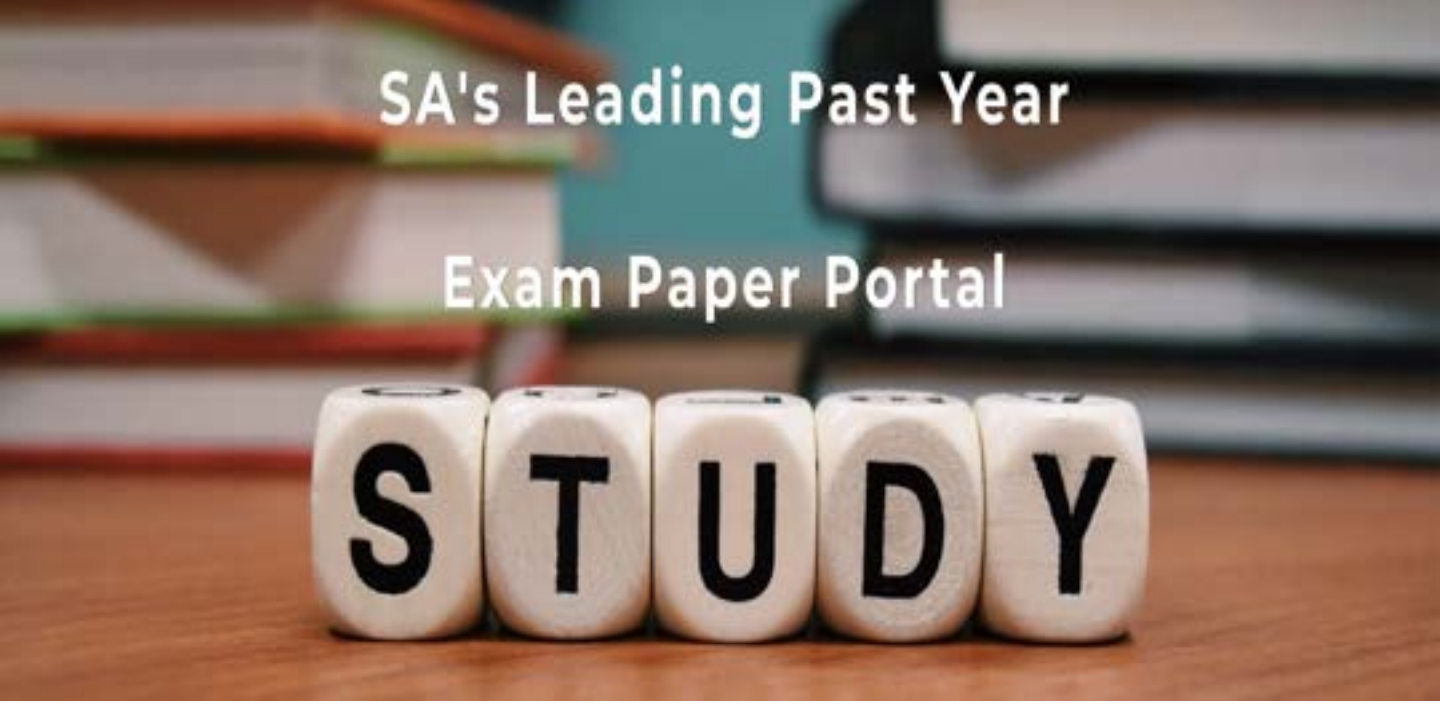

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GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2021

POINTS: 150

TIME: 2 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 formulas, where applicable.
7. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are given 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 B.

1.1.1 The following is NOT part of a pig stomach:

A Fundus
B Reticulum
C Pillar
D Kardia

1.1.2 The structure of the digestive tract of a young ruminant differs from that of an adult ruminant because in the young ruminant is...

A the rumen and abomasum develop very well.
B the omasum is fully developed and the abomasum is underdeveloped.
C only the rumen and reticulum are functional. only the
D esophagus and abomasum functionally.

