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SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

MAY/JUNE 2025

MARKS: 150

TIME: 2½ hours

This question paper consists of 18 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. 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 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 part in the alimentary canal of fowls which is the common opening for the digestive and urogenital systems:

- A Rectum
- B Colon
- C Caecum
- D Cloaca

1.1.2 The energy value of a feed that is calculated by subtracting energy lost through faeces, urine and gases from gross energy:

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

1.1.3 ... are volatile fatty acids that are the end products of microbial fermentation in the rumen.

- A Methanoic and butyric acid
- B Acetic and propionic acid
- C Acetic and ethanoic acid
- D Methanoic and ethanoic acid

1.1.4 Micro-organisms in ruminant animals have the following functions:

- (i) The digestion of vitamin A and K
- (ii) The synthesis of amino acids
- (iii) The hydrolysis of protein
- (iv) Conversion of ammonia to high-quality microbial protein

Choose the CORRECT combination:

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



1.1.5 The following should be considered to avoid stress and aggressive behaviour in male farm animals:

- A House all male farm animals in one pen.
- B Place male animals together regardless of their body weight and age.
- C Group animals that are familiar with one another and of the same age together.
- D Place male and female animals together during the breeding season.

1.1.6 ONE of the following is a basic guideline to be considered when transporting animals:

- A Pregnant animals should not be transported.
- B Transport cattle, sheep and goats together in an unpartitioned truck.
- C Load animals long before departure.
- D Feed animals immediately before they are loaded.

1.1.7 The ... is NOT a principle of good health to control diseases and parasites in farm animals.

- A disinfecting of shelters and feed containers
- B retention of manure in the broiler house
- C isolation of animals with contagious diseases
- D use of the correct application technique and dosage of medication

1.1.8 The following are signs of an animal with poor health:

- (i) Discoloured urine
- (ii) Loss of appetite and weight
- (iii) Smooth and shiny hair coat in cattle
- (iv) Isolation from the rest of the herd

Choose the CORRECT combination:

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

1.1.9 The following may cause abortion, except for ...

- A strong laxatives.
- B embryo normality.
- C toxic elements in feed.
- D injuries.



1.1.10 When the signs of oestrus are observed in the morning, the best time to administer artificial insemination is ...

- A 12 hours later in the afternoon.
- B 24 hours later the next morning.
- C 36 hours later in the morning.
- D 48 hours later in the afternoon.

(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:	Duodenum	The part where maximum absorption of nutrients occurs
	B:	Jejunum	
1.2.2	A:	Urea	A non-protein nitrogen substance that is safer to use because it is less soluble
	B:	Biuret	
1.2.3	A:	Balling guns	Tools that farmers use for the castration of farm animals
	B:	Drenching guns	
1.2.4	A:	Watery diarrhoea	Visible symptoms of roundworm infestation in farm animals
	B:	Bottle-jaw	
1.2.5	A:	Embryo splitting	Method used to separate the embryos to increase the number of offspring during embryo transplant
	B:	Embryo flushing	

(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 A measure of the digestibility of a feed which is expressed as a percentage of the dry matter
- 1.3.2 An organism that carries a disease from one animal to another
- 1.3.3 Oval projections in the uterus walls that provide future attachment to the foetus
- 1.3.4 The embryonic membrane that forms a sac filled with a fluid that acts as a shock absorber to protect the embryo
- 1.3.5 A tool that consists of a rectal probe and is used to collect semen

(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 Mineral lick is a method of supplementing minerals where an animal takes in as much minerals as required.
- 1.4.2 Marbling is the stiffening of muscles in the body of an animal immediately after slaughtering.
- 1.4.3 Flushing is the release of a large number of ova at the same time.
- 1.4.4 The endometria are paired tubes that transport ova from the ovaries to the uterus.
- 1.4.5 A hormone secreted by the Graafian follicle which is responsible for the onset of oestrus is progesterone. (5 x 1) (5)

