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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE/ NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2020

MARKS: 150

TIME: 2½ hours

This question paper consists of 14 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 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, e.g. 1.1.11 B.

1.1.1 A cost-effective protein supplement for a ruminant animal is …

A fish meal.
B cottonseed oil-cake meal.
C urea.
D carcass meal.

1.1.2 Keratomalacia is caused by a deficiency of … in farm animals.

A thiamine
B vitamin A
C calcium
D vitamin C

1.1.3 The small intestine is adapted for effective absorption of nutrients because:

(i) It has many folds to increase the surface area.
(ii) Its length decreases the surface area for absorption.
(iii) It has muscles that contract and relax to move nutrients.
(iv) It has small finger-like projections.

Choose the CORRECT combination:

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

1.1.4 The part of the alimentary canal of ruminant animals responsible for chemical digestion:

A Rumen
B Reticulum
C Omasum
D Abomasum

1.1.5 Protection against … is NOT an advantage of shelters in livestock production.

A optimum temperatures
B predators
C cold temperatures
D rainfall

1.1.6 The following refer to an extensive production system:

(i) Animals kept at a low density
(ii) No environmental control and management
(iii) More labour and care needed for the animals
(iv) There are lower inputs

Choose the CORRECT combination:

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

1.1.7 … is a protozoal disease in fowls that results in thin watery diarrhoea containing mucus.

A Avian flu
B Coccidiosis
C Newcastle disease
D H1N1

1.1.8 The effects of external parasites may be reduced by …

A applying fewer 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 Multiplets formed from the release of more than one ovum are …

A identical.
B monozygotic.
C freemartins.
D non-identical.

1.1.10 The hormone that causes the corpus luteum to regress, as an indication that the cow is not pregnant:

A Oestrogen
B Prostaglandin
C Relaxin
D Progesterone (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:	Lipase	Enzyme responsible for protein digestion
	B:	Amylase	
1.2.3	A:	Furrowing pen	Facility separating a sow from piglets
	B:	Pigsty	
1.2.4	A:	Ticks	Microscopic parasites with mouth parts used to suck blood and cause irritation for the host
	B:	Mites	
1.2.5	A:	Chin-ball marker	Method dairy farmers can adopt to assist with the identifying of cows on heat
	B:	Pedometer	

(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 measure of the digestibility of a feed expressed as a percentage of the dry matter intake

1.3.2 Oral intake of drugs and medicines to control diseases

1.3.3 The process of depositing semen into the cervix of a female animal without mating taking place

1.3.4 A condition where successful mating occurs but no fertilisation takes place due to congenital defects

1.3.5 The hormone that prepares the uterus to receive the fertilised ovum (5 x 2) (10)

1.4 Change the UNDERLINED WORD 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 <u>parotid</u> gland is situated underneath the tongue of the pig for secretion of saliva.

1.4.2 In a <u>backyard</u> production system, animals are allowed to roam around freely.

1.4.3 <u>Cryptorchidism</u> refers to underdeveloped testes.

1.4.4 <u>Cowper's</u> gland secretes a milky, slightly alkaline mucus that gives semen a characteristic smell.

1.4.5 Embryo <u>splitting</u> is the removal of fertilised ova from superior cows to transplant them into inferior cows. (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 represent the alimentary canals of farm animals.