1.1.3 Mineral elements required by animals in large quantities:

A Potassium, iron and cobalt
B Phosphate, chloride and copper
C Calcium, magnesium and sulfur
D Magnesium, selenium and zinc

1.1.4 The statements below refer to essential amino acids:

(i) It can not be synthesized by non-ruminants.
(ii) It is found in the protein of animal origin.
(iii) Both plant and animal proteins contain essential amino acids.
(iv) It can be supplied to animals by means of the feed.

Choose the CORRECT combination:

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

1.1.5 The rapid spread of infectious diseases over a very large territory:

A Acute
B Pandemics
C Sporadic
D Endemic

1.1.6 Subsistence livestock farmers who cannot afford expensive modern technology, can use the following methods to control parasites:

(i) Burn the field
(ii) Herbal remedies
(iii) Alternating grazing
(iv) Electric spray dip

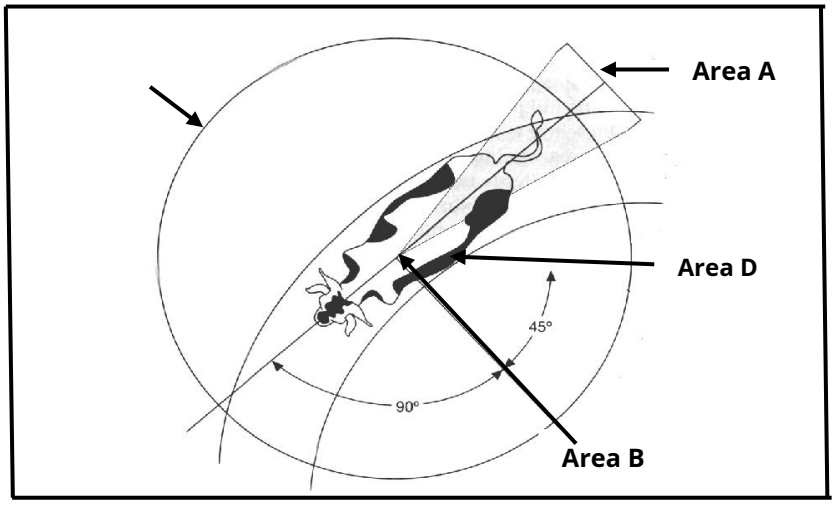
Choose the CORRECT combination:

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

1.1.7 The following is a disadvantage of keeping pigs in a free-running system:

A Lower feed costs on good pastures
B Better isolation and disease control
C May take more time for pigs to reach market stage Reduce
D waste management problems

1.1.8 The area in the graph below that represents the distance within which a person can approach an animal before it moves away is...



A Area A.
B Area B.
C Area C.
D Area D.

1.1.9 The scrotum regulates the temperature during spermatogenesis by...

A contract in cold conditions and relax during hot conditions.

B pulling up the testes during hot conditions. let
C the testes relax during low temperatures.
D contract when the temperature is high.

1.1.10 A condition in which the fetus dies after the hard skeleton and skin already formed without abortion and secondary inflammation:

A Massage
B Edema
C Mummification
D Prolapse (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 **NEITHER** of the items in COLUMN A. Write **A only**, **B only**, **both A and B** or **neither** next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 Only B.

COLUMN A			COLUMN B
1.2.1	A:	Gal	Prevents rot in the stomach of an animal
	B:	Hydrochloric acid	
1.2.2	A:	Dry rolling	Method to increase the digestibility of grain
	B:	Dry heating	
1.2.3	A:	Pulse beat	The number of heartbeats in one minute
	B:	Respiration rate	
1.2.4	A:	Deep scrub	The system where chickens are kept in small wire cages for the rest of their lives to lay eggs
	B:	Freewheeling	
1.2.5	A:	Perimetrium	Embryonic membrane surrounding the fetus
	B:	Endometrium	

(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 total amount of energy released as heat when a feed is completely burned

1.3.2 An organism that carries a disease-causing agent / agent

1.3.3 The inability of a cow to expel the placenta within 12–24 hours after birth

1.3.4 The process by which the male reproductive cells are formed

1.3.5 A device that is placed around the lower part of the cow's leg during estrus to observe her movement and increased activities

(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 Malformation and ulceration of the cornea of an eye leading to impaired vision in farm animals is due to a lack of vitamin D .

