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# **NATIONAL SENIOR CERTIFICATE**

## **GRADE 12**

### **JUNE 2025**

## **AGRICULTURAL SCIENCES**

**MARKS: 150**

**TIME: 2½ hours**



This question paper consists of 14 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.



**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, for example 1.1.11 D.

1.1.1 ... is an example of protein rich roughage.

- A Lucerne hay
- B Maize meal
- C Teff hay
- D Fish meal

1.1.2 ... are the most numerous of rumen microbes.

- A Protozoa
- B Bacteria
- C Fungi
- D Viruses

1.1.3 The following is true about feeds with protein of high biological value:

- (i) They are of animal origin
- (ii) They are of plant origin
- (iii) They have a large proportion of essential amino acids as compared to non-essential amino acids
- (iv) They contain high quality proteins

Choose the CORRECT combination:

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

1.1.4 ... is the potential energy value of a feed.

- A Digestible energy
- B Metabolic energy
- C Net energy
- D Gross energy

1.1.5 Plant poisoning by ... causes aflatoxicosis in animals.

- A thorn apple
- B Cape tulip
- C maize fungus
- D poison bulb



- 1.1.6 Temperature inside a shelter, housing day old chicks, needs to be kept high, because day old chicks have ...
- A a low lower critical temperature.
  - B a high lower critical temperature.
  - C high heat production capacity.
  - D a high upper critical temperature.
- 1.1.7 A disease that develops over a time and persists for longer.
- A Chronic
  - B Acute
  - C Peracute
  - D Sub-acute
- 1.1.8 A viral disease that causes fluid filled vesicles between toes, on heels, lips and palate of cattle.
- A Newcastle disease
  - B Anthrax
  - C Rabies
  - D Foot-and-mouth
- 1.1.9 The following are signs of a cow approaching parturition:
- (i) Urinates and defecates often
  - (ii) Isolates itself from other animals
  - (iii) Sudden decrease in milk production
  - (iv) String of mucus hang from the vulva
- Choose the CORRECT combination:
- A (i), (ii) and (iii)
  - B (i), (iii) and (iv)
  - C (i), (ii) and (iv)
  - D (ii), (iii) and (iv)
- 1.1.10 The following are infectious causes of infertility in cows, except ...
- A Vibriosis.
  - B Brucellosis.
  - C Dermatitis.
  - D Trichomoniasis.
- (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 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	Vitamin E	Produced by rumen microbes
	B	Vitamin A	
1.2.2	A	Cellulose digestion	Amylolytic bacteria
	B	Starch digestion	
1.2.3	A	Crutching	Blowfly strike preventative measure
	B	Tail docking	
1.2.4	A	Liver fluke	Causes anaemia
	B	Round worm	
1.2.5	A	Impotence	Inability to maintain an erection
	B	Lack of libido	

(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 Amino acids that cannot be synthesised by the organism itself and need to be supplied with the diet.

1.3.2 Animals that maintain a constant body temperature.

1.3.3 Release of semen into the female reproductive tract during mating.

1.3.4 A semen dilutant that provides protection against pH changes.

1.3.5 An abnormal calf presentation where the calf comes out with its hind quarters first.

(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 Bolus refers to ingesta in the stomach.

1.4.2 A dosing gun is used to administer pills.

1.4.3 During the lactation period, milking stopped to allow for recovery of glandular tissue.

1.4.4 Spermatogenesis is the production of female gametes.

1.4.5 Anoestrus is when an animal does not ovulate. (5 x 1) (5)

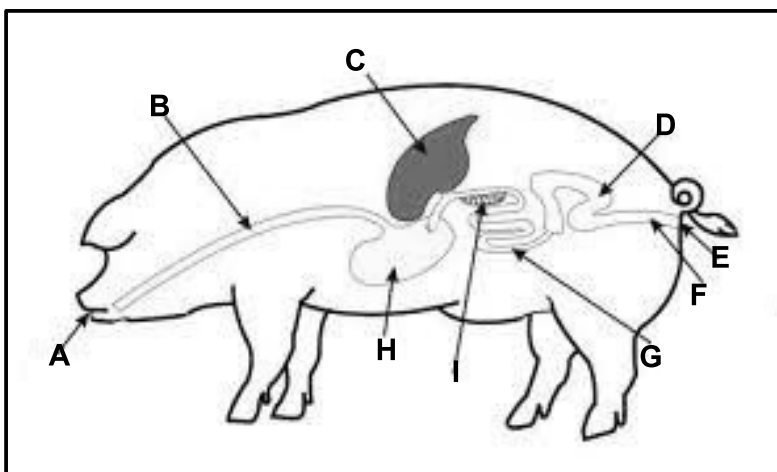
**TOTAL SECTION A: 45**



**SECTION B****QUESTION 2: ANIMAL NUTRITION**

Start this question on a NEW page.