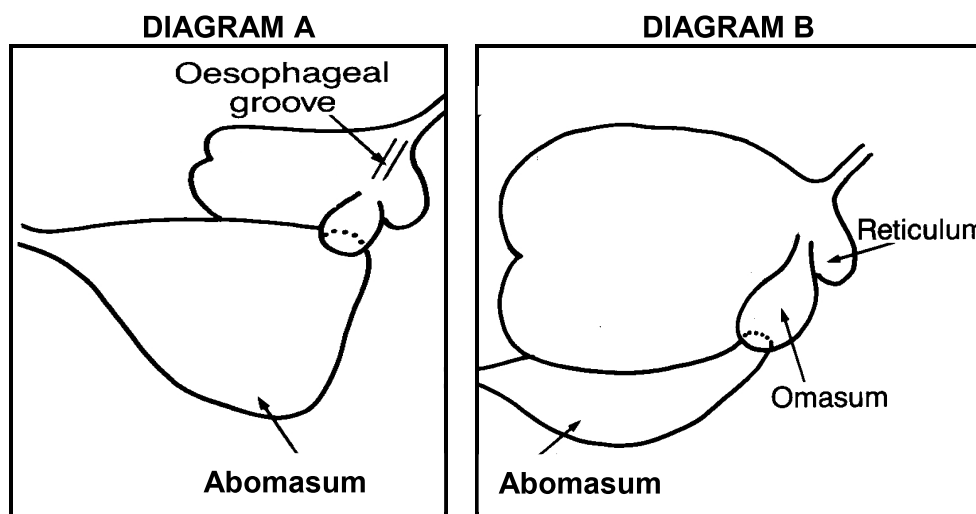
TOTAL SECTION A: 45



SECTION B**QUESTION 2: ANIMAL NUTRITION**

Start this question on a NEW page.

2.1 The diagrams below show parts of the stomachs of two farm animals.



2.1.1 Identify the diagram (**A** or **B**) that represents the stomach of an adult ruminant animal. (1)

2.1.2 Justify the answer to QUESTION 2.1.1. (1)

2.1.3 State the function of the oesophageal groove. (1)

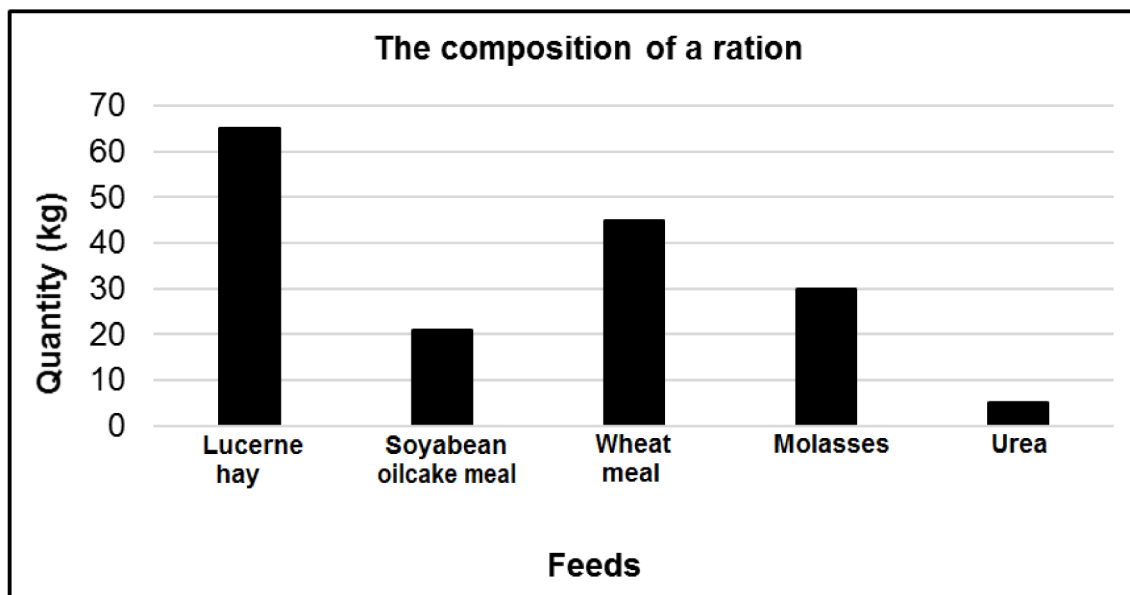
2.1.4 Identify the part of the stomach in **DIAGRAM B** that performs the same function as the proventriculus in poultry. (1)

2.2 The table below presents information on the sizes of the stomachs in sheep at different ages.

AGE	RETICULORUMEN (% OF THE TOTAL STOMACH)	ABOMASUM (% OF THE TOTAL STOMACH)
Birth	30	60
1 month	60	30
2 months	80	20
3 months	70	15
Adult	70	10