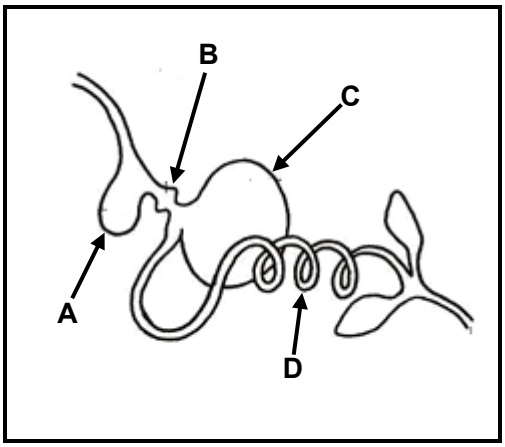


DIAGRAM 1

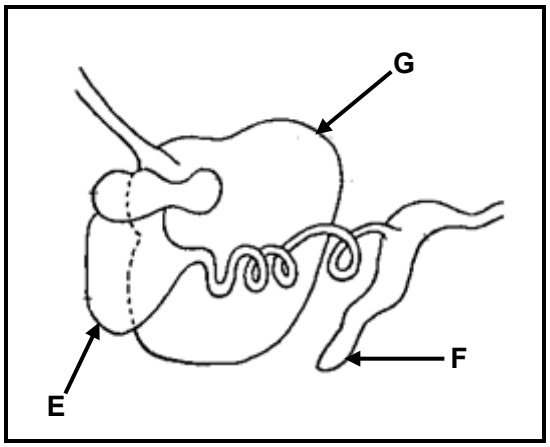


DIAGRAM 2

2.1.1 Name the farm animals whose alimentary canals are represented in DIAGRAM 1 and DIAGRAM 2. (2)

2.1.2 Identify the part in DIAGRAM 1 where EACH of the following occurs. Write down only the letter (A–D).

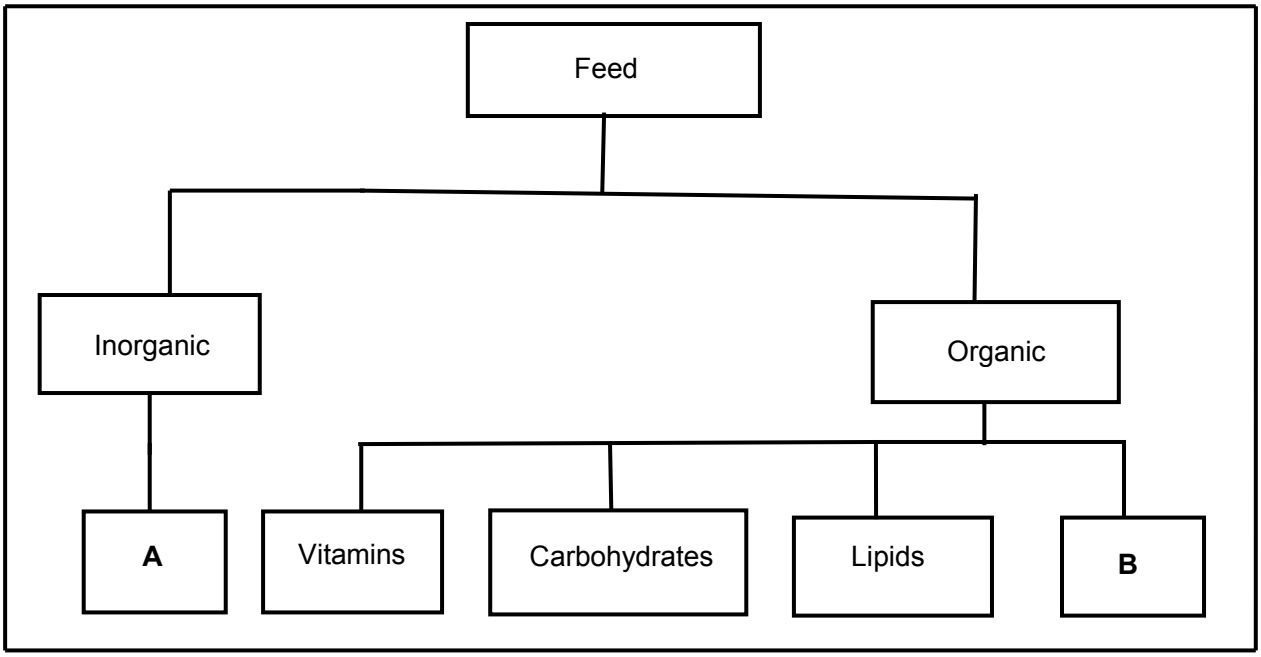
(a) Digestive juices are secreted (1)

(b) Mechanical digestion occurs (1)

(c) Food is moistened and softened (1)

2.1.3 Name TWO adaptations of part **G** in DIAGRAM 2 which enables the animal to digest feed rich in fibre. (2)

2.2 The flow chart below shows the components of feed.



2.2.1 Identify components **A** and **B**. (2)

2.2.2 State TWO ways in which component **A** can be supplemented in farm animals. (2)

2.2.3 Indicate the main component that is needed for EACH of the following functions:

(a) Production of eggs and milk (1)

(b) Fattening of farm animals (1)

2.3 During a digestibility trial, an animal ingested 15 kg of feed with a moisture content of 10% and excreted 3,5 kg dry manure.

2.3.1 Calculate the digestibility coefficient of the feed above. Show ALL calculations. (5)

2.3.2 Give the implication of the digestibility of the feed calculated in QUESTION 2.3.1. (1)

2.3.3 Name TWO factors that may have contributed to the digestibility of the feed used in the trial. (2)

2.4 The value of the feed depends on the energy content that remains after all metabolic processes have occurred in the body.

