Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

JUNE 2024

AGRICULTURAL SCIENCES

MARKS: **150**

TIME: **2½ hours**

This question paper consists of 15 pages.

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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. 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.

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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, for example 1.1.11 D.

1.1.1 … is a muscular valve that opens to allow food to pass from the stomach to the top of the small intestine.

A Cardiac sphincter
B Pyloric sphincter
C Urethral sphincter
D Anal sphincter

1.1.2 A type of feed has a TDN of 80% and a DP of 18%. The Nutritive Ratio of this feed will be …

A 1 : 0,78.
B 1 : 5,4.
C 1 : 3,4.
D 1 : 4,4.

1.1.3 The succus entericus is secreted by the …

A glands of Lieberkühn.
B pancreas.
C liver.
D Brunners' glands.

1.1.4 The following are the functions of rumen microbes:

(i) Hydrolyse proteins
(ii) Digest cellulose
(iii) Synthesise amino acids
(iv) Synthesise vitamin C

Choose the CORRECT combination:

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

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1.1.5 A … is an example of a three-host tick.

A blue tick
B red legged tick
C Bont-legged tick
D bont tick

1.1.6 A long flat ribbon shaped worm, whose body consist of hundreds of segments.

A Roundworm
B Liver fluke
C Tapeworm
D Wire worm

1.1.7 A roofless enclosure where livestock are temporarily confined.

A Holding shed
B Holding pen
C Furrowing pen
D Feed shed

1.1.8 … is when animals lose body heat through contact of the animal's body with a cold surface.

A Conduction
B Excretion
C Convection
D Heat radiation

1.1.9 The correct temperature to store semen that will be used after a long time:

A 37 °C
B 42 ˚C
C 5 ˚C
D -196 °C

1.1.10 … is the hormone responsible for the milk release reflex.

A Oestrogen
B Progesterone
C Prolactin
D Oxytocin

(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 question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

COLUMN A			COLUMN B
1.2.1	A:	Diffusion	Movement of nutrients down the concentration gradient
	B:	Passive uptake	
1.2.2	A:	Create ideal pH or enzymes pepsin and renin	Functions of hydrochloric acid in a glandular stomach
	B:	Destroy bacteria absorbed with food	
1.2.3	A:	Acute	Disease that is persistent or long lasting in its effects
	B:	Per acute	
1.2.4	A:	Pinned ears	Sign of aggression in cattle
	B:	Snorting	
1.2.5	A:	Foetal period	Stage of pregnancy characterised by differentiation of cells to form tissues, organs and systems
	B:	Embryonic period	

(5 x 2) (10)

1.3 Give ONE word/phrase for each of the following descriptions. Write ONLY the term next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

1.3.1 A type of fodder made from green foliage crops which have been preserved by fermentation to the point of acidification

1.3.2 A restricted area where a large number of animals are kept for optimal production purposes

1.3.3 The stage of mating during which bulls display the flehmen reaction

1.3.4 A method of increasing the numbers of oocytes that are released at ovulation and are available to increase fertilisation

1.3.5 The fusion of male and female gametes to form a zygote

(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 The pharynx is a gutter shaped structure which carries milk from the oesophagus directly into the abomasum in a young lamb.

1.4.2 Metabolic diseases can be transmitted from one animal to another.

1.4.3 Spermatogenesis is the production of ova.

1.4.4 Twins formed from one sperm and ovum are called dizygotic twins.

1.4.5 Maceration occurs when a foetus dies, followed by the formation of a hard skeleton and skin.

(5 x 1) (5)

TOTAL SECTION A: 45

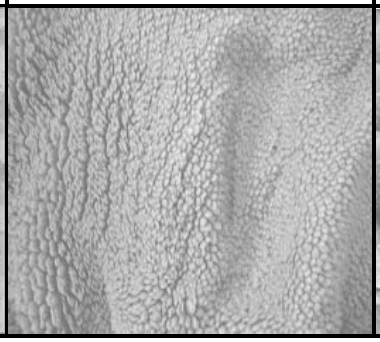
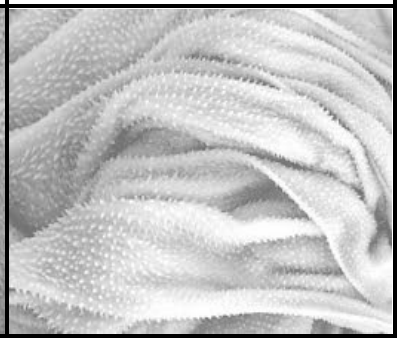
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SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The pictures below show the internal structures of the stomach compartments of a ruminant farm animal.