Draw a combined bar graph to show the size of the reticulorumen and abomasum in sheep at different ages by using the data in the table above. (6)

2.3 The graph below shows the composition of a ration for farm animals.



2.3.1 Indicate the type of farm animal that CANNOT benefit from the ration presented in the graph above. (1)

2.3.2 Give a reason to support the answer to QUESTION 2.3.1 based on the composition of the ration. (2)

2.3.3 Identify a feed in the graph above, that is an example of EACH of the following:

(a) Protein-rich roughage (1)

(b) Carbohydrate-rich concentrate (1)

2.4 Calculate the dry matter content of the feed in kg if an animal ingested 25 kg of a feed containing 15% moisture. Show ALL calculations. (2)

2.5 A farmer mixed oatmeal and fishmeal to prepare a ration containing 14% digestible protein (DP). The oatmeal contains 12% DP and fishmeal 28% DP.

2.5.1 Use the Pearson square method to calculate the ratio at which oatmeal and fishmeal will be mixed. (4)

2.5.2 Calculate the percentage of fishmeal in the mixture. (3)

2.6 The table below shows the nutrients that are available in two different feeds.

FEED	CARBOHYDRATES (%)	DIGESTIBLE PROTEIN (%)	FATS (%)	NUTRITIVE RATIO
A	61	17	5	...
B	74	9	7	1 : 9

2.6.1 Identify, in the table above, the feed that is suitable for each of the following:

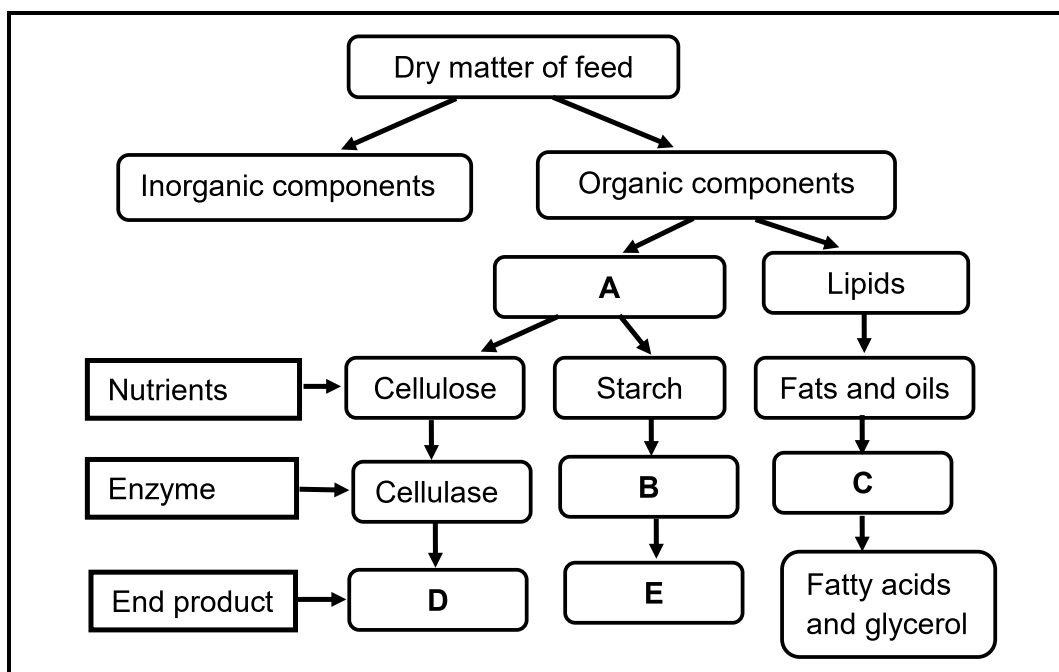
(a) Fattening of lambs (1)

(b) Lactating cows (1)

2.6.2 Justify, with a reason, the answer to QUESTION 2.6.1(b). (1)

2.6.3 Calculate the nutritive ratio of **FEED A**. Show ALL calculations, including the formula. (3)

2.7 The schematic representation below illustrates two feed components, the enzymes and the end products of the digestion of the feed components.



2.7.1 Identify **A** and **E**. (2)

2.7.2 Name the enzyme represented by **C** that acts on fats and oils. (1)

2.7.3 Name a feed component for each of the following:

(a) An organic component other than those in the schematic representation (1)

(b) Inorganic component (1)

[35]



QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The table below shows two farmers involved in farming activities.