1.4.2 aHalter is a fixed handling facility attached at the end of a crush to restrain cattle upside down.

1.4.3 Thesperm tube is a common excretory and reproductive tract in male farm animals.

1.4.4 Pregnancy is the period that lasts about 305 days during which a dairy cow produces milk.

1.4.5 Hypoplasia is a condition in which a male animal shows interest in a female animal but does not have the ability to cover the female animal.

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The table below shows the intake and flow of feed in two farm animals.

COLUMN A	COLUMN B
- Animals ingest food using the lips and tongue - The teeth grind the food - Chemical digestion starts in the mouth by amylase - Food is pushed through the esophagus into the stomach where it is further digested by enzymes	- Animal ingests food by biting it - Food moves into the esophagus where it is wetted and softened and stored Both - physical and chemical digestion takes place in the stomach

2.1.1 Name the farm animal referred to in:

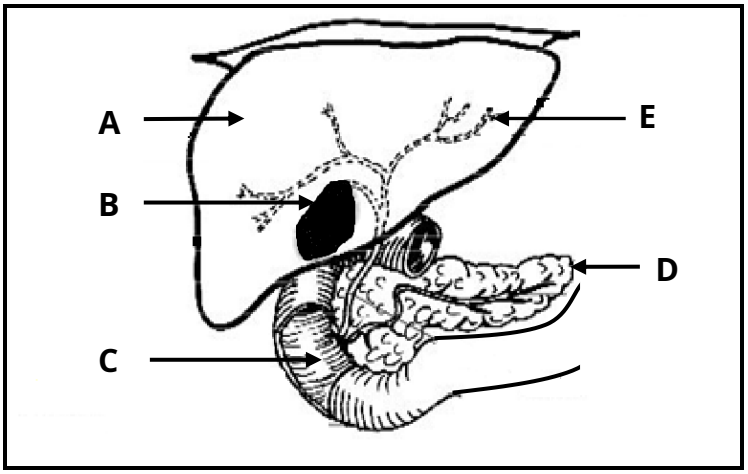
(a) COLUMN A (1)

(b) COLUMN B (1)

2.1.2 Identify, in the table above, a reason for the answers to QUESTIONS 2.1.1 (a) and 2.1.1 (b) above. (2)

2.1.3 Give the structural difference in the large intestines of the farm animals in COLUMN A and COLUMN B respectively. (2)

2.2 The diagram below shows a part of the digestive tract in farm animals.



2.2.1 Write down the letter (A – E) that represents the section where EACH of the following takes place:

(a) Soluble food particles enter the bloodstream (1)

(b) Storage of fat-soluble vitamins (1)

2.2.2 Name TWO digestive juices that are in part **C** be deposited. (2)

2.2.3 Name the fat digestive enzyme that is in part **D** be separated. (1)

2.2.4 Give TWO reasons for the breakdown of fat by the juice that is in part **B** prevent. (2)

2.3 Farm animals can chew on foreign objects due to certain mineral deficiencies.

2.3.1 Name the mineral that the farm animals lack in the statement above. (1)

2.3.2 Name the condition where farm animals show the deficiency mentioned in QUESTION 2.3.1. (1)

2.3.3 Give an example of a feed supplement that can be used to treat condition mentioned in QUESTION 2.3.2. (1)

2.4 The table below shows different animal feeds with the percentages of digestible protein (VP).

FEED	PERCENTAGE OF VP (%)
A. Mieliemeel	9
B. Mieliereste	4
C. Fishmeal	36

2.4.1 Classify maize meal and maize residues as main types of feed. (2)

2.4.2 Indicate the importance of feeding maize residues to EACH of the following farm animals:

(a) Young ruminant (1)

(b) Adult ruminant (1)

2.4.3 Calculate the ratio in which maize flour and fishmeal must be mixed to obtain a feed with 15% VP. (Show ALL edits.) (4)