A	B	C
		

2.1.1 Name a farm animal with the stomach compartments shown above. (1)

2.1.2 Name stomach compartments **A** and **C**. (2)

2.1.3 Identify an adaptation feature visible on stomach compartment **A**. (1)

2.1.4 Explain how the adaptation mentioned in QUESTION 2.1.3 above results in improved digestion. (2)

2.1.5 Deduce with a reason, the stomach compartment of a ruminant where one will expect to find a plastic bag, if an animal mistakenly swallowed it. (2)

2.2 Below are some minerals and vitamins which are essential for animal growth.

Zinc; Cobalt; Vitamin D; Vitamin B; Iodine

2.2.1 Identify the vitamins associated with each of the deficiency symptoms below:

(a) An enlarged thyroid gland (1)

(b) Rickets (1)

(c) Skin lesions (1)

2.2.2 Identify a vitamin that is less likely to be deficient in ruminants. (1)

2.2.3 Motivate your answer to QUESTION 2.2.2 above. (2)

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2.3 In a digestibility trial a fowl ingested 1,5 kg of maize grains with a moisture content of 12%, and excreted 0,5 kg of faeces with a moisture content of 30%.

2.3.1 Calculate the coefficient of digestibility of the feed above. (6)

2.3.2 Give TWO factors that could have influenced the digestibility of the feed in the trial. (2)

2.3.3 Suggest TWO methods a farmer can use to improve the digestibility of the feed above. (2)

2.4 A farmer grows maize and soyabeans on his farm. The farmer is keeping layers which require a feed with a digestible protein content of 17%. Maize has a digestible content of 13% while the soyabean contains 38% digestible protein.

Use a Pearson square to determine the ratio at which the two feeds must be mixed, to get the desired digestible protein content. (4)

2.5 Biological value (BV) is a measure of the proportion of absorbed protein from a food which becomes incorporated into the proteins of the organism's body.

2.5.1 Compare the biological values of feeds of plant origin to those of animal origin. (2)

2.5.2 Explain why it is important to feed non-ruminants with feeds of higher biological as compared to ruminants. (2)

2.6 To ensure optimum production, farmers need to ensure that there is enough feed to meet the needs of the animals for the whole year.