FARMER A	FARMER B
A farmer has one worker and 58 goats, which depend on natural pastures in a large communal land. Goats are kept in a kraal at night and get water from a stream.	A farmer keeps 540 sheep on 30 ha land, 9 workers, 2 boreholes, 2 feed sheds, a feedlot and a sheep handling facility. The farmer buys feeds and also grows lucerne.

3.1.1 Identify the production system practised by each of the following:

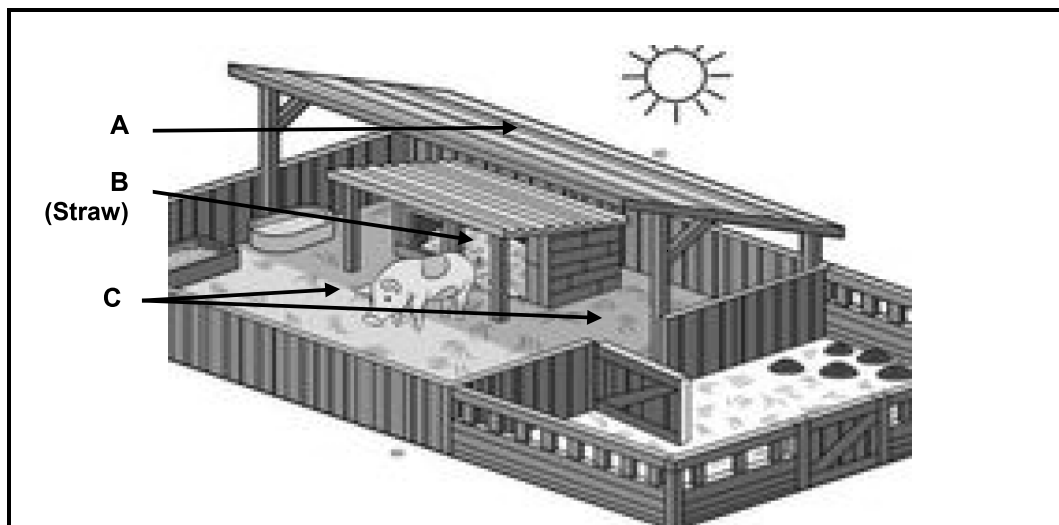
(a) FARMER B (1)

(b) FARMER A (1)

3.1.2 Give TWO reasons in the table above to support the answer to QUESTION 3.1.1(a). (2)

3.1.3 State TWO factors that **FARMER A** should consider in order to increase production of the farm animals. (2)

3.2 The picture below shows a housing facility for pigs.



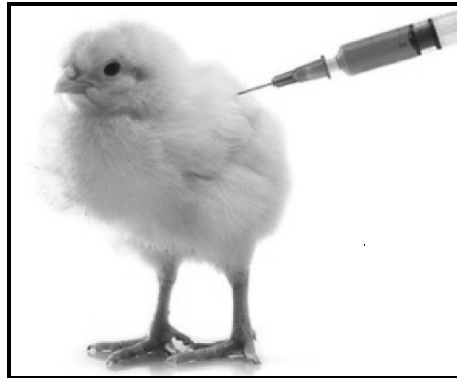
3.2.1 Identify the letter (**A** to **C**) in the picture above that represents the structure, equipment or material that is BEST suited to each of the following statements:

(a) Protects pigs against radiation during the day (1)

(b) Keeps pigs dry and warm at night (1)

(c) An area where pigs can roam freely during the day (1)

3.3 The picture below shows the handling of a chick.



- 3.3.1 Identify the reason for handling a chick as indicated in the picture above. (1)
- 3.3.2 Name the tool used in the picture above. (1)
- 3.3.3 Indicate TWO basic guidelines for handling poultry. (2)
- 3.3.4 Name TWO types of equipment or tools that are used by farmers to restrain farm animals. (2)

3.4 Indicate the methods of administering medication applicable to EACH of the statements below:

- 3.4.1 Treatment of external parasites by immersing farm animals in water mixed with a pesticide (1)
- 3.4.2 Administering liquid medication through the mouth to treat internal parasites (1)
- 3.4.3 The insertion of drugs to prevent infections that may be caused by retained placenta (1)
- 3.4.4 Treatment of wounds on the skin of a farm animal (1)