2.5 A farm animal ingested 15 kg of hay with a dry matter content of 84% and excreted 3.5 kg of dry manure.

2.5.1 Calculate the digestibility coefficient of the feed in the statement above. (Show ALL calculations.) (5)

2.5.2 Give the percentage of the excreted material. (1)

2.6 The table below shows the feed flow program over a period of six months.

MONTHS	JAN.	FEB.	MARCH	APRIL	MAY	JUNE
Pasture available (kg / ha)	1 400	1 200	950	800	500	100
Supplementary feed required (kg / animal / day)	0	0	2	3	5	8

2.6.1 Identify the month during which it would be most advisable to reduce the farm animal numbers. (1)

2.6.2 Refer to the data above to justify the answer to QUESTION 2.6.1. (1)

2.6.3 Calculate the total amount of feed available (in tons) for the month of April if the farmer has 5 hectares available for grazing. (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 animal behavior during hot conditions.

3.1.1 Identify TWO visible actions that the cattle perform in the picture above to reduce the effect of heat. (2)

3.1.2 Indicate TWO reasons why shelter for farm animals is important. (2)

3.1.3 Name TWO requirements of the vehicle transporting farm animals. (2)

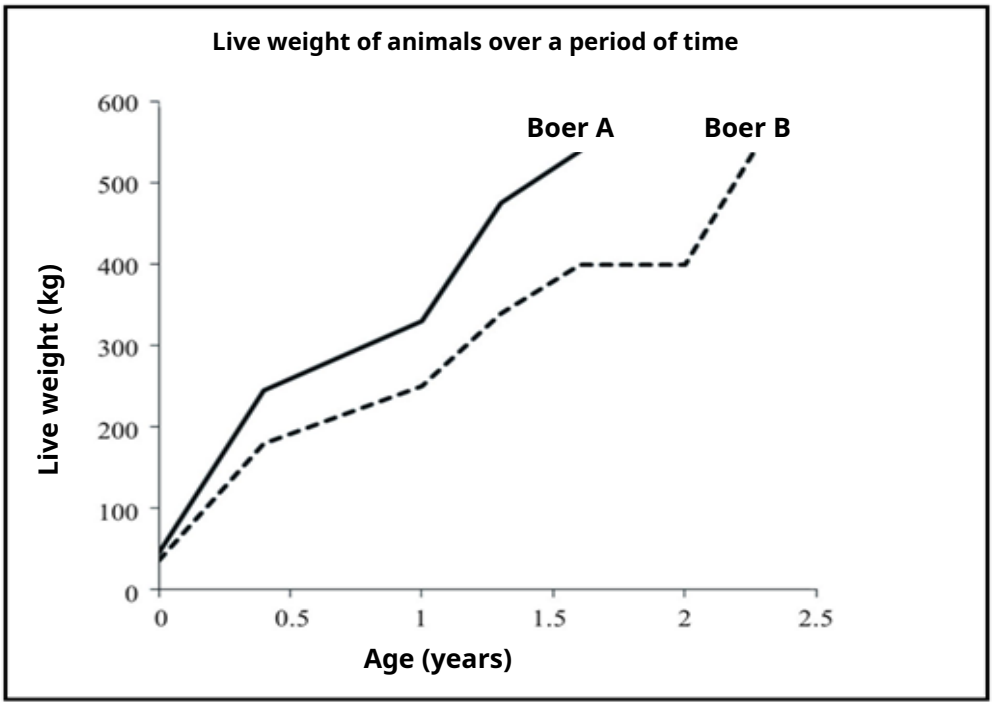
3.2 The table below shows relative changes in the expected dry matter intake (DMI), milk production and water intake during rising ambient temperature.

TEMPERATURE ()C)	DRY MATERIAL-INTAKE (kg)	MILK PRODUCTION (LITER)	WATERINNAME (LITER)
20	18.2	27	68
25	17.6	25	74
30	16.9	23	79
35	16.7	18	120
40	10.2	12	106

3.2.1 Identify the main farm product produced in the table above here. (1)

3.2.2 Describe the relationship between dry matter intake (DMI), milk production and water intake when the ambient temperature rises. (3)

3.3 The graph below shows the average live weight of farm animals for farmer A and farmer B using different production systems.