2.6.1 Identify the plan described above. (1)

2.6.2 Give TWO reasons why the plan mentioned in QUESTION 2.6.1 is essential for optimum animal production. (2)

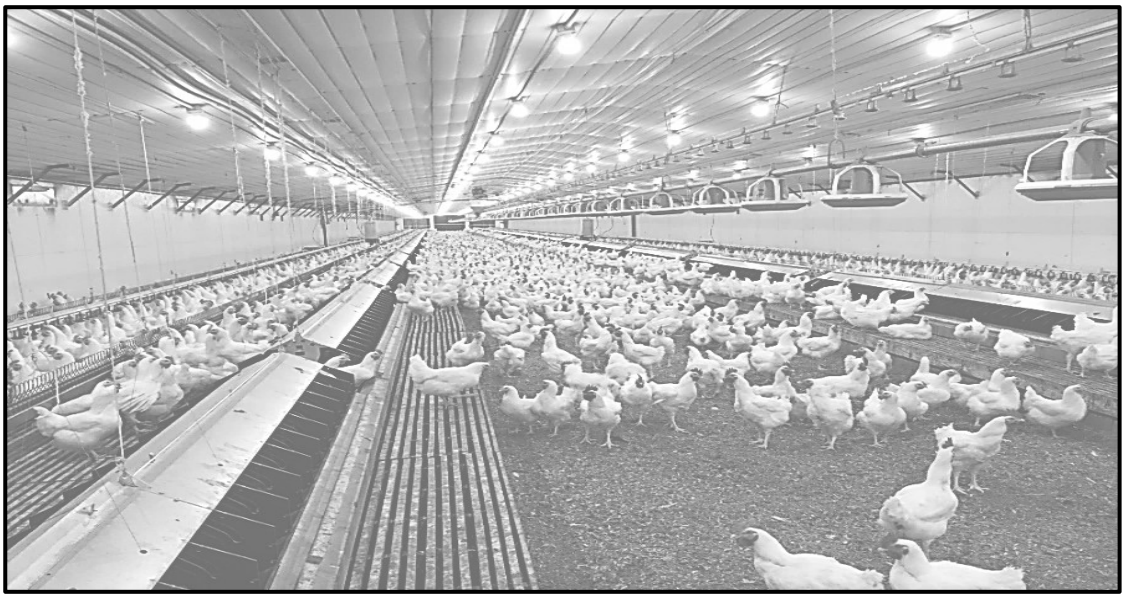
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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The picture below shows a chicken housing system.



3.1.1 Identify the production system associated with the housing system above. (1)

3.1.2 Motivate the answer to QUESTION 3.1.1 above by giving TWO visible reasons in the picture. (2)

3.1.3 Assess whether the production system above can be implemented by resource poor farmers? Justify your answer. (2)

3.1.4 Identify TWO factors that can result in improved production in the production system above. (2)

3.2 The table below shows the recommended temperature for chicks:

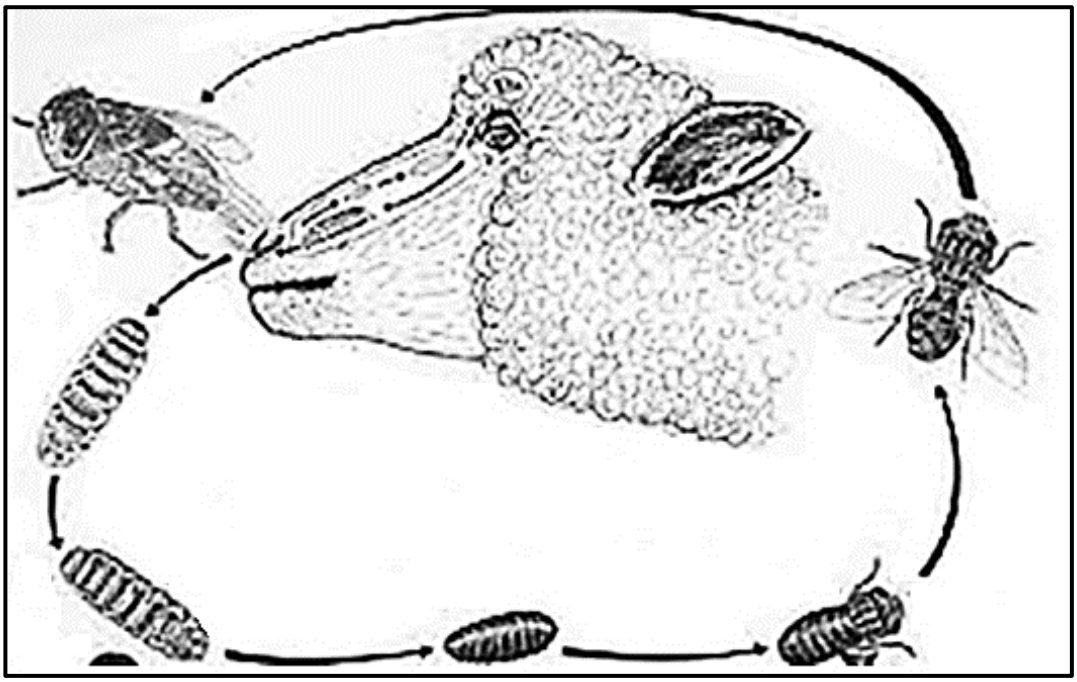
AGE (WEEKS)	TEMPERATURE (°C)
1	35
2	33
3	31
4	29
5	26
6	23