3.5 Animal diseases can be diagnosed through observing the symptoms or by testing body fluids in a laboratory.

- 3.5.1 Name the animal disease described by EACH of the following statements:
- (a) Swelling in the lower body region, a bloody discharge from the body openings, staggering, trembling, difficult breathing and convulsive movements (1)
- (b) Causes a high temperature in animals followed by the development of blisters mainly in the mouth and on the feet (1)
- (c) Is caused by single-celled parasites resulting in watery diarrhoea, mucus, blood in the droppings and whitish soiling around the vent (1)
- (d) A disease that affects the skin causing hard scab masses that lift from the skin with the fleece as the disease grows (1)

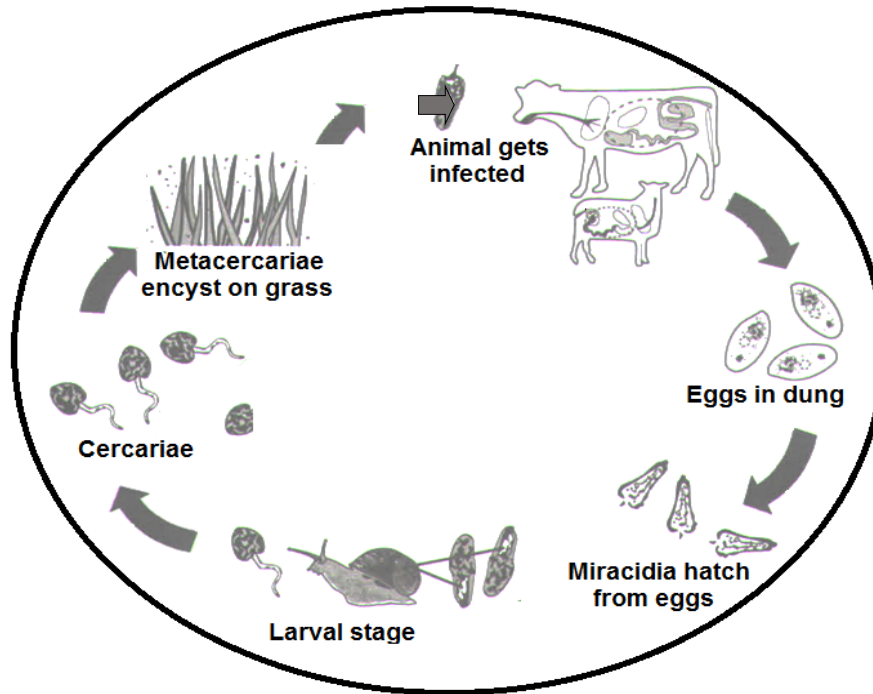


3.5.2 Indicate the pathogen that causes the disease named in EACH of the following questions:

(a) 3.5.1(d) (1)

(b) 3.5.1(a) (1)

3.6 The diagram below shows the life cycle of a parasite.



3.6.1 Name the parasite in the diagram above. (1)

3.6.2 Identify EACH of the following in the diagram:

(a) Primary host (1)

(b) Secondary host (1)

3.6.3 State a measure a farmer can adopt to break the life cycle of the parasite named in QUESTION 3.6.1 and prevent further infestation. (1)

3.7 The table below shows different parasites that affect farm animals.

PARASITE A	PARASITE B	PARASITE C
Lays eggs on wool that is soiled with faeces and also on open wounds	Causes irritation of the sinuses, sneezing and severe nasal discharge	Causes skin irritation with severe itching resulting in mange