3.3.1 Indicate the farmer who represents EACH of the following:

(a) Extensive production system (1)

(b) Intensive production system (1)

3.3.2 Justify the answers to QUESTIONS 3.3.1 (a) and 3.3.1 (b). (2)

3.3.3 Identify a disadvantage with regard to the input costs of the intensive production system. (1)

3.4 The Department of Agriculture has reported several cases of foot-and-mouth disease outbreaks in different parts of South Africa. This led to a ban on the export of animals and animal products. Veterinarians were subsequently deployed to the affected areas where infected animals were separated from non-infected animals.

3.4.1 Indicate the pathogen that causes the disease in the scenario above. (1)

3.4.2 Give TWO main symptoms of foot-and-mouth disease in farm animals. (2)

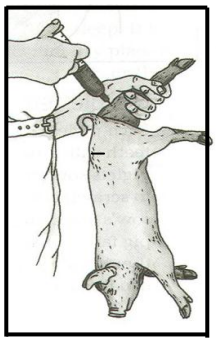
3.4.3 Identify, in the scenario above, TWO roles of the state with regard to the control of animal diseases. (2)

3.4.4 Name TWO economic consequences of foot-and-mouth disease for South Africa. (2)

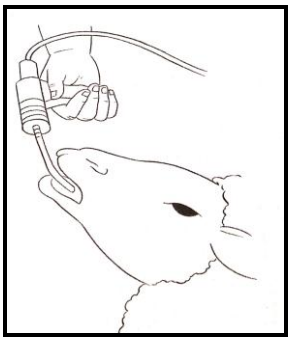
3.5 The pictures below show different methods used to administer medication to farm animals.

A

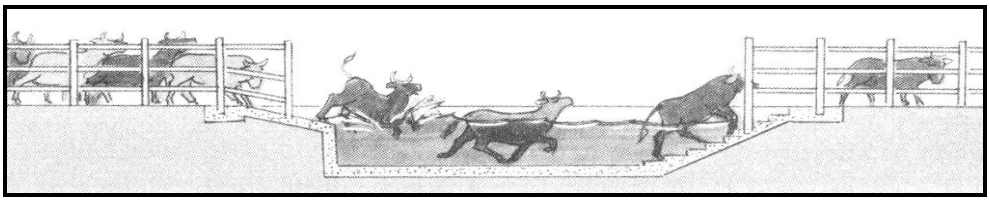
B



C



D



Write down the letters (A – D) that represent TWO methods in the pictures above that can be used for the following:

3.5.1 To control external parasites (2)

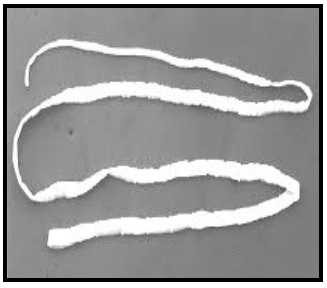
3.5.2 To treat internal parasites (2)

3.6 The pictures below show different organisms that are harmful to farm animals.

A

B

C



D

3.6.1 Give a term that describes the organisms in pictures **A**, **B**, **C** and **D** describe. (1)

3.6.2 Classify the organisms at **B** and **C**. (2)

3.6.3 Identify the organism (A, B, C or D) that is responsible for the transmission of EACH of the following diseases:

(a) Red water (1)

(b) Rift Valley fever (1)

(c) Heartwater (1)