3.2.1 Translate the information in the table above into a line graph. (6)

3.2.2 Deduce the trend shown in the graph. (2)

3.2.3 Suggest TWO pieces of equipment that can be used by farmers to regulate temperature in animal housing systems. (2)

3.3 Study the picture below.



3.3.1 Identify the parasite shown above. (1)

3.3.2 Classify the parasite above as an ecto or endoparasite. (1)

3.3.3 Describe ONE symptom of infestation by the parasite above in sheep. (1)

3.3.4 Give THREE financial implications of infestation by the parasite shown above. (3)

3.3.5 Recommend a chemical control measure that can be used by farmers to deal with parasite shown above. (1)

3.4 Below is a list of examples of animal diseases.

Mastitis;	Rabies;	Lumpy wool;	Red water

Identify a disease from the list above that matches each of the statements below:

3.4.1 It is a zoonotic disease (1)

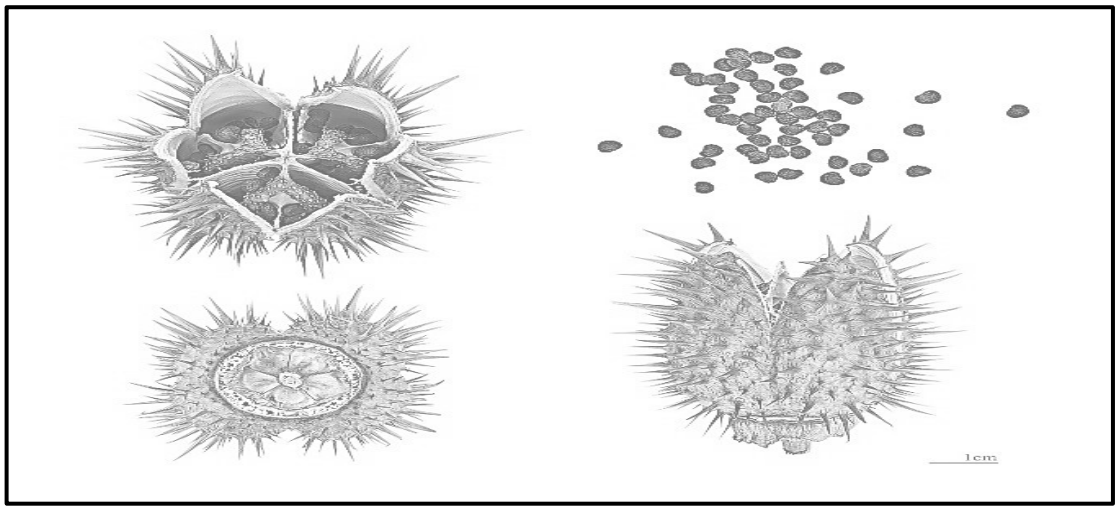
3.4.2 Transmitted by a one host tick (1)

3.4.3 Causes inflammation of the udder (1)

3.4.4 Is an example of a fungal disease (1)

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3.5 Study the picture below.



3.5.1 Identify the poisonous plant shown in the picture above. (1)

3.5.2 Recommend with a reason a treatment strategy for an animal that has consumed the poisonous plant shown above. (2)

3.5.3 Give TWO measures farmers can use to prevent their livestock from being poisoned by poisonous plants like the one shown above. (2)