2.1 The diagram below shows an alimentary canal of a farm animal.



- 2.1.1 Identify the organs represented by the labels **C** and **I**. (2)
- 2.1.2 Classify the animal in the diagram above, based on its alimentary canal. (1)
- 2.1.3 Describe TWO adaptations of part **G** to perform its functions. (2)
- 2.1.4 The part labelled **H** corresponds with the abomasum of ruminants. Justify this statement. (2)
- 2.1.5 Briefly explain why the pH of ingesta in part **H** is different to that of part **G**. (2)
- 2.2 The table below shows the relationship between crude protein content and crude fibre content of three feeds.

FEED	CRUDE PROTEIN (%)	CRUDE FIBRE (%)
Lucerne silage	4	8
Air-dried lucerne hay	18	24
Maize meal	8	2

- 2.2.1 Translate the information in the table above into a combined bar graph. (6)
- 2.2.2 Identify a concentrate in the table above. (1)



2.3 The table below indicates the composition of two feeds.

FEED COMPONENT	FEED A	FEED B
TDN	85%	76%
DP	35%	8%
NR	-	1 : 8,5

2.3.1 Calculate the nutritive ratio of **Feed A**. (3)

2.3.2 Identify, with a reason, a feed that will be suitable for feeding a young animal. (2)

2.3.3 Determine the ratio at which **Feed A** and **Feed B** must be mixed to produce a ration with a Digestible Protein content of 16%. (4)

2.4 Growth stimulants such as tranquilisers and thyroid regulators increase the growth rate of animals.

2.4.1 Give TWO other substances that can be administered by farmers to increase the growth rate of animals. (2)

2.4.2 Explain how the administration of tranquilisers results in higher animal growth rates. (2)

2.5 The table below shows stock and fodder flow required for January on a dairy farm.

CLASS OF ANIMAL	BODY MASS PER UNIT (kg)	DRY MATTER NEEDED (kg)
4 breeding bulls	800	1 648
80 heifers	450	24 000
20 replacement heifers	350	5 000
20 calves	75	1 280

2.5.1 Calculate how much feed each heifer will receive per day in January. (3)

2.5.2 Give THREE reasons to justify fodder production planning. (3)

**[35]**



**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**

Start this question on a NEW page.

- 3.1 Fattening cattle in a feedlot is an operation with several phases which require housing and equipment. When done properly, it can be profitable for livestock farmers.

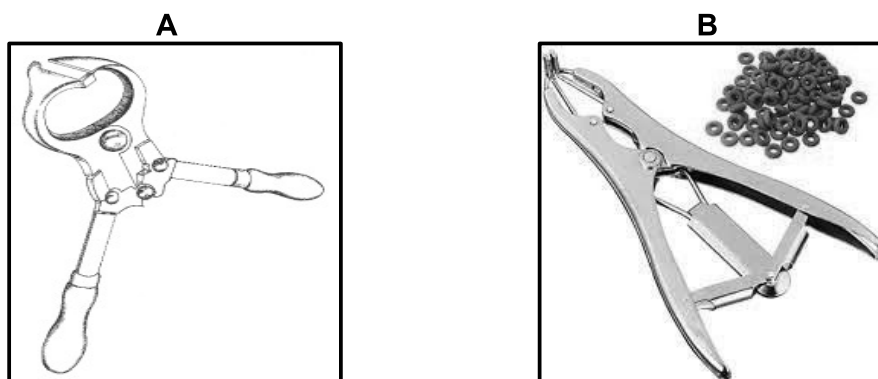
- 3.1.1 Identify a production system associated with feedlot farming. (1)
- 3.1.2 Give TWO reasons from the extract above to justify your answer in QUESTION 3.1.1. (2)
- 3.1.3 Distinguish *commercial* from *subsistence farming*. (2)

- 3.2 The picture below shows a pen used in pig production.



- 3.2.1 Identify the pen shown above. (1)
- 3.2.2 Identify TWO design features visible in the pen above that enable the optimal functioning of the pen. (2)
- 3.2.3 Explain how each of the features mentioned in QUESTION 3.2.2, ensures optimum functioning of the pen. (2)
- 3.2.4 Outline TWO roles of shelter in animal production. (2)

3.3 The pictures below show tools that are used to castrate animals.



3.3.1 Identify tools **A** and **B**. (2)

3.3.2 Which ONE of the tools shown above has the following advantage:

- (a) Can be used for both castration and tail docking (1)
- (b) Lower risk of infection (1)

3.3.3 Explain the role of the tools above in animal reproduction (2)

3.4 The influenza outbreak in South Africa in 2023 led to the culling of millions of birds in the country, resulting in a 30% reduction in the production of hatching eggs. Poultry producers have suffered big losses.