3.7.1 Classify the parasites in the table above. (1)

3.7.2 Identify **PARASITE A** and **PARASITE C**. (2)

3.7.3 State ONE management practice to prevent infestation by **PARASITE A**. (1)

3.8 Urea poisoning occurs when animals consume too much of it.

3.8.1 Name ONE symptom of urea poisoning in farm animals. (1)

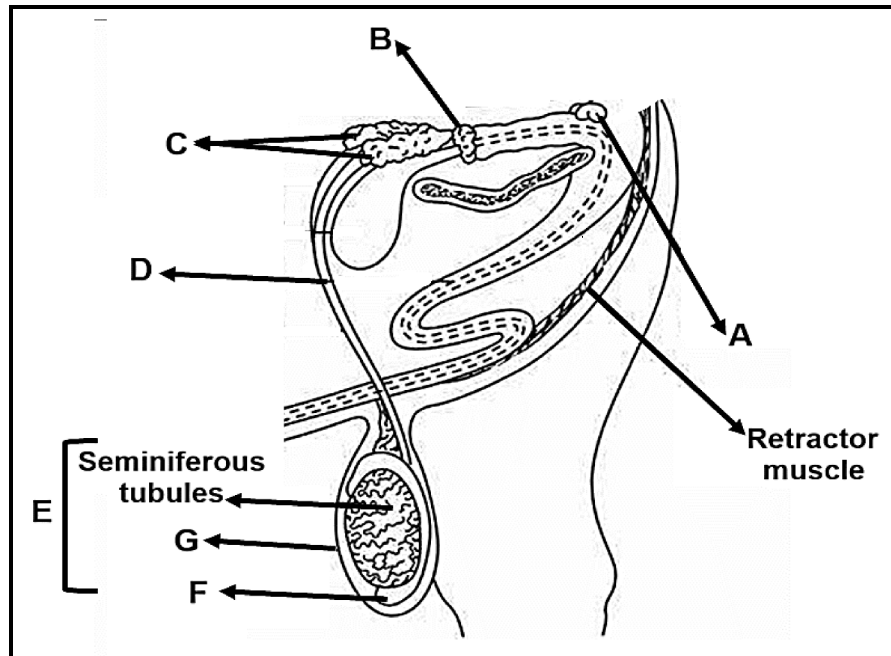
3.8.2 Indicate a method the farmer can use to treat urea poisoning in farm animals. (1)
[35]



QUESTION 4: ANIMAL REPRODUCTION

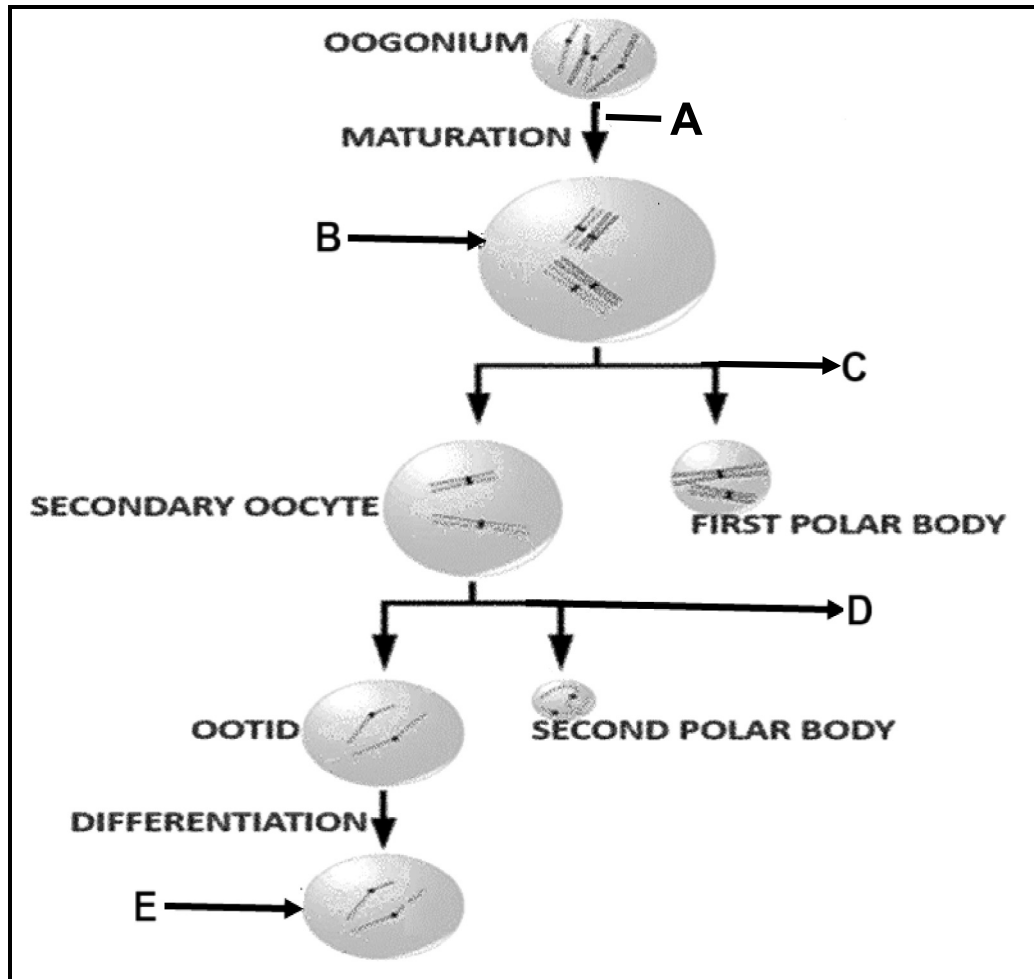
Start this question on a NEW page.