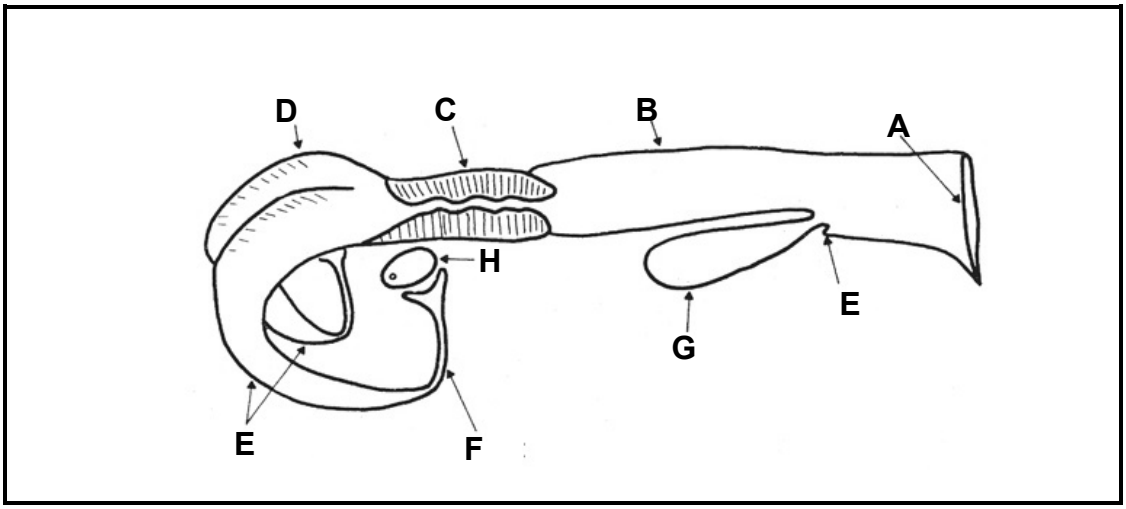
3.5.4 Describe TWO roles that the state play in animal protection. (2)
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QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

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



4.1.1 Identify parts labelled **A**, **B** and **D**. (3)

4.1.2 Identify the part associated with each of the statements below:

(a) The primary reproductive organ (1)

(b) The copulatory organ (1)

(c) Site of fertilisation (1)

4.1.3 Describe TWO functions of part **C**. (2)

4.2 Millions of cows throughout the world are bred by artificial insemination (AI) each year and the number are increasing. Most cows inseminated worldwide are dairy cows, but increasingly AI is being used in the beef industry. AI is the cheapest, safest and most effective means of spreading superior genetic material and both the beef and dairy cattle industries depend on it for their genetic advancement schemes. The most recent advances are in the area of synchronisation of oestrous.

4.2.1 Explain why artificial insemination is considered cheap. (1)

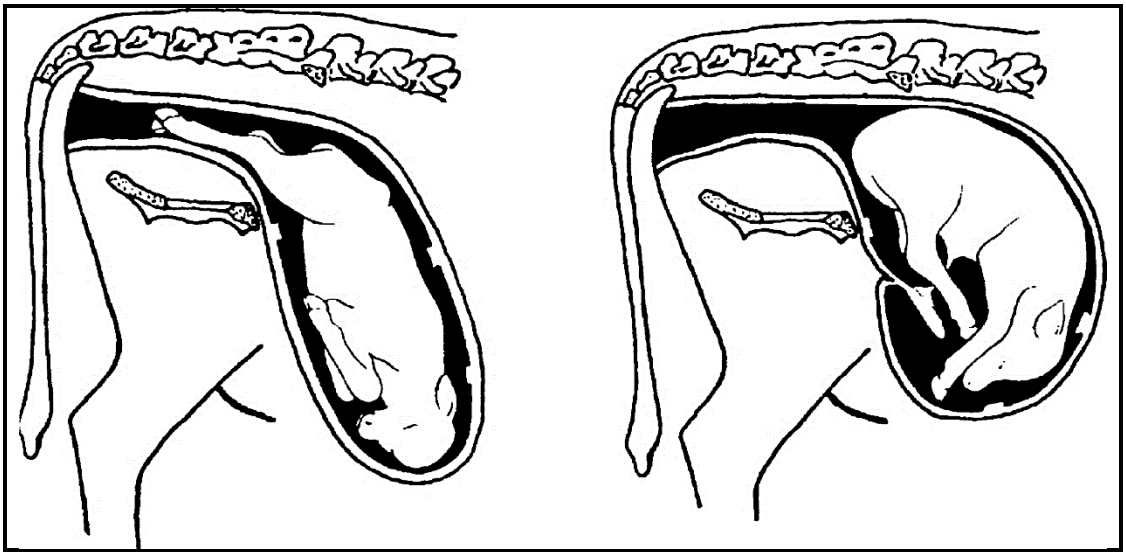
4.2.2 Name TWO pieces of equipment that are key in the process described above. (2)

4.2.3 Define the underlined phrase in the passage above. (2)

4.2.4 Give TWO hormones that can be used to synchronise oestrus. (2)

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4.3 The diagram below shows a foetal presentation that causes dystocia during parturition.