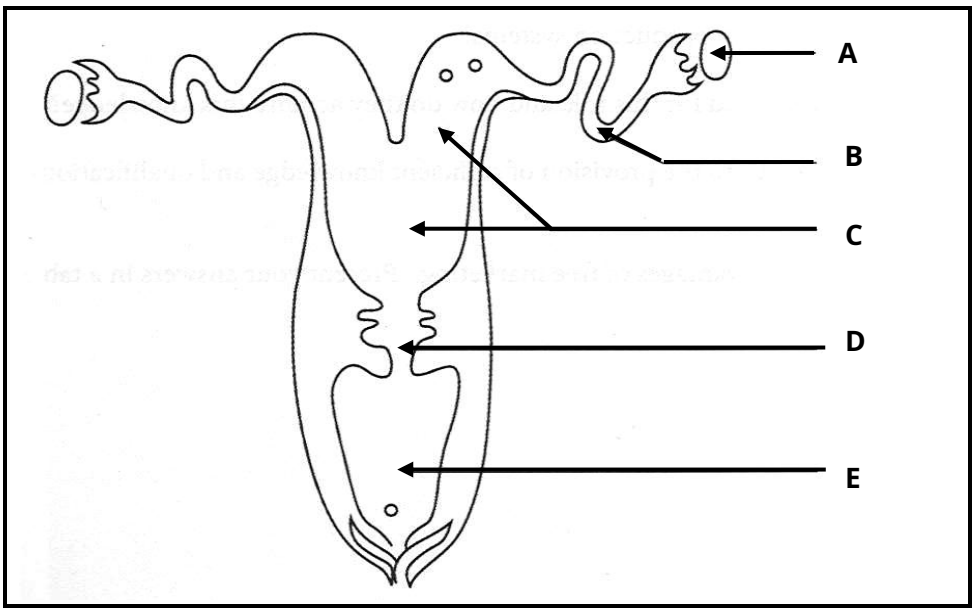
3.7 Name THREE plants that are toxic to farm animals. (3)

[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

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



4.1.1 Write down the letters (A – E) that represent TWO secondary genitals in the diagram above. (2)

4.1.2 Write down the letter (A – E) that represents the part where EACH of the following takes place:

(1)

(a) Fertilization

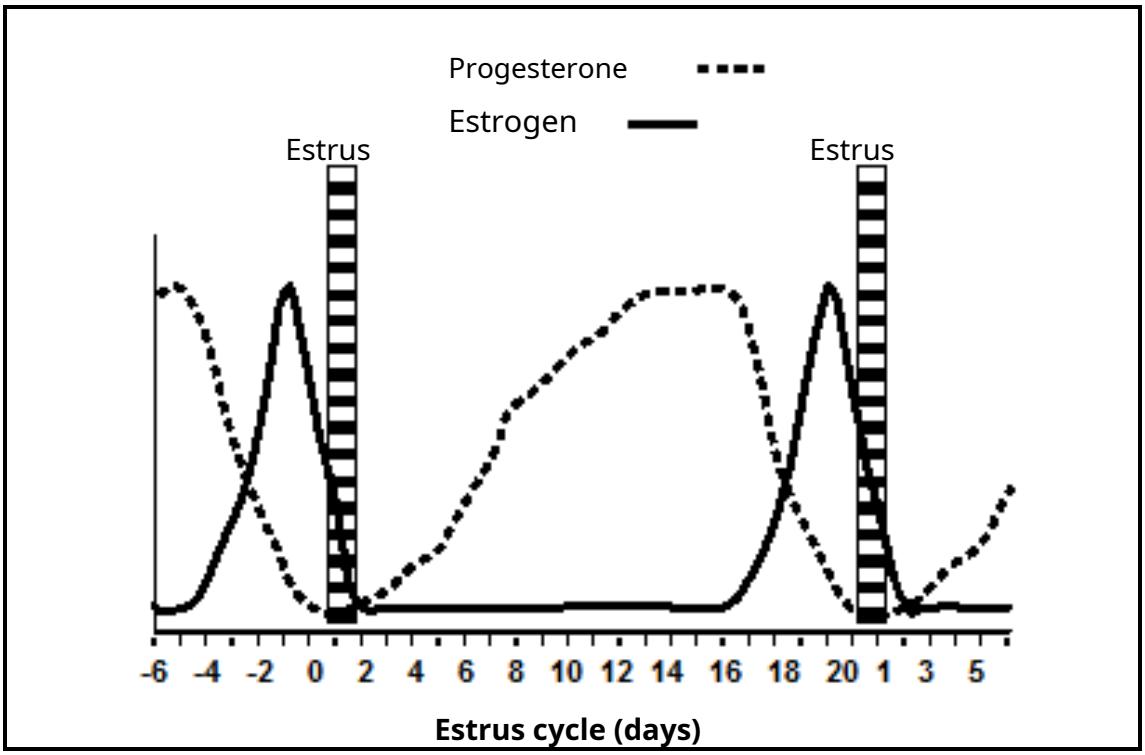
(b) Secretion from these glands provides nutrients to developing embryos (1)