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



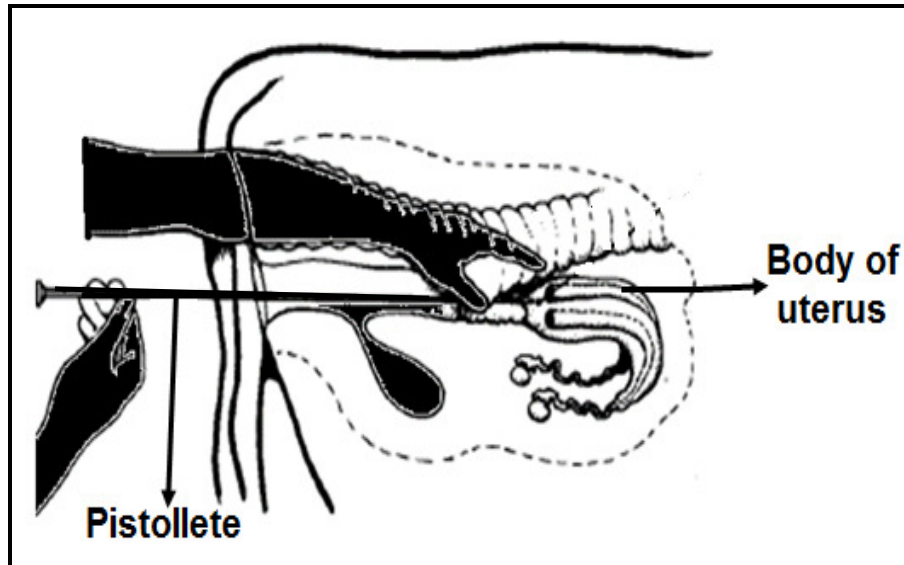
- 4.1.1 Name structures **A** and **D**. (2)
- 4.1.2 Write down the letter that represents the part that is responsible for EACH of the following functions: (1)
- (a) Secretion of milky alkaline mucus that gives semen its characteristic smell (1)
 - (b) Production of male sex hormones (1)
 - (c) Provision of energy and more fluid to increase volume of semen (1)
 - (d) Storage of spermatozoa until maturity (1)
 - (e) Regulation of the temperature of the testes (1)
- 4.1.3 State TWO factors that cause sterility in bulls. (2)

- 4.2 The illustration below shows the process of gametogenesis in female farm animals.



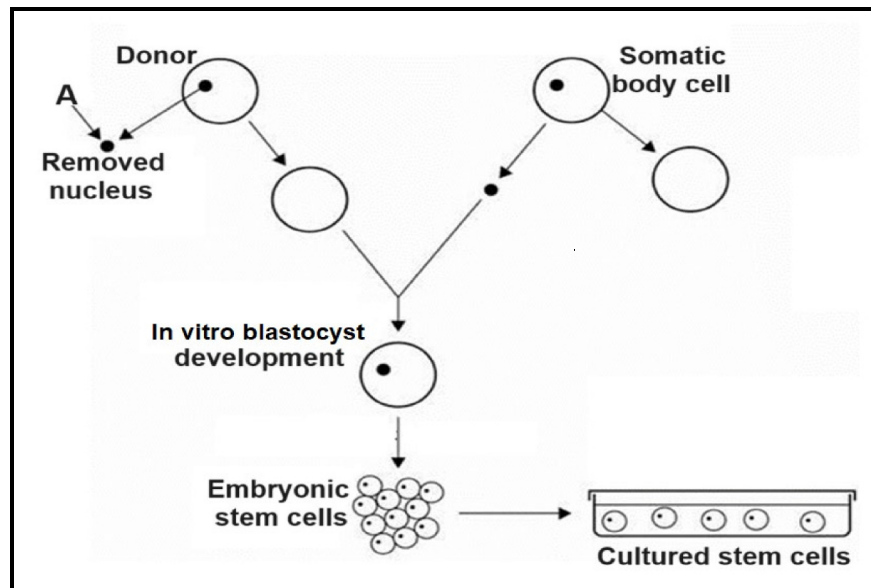
- 4.2.1 Identify the type of gametogenesis represented by the illustration above. (1)
- 4.2.2 Label **B** and **E**. (2)
- 4.2.3 Name the type of cell division represented by EACH of the following: (1)
- (a) **A** (1)
- (b) **D** (1)
- 4.3 Hormones are used by farmers to bring female animals to oestrus at approximately the same time.
- 4.3.1 Identify the reproductive technique indicated by the statement above. (1)
- 4.3.2 State TWO disadvantages of the reproductive technique in QUESTION 4.3.1. (2)