2.4.1 Name the energy that is important for production and maintenance. (1)

2.4.2 Give TWO reasons why it is important for the farmer to know the energy value of the feed. (2)

2.5 A farmer formulated a feed with the following composition:

Digestible protein (DP) = 13%
Total digestible nutrients (TDN) = 75%
Crude fibre content = 12%

2.5.1 Use a formula to calculate the nutritive ratio (NR) of this feed. (3)

2.5.2 Indicate the age group of the animal that will benefit most from this feed. (1)

2.5.3 Give TWO reasons for using this feed to feed the animals indicated in QUESTION 2.5.2. (2)

2.6 Planning and managing feed is the most critical management function on a farm. Livestock farmers must ensure that enough fodder is available to meet the animal feed requirements throughout the year so that they produce on an ongoing basis.

2.6.1 Give an appropriate term for the scenario above. (1)

2.6.2 Give TWO reasons for planning fodder production. (2)

2.6.3 State TWO aspects the farmer has to consider when planning fodder production. (2)
[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The table below shows the temperature requirements of broiler chickens at various ages.

AGE IN WEEKS	TEMPERATURE REQUIREMENTS (°C)
1	35
2	30
3	25
4	22
5	20
6	20
7	20

3.1.1 Draw a bar graph showing the temperature requirements of broiler chickens at various ages. (6)

3.1.2 Deduce the trend in temperature requirements of broiler chickens. (2)

3.1.3 Name the equipment that can be used to maintain the temperature in a broiler house. (1)

3.2 Indicate the farm animals that show the following types of behaviour during handling:

3.2.1 Pawing when in distress (1)

3.2.2 Easy to handle when they are together (1)

3.2.3 Panting when they are stressed (1)

3.2.4 Peck when feeding (1)

3.3 The pictures below show farming systems.

PICTURE A

PICTURE B

3.3.1 Identify the farming systems shown in PICTURE A and PICTURE B. (2)

3.3.2 Compare the farming systems identified in QUESTION 3.3.1 with regard to their effect on the environment. (2)

3.4 Swine flu, anthrax, foot-and-mouth disease, tuberculosis and rabies are all highly contagious and pandemic diseases. Some are zoonotic while others are enzootic. Most of these diseases are notifiable diseases. The diseases are caused by different pathogens which could be transmitted by either direct contact or inhaling infected air. Some can remain infectious for weeks or even many months. People can also be infected by eating animal products from affected animals.

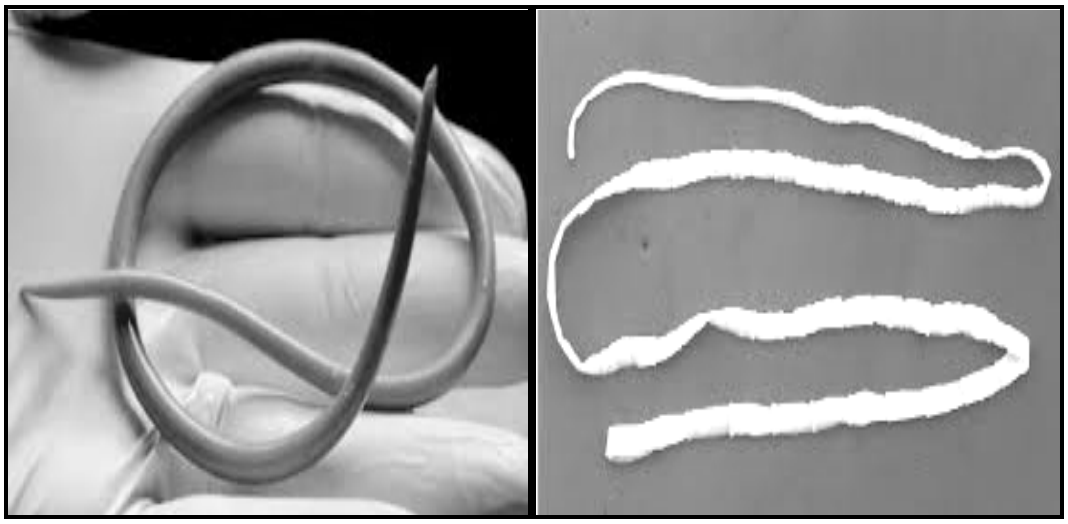
3.4.1 Classify the diseases in the scenario above according to the pathogens that cause them. (2)

3.4.2 Explain the meaning of *zoonotic diseases*. (2)

3.4.3 Why is swine flu regarded as enzootic? (1)

3.4.4 Give TWO roles of the state in controlling all notifiable diseases such as anthrax, swine flu and tuberculosis (TB). (2)