3.4.1 Identify the disease described in the extract above. (1)

3.4.2 Classify the disease in the extract above based on its causative pathogen. (1)

3.4.3 Identify a disease control measure that is mentioned in the extract above. (1)

3.4.4 Animal diseases can be detrimental to a country's economy. Justify this statement with TWO reasons. (2)

3.5 The picture below shows a parasite that attacks farm animals.



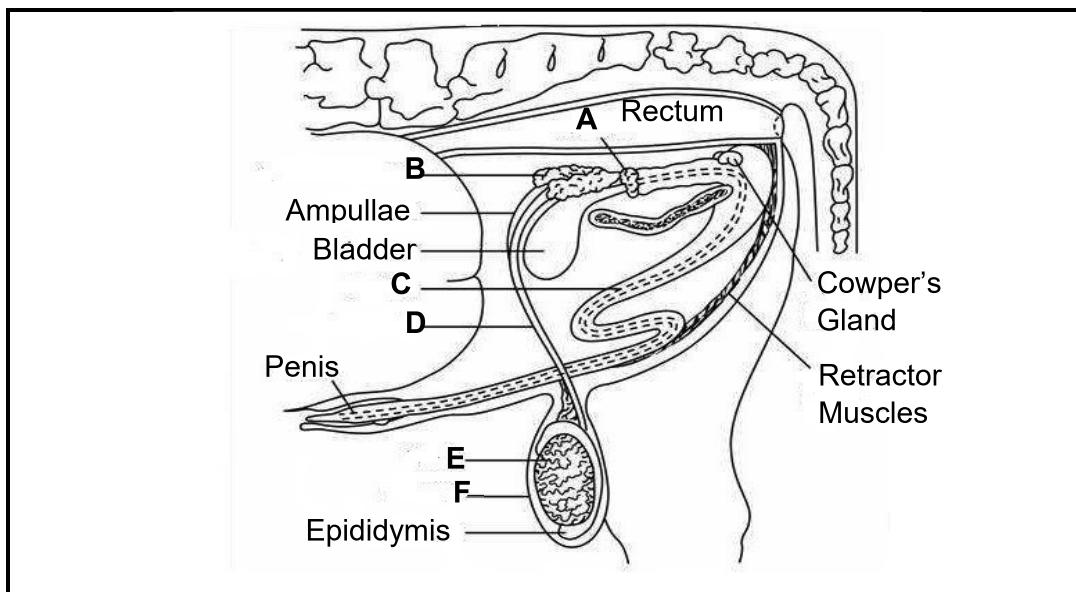
- 3.5.1 Identify the tick shown in the picture above. (1)
- 3.5.2 Classify the tick based on the number of hosts it needs to complete its life cycle. (1)
- 3.5.3 Give an example of a disease in which the parasite is a vector. (1)
- 3.5.4 Describe TWO effects of ticks on animals. (2)
- 3.5.5 Recommend TWO measures farmers can take to prevent build-up of parasites like the one shown in the picture above, in their pastures. (2)
- 3.6 Animals can be poisoned by poisonous plants or metallic salts. Farmers need to know the necessary measures to prevent poisoning as well as the treatment strategies to implement when animals are poisoned.
- 3.6.1 Give a reason for administering the following when animals are poisoned:
- (a) Vinegar
  - (b) Glucose
  - (c) Activated charcoal (3)
- 3.6.2 Suggest TWO measures farmers can take to reduce the risk of their animals being poisoned by urea. (2)

**[35]**

**QUESTION 4: ANIMAL REPRODUCTION**

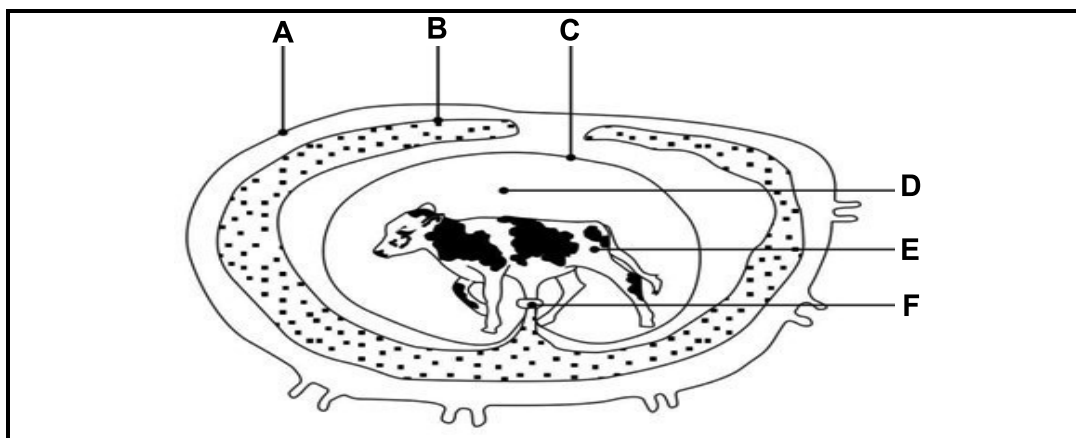
Start this question on a NEW page.