- 4.4 The diagram below shows the reproductive technique that takes place in female animals.



- 4.4.1 Identify the reproductive technique represented in the diagram above. (1)
- 4.4.2 State TWO advantages of the reproductive technique identified in QUESTION 4.4.1. (2)
- 4.4.3 State ONE basic requirement for semen collection. (1)
- 4.4.4 State ONE characteristic of high quality semen. (1)

4.5 The diagram below shows a type of cloning.



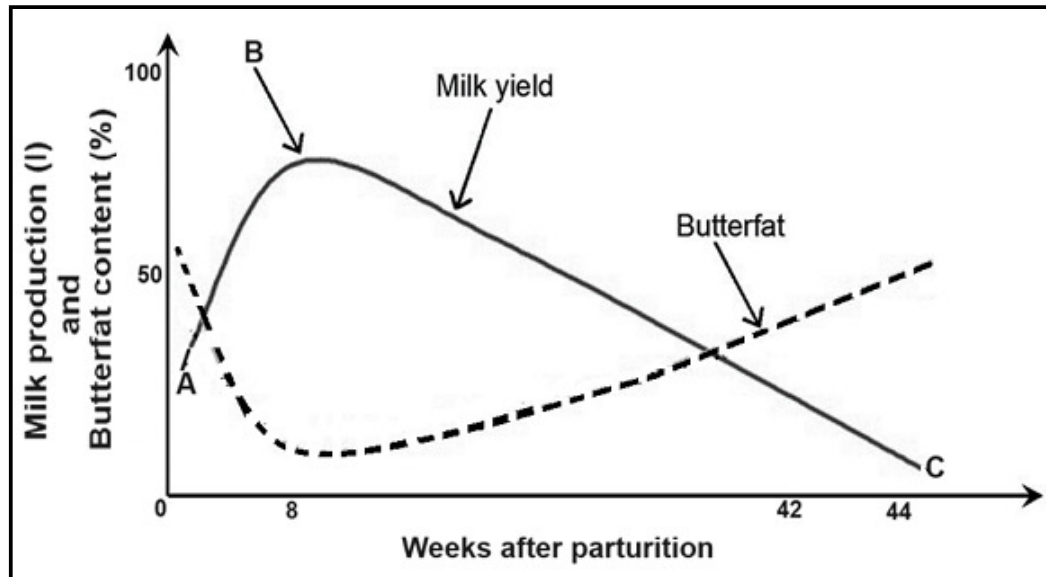
- 4.5.1 Identify the type of cloning in the diagram above. (1)
- 4.5.2 Indicate the purpose of performing the cloning in QUESTION 4.5.1. (1)
- 4.5.3 Name the process that has resulted in cell **A**. (1)
- 4.5.4 Give a reason for the process named in QUESTION 4.5.3. (1)

4.6 The picture below illustrates a stage of parturition.



- 4.6.1 Indicate the stage of parturition in the picture above. (1)
- 4.6.2 Name the stage that follows the one in QUESTION 4.6.1. (1)
- 4.6.3 State ONE factor that will make it difficult for the cow to get into the stage named in QUESTION 4.6.2. (1)
- 4.6.4 Name ONE calf-related problem that may interfere with the normal parturition process. (1)

4.7 The graph below indicates milk production in a cow.



4.7.1 Indicate what is represented by EACH of the following in the graph above:

(a) Curve **A** to **C**

(1)

(b) Point **B**

(1)

4.7.2 Determine from the graph the number of days during which the animal will be producing milk.

(1)

4.7.3 Explain the relationship between milk production and butterfat content in week 8.

(2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