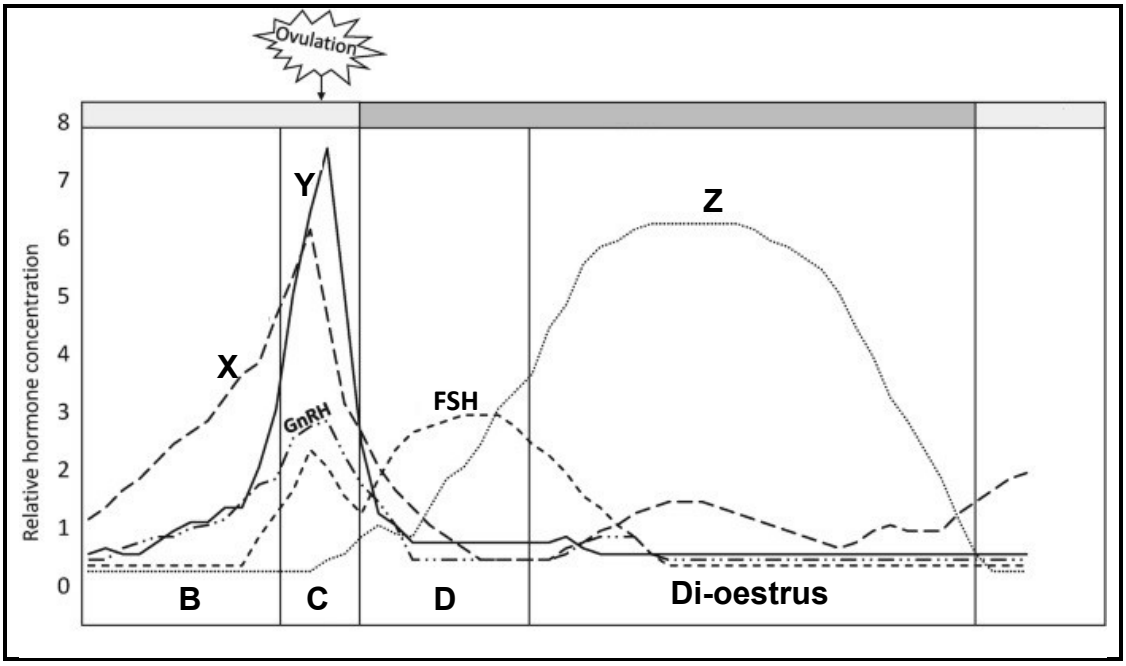
4.3.1 Name the presentation shown in the diagram above. (1)