4.1.3 Name the function of **D** under the following conditions:

(a) During mating (1)

(b) During pregnancy (1)

4.2 The graph below shows the hormone levels of a female farm animal during the reproductive cycle.



4.2.1 Define the concept *estrus.* (2)

4.2.2 Indicate whether the female farm animal shown in the graph above become pregnant or not. (1)

4.2.3 Give a reason, based on the data in the graph, to support the answer to QUESTION 4.2.2. (1)

4.2.4 Indicate the expected FSH level from day 17 to day 20 of this female farm animal. (1)

4.3 The table below shows the percentage (%) of fat, protein and lactose in the milk of dairy cows during certain times.

WEEKS	VET (%)	PROTEIN (%)	LACTOSE (%)
5	4.0	3.0	5.0
10	4.1	3.2	4.9
15	4.2	3.5	4.8
20	4.3	3.6	4.8
25	4.4	3.7	4.6
30	4.5	3.8	4.4
35	4.1	4.0	4.3
40	4.5	4.1	4.2
45	4.6	4.2	4.1

Draw a combined bar graph to show the fat and protein percentages from week 5 to 25. (6)

4.4 Cattle breeders can increase the number of offspring by artificially bringing all the cows into estrus at about the same time.

4.4.1 Identify the process in the scenario above. (1)

4.4.2 Name TWO techniques or methods used in the process identified in QUESTION 4.4.1. (2)

4.4.3 Name TWO disadvantages of the process identified in QUESTION 4.4.1. (2)

4.5 Arrange the statements about the stages of mating below in order. Write down ONLY the letters (A – E).

A Penetration of the vagina (1)

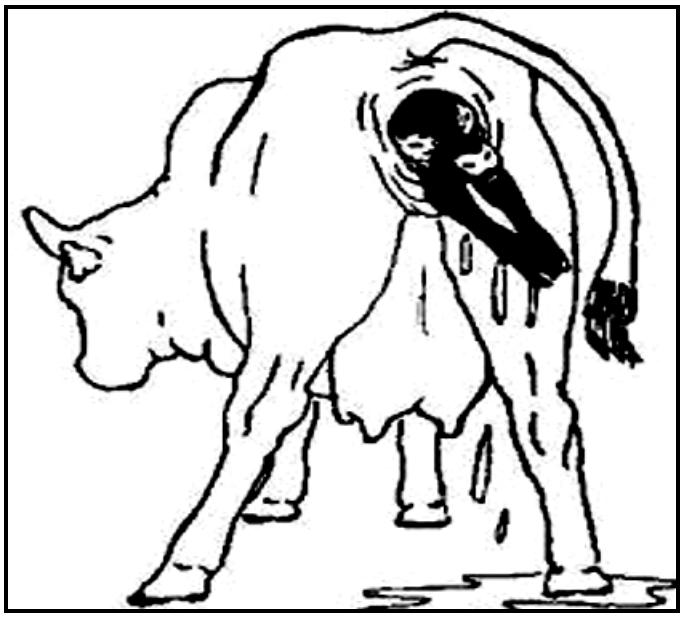
B Bul jump off (1)

C Bull shows interest in cows due to increased pheromone levels (1)

D Bull stands on his hind legs and rests his chest on the female animal's cross (1)

E Bull releases sperm cells (1)