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



- 4.1.1 Identify the gender of the animal with the reproductive organs shown above. (1)
- 4.1.2 Identify the parts **A**, **D** and **E**. (3)
- 4.1.3 State TWO functions of part **B**. (2)
- 4.1.4 Describe how the part labelled **F** regulates the temperature of the testicles. (2)
- 4.2 The oestrus cycle is a set of recurring physiological changes induced by reproductive hormones in females of certain mammals. Oestrus cycles start after sexual maturity in females and are interrupted by rest phases, or by pregnancies. These cycles are widely variable in duration and frequency depending on the species.
- 4.2.1 Name the rest phase of the oestrus cycle. (1)
- 4.2.2 Describe TWO visible signs of oestrus. (2)
- 4.2.3 Give ONE example of a heat detection aid. (1)
- 4.2.4 Name TWO hormones that are closest to their peak during oestrus. (2)

4.3 The diagram below shows a reproduction stage in farm animals.



4.3.1 Identify the stage of gestation shown in the diagram above. (1)

4.3.2 Give TWO functions of part D. (2)

4.3.3 Identify the organ responsible for each of the following (give ONLY the letter):

(a) Exchange of nutrients and oxygen (1)

(b) Collects liquid waste (1)

(c) A membrane that together with the endometrium forms the placenta (1)

4.3.4 Differentiate *mummification* from *maceration*. (2)

4.4 Farmers use various modern methods to improve herd genetics and optimise production. These methods include artificial insemination, synchronisation of oestrus, embryo transfer and cloning.

4.4.1 Recommend a method, from those given above that would best achieve each of the following:

(a) Endangered species conservation (1)

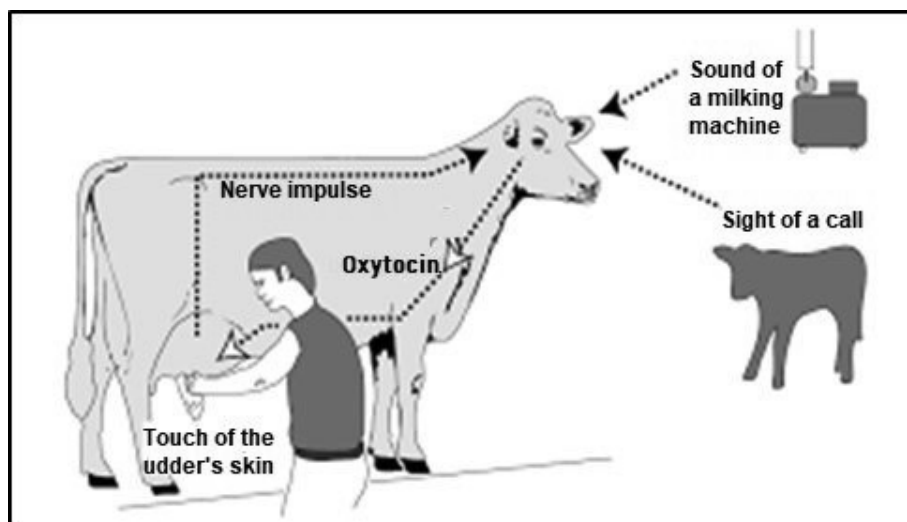
(b) Allow the production of multiple offspring from one superior female (1)

(c) Allow farmers to save on breeding bull costs (1)

4.4.2 Define *synchronisation of oestrus*. (2)

4.4.3 Identify TWO common disadvantages of the methods given above. (2)

4.5 The diagram below illustrates a process that takes place in female animals.



- 4.5.1 Identify the phenomenon shown in the diagram above. (1)
- 4.5.2 Name the hormone that inhibits milk release in the process above. (1)
- 4.5.3 Describe the role of the hormone, oxytocin, in the process above. (2)
- 4.5.4 Explain the relationship between *feed roughage content* and *milk butterfat content*. (2)
- [35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**