4.3.2 Identify the stage of parturition shown above. (1)

4.3.3 Describe TWO other causes of dystocia. (2)

4.3.4 Give TWO signs shown by cows approaching parturition that farmers should look out for. (2)

4.4 The graph below shows the changes in levels of various hormones that control the oestrus cycle.



4.4.1 Identify hormones **X** and **Y**. (2)

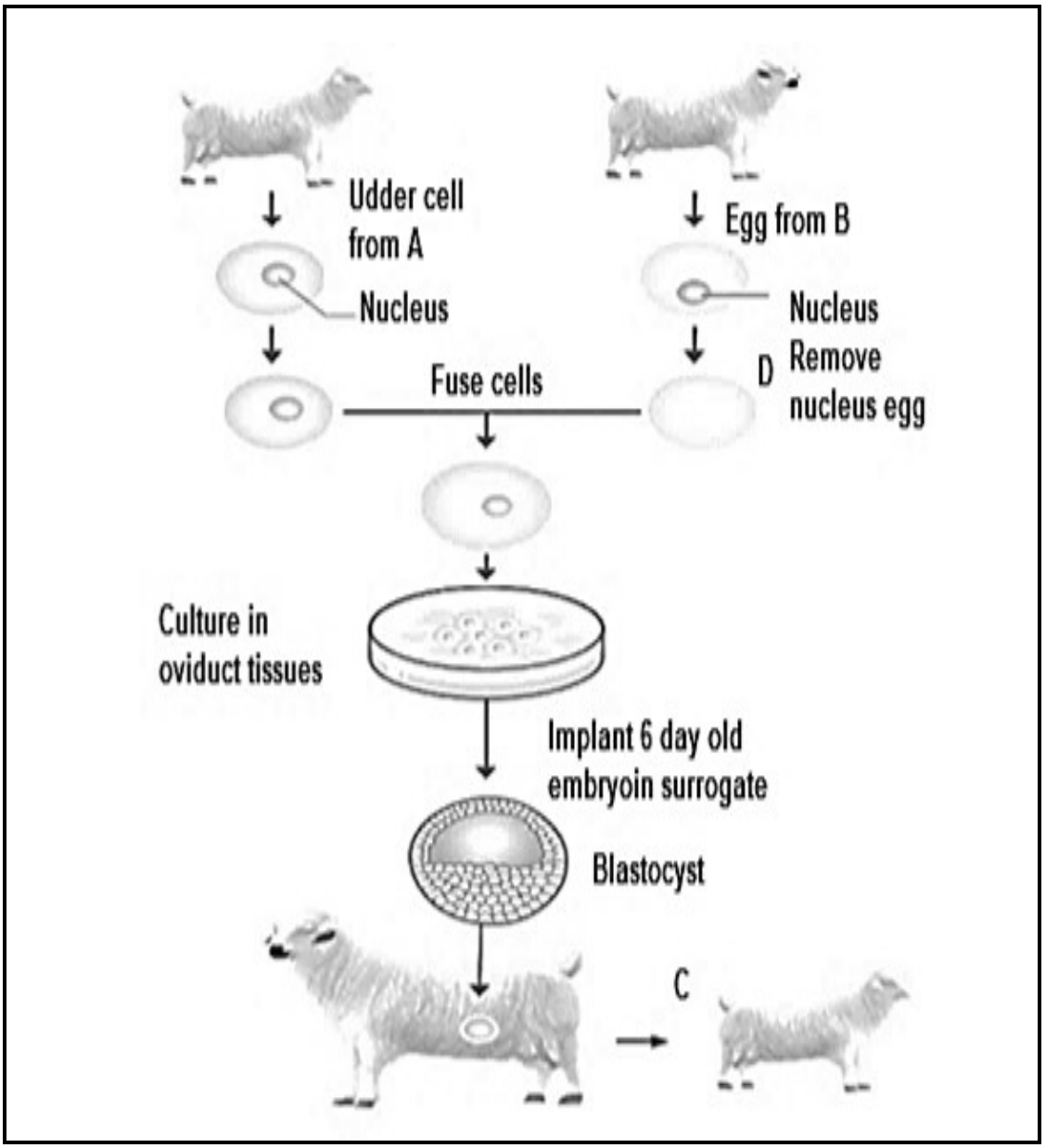
4.4.2 Give the letter of the stage that shows the oestrus stage. (1)

4.4.3 Give TWO reasons to support your answer to QUESTION 4.4.2 above. (2)

4.4.4 Recommend TWO aids farmers can use to detect animals on oestrus. (2)

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4.5 The diagram below shows a modern technique used in animal breeding.



4.5.1 Identify the technique shown above. (1)

4.5.2 Deduce whether the offspring **C** will have the genes of sheep **A** or **B**. (1)

4.5.3 Name process **D**. (1)

4.5.4 Describe the main purpose of the reproductive technique above. (1)

4.5.5 Give THREE disadvantages of this reproductive technique. (3)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

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