4.6 The picture below shows a cow during the birth process.



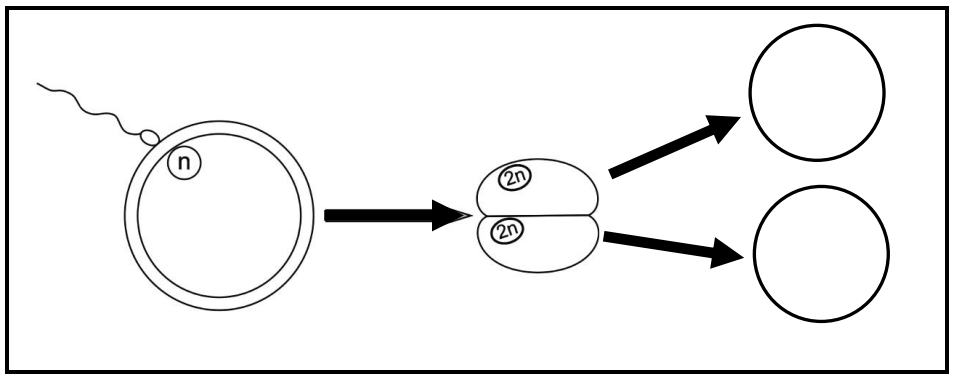
4.6.1 Name the birth stage illustrated in the picture above. (1)

4.6.2 Give the term for a situation when a cow cannot give birth on her own. (1)

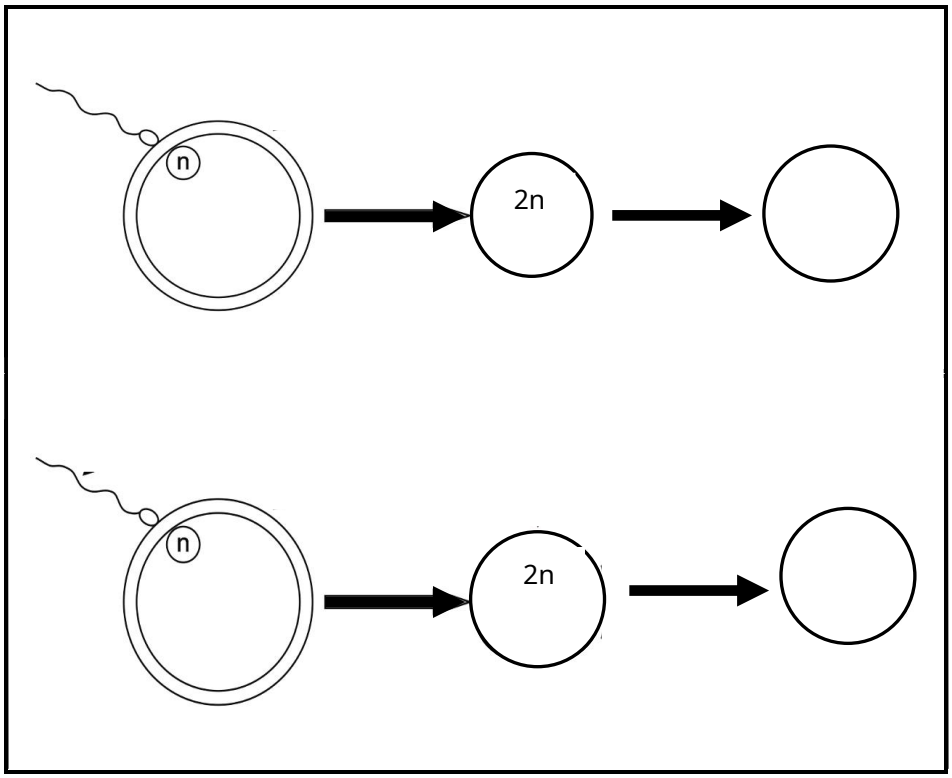
4.6.3 Indicate TWO problems with the calf that can negatively affect the normal birth process. (2)

4.7 Diagrams A and B below show the fusion of male and female gametes and the development of the zygotes.

A



B



4.7.1 Identify the type of multiple births that resulted from the fusion that are represented in the following:

(a) Diagram A (1)

(b) Diagram B (1)

4.7.2 Distinguish between the two multiple births identified in QUESTION 4.7.1. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150