3.5 Internal parasites are a problem for sheep farmers. They may cause serious losses if not controlled.



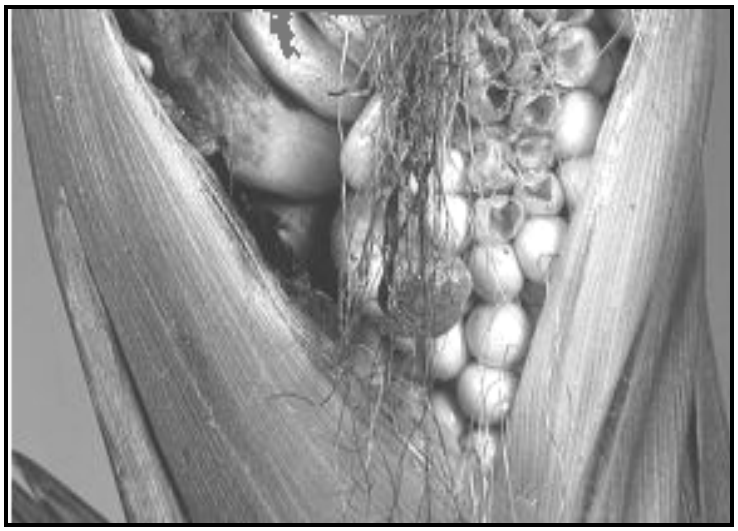
PARASITE A **PARASITE B**

3.5.1 Identify PARASITE A and PARASITE B. (2)

3.5.2 Name TWO visible symptoms in sheep that are heavily infested with PARASITE A. (2)

3.5.3 State TWO management practices that can be applied to prevent the infestation of a flock by internal parasites. (2)

3.6 The picture below is an example of a plant that can cause poisoning of animals and even result in death with continuous exposure.



3.6.1 Identify the poisonous plant in the picture above. (1)

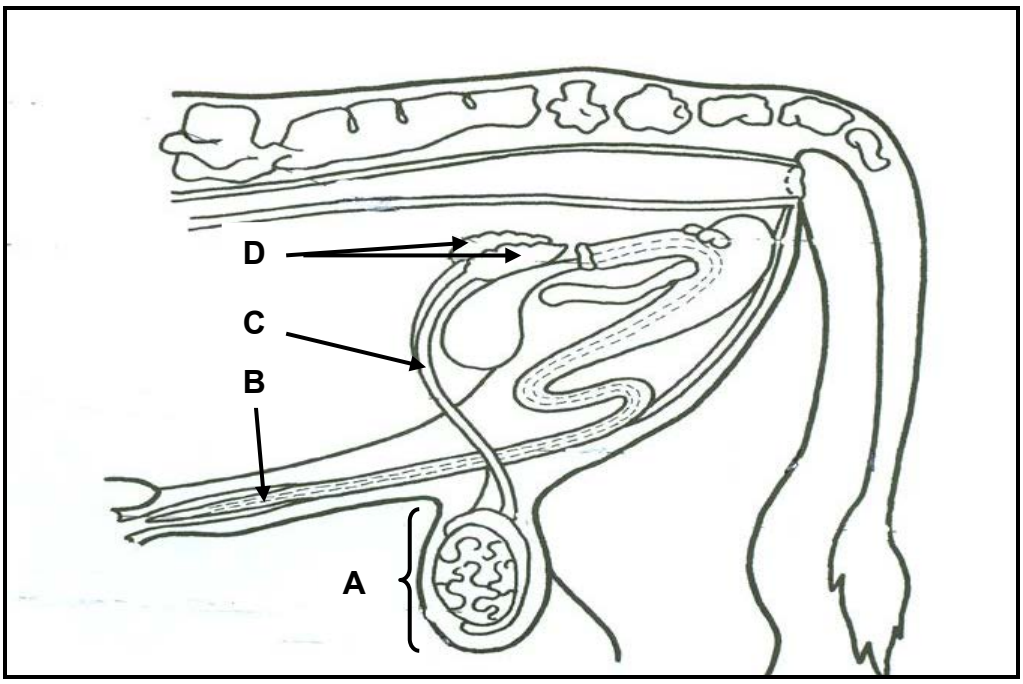
3.6.2 State TWO measures which can be taken to prevent stored feeds from being contaminated by the plant identified in QUESTION 3.6.1. (2)

3.6.3 Indicate TWO actions that can be taken once the presence of the poison identified in QUESTION 3.6.1 is detected in feeds. (2)
[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The picture below shows the reproductive system of a bull.



4.1.1 Identify **A**, **B** and **C**. (3)

4.1.2 State ONE function of **A**. (1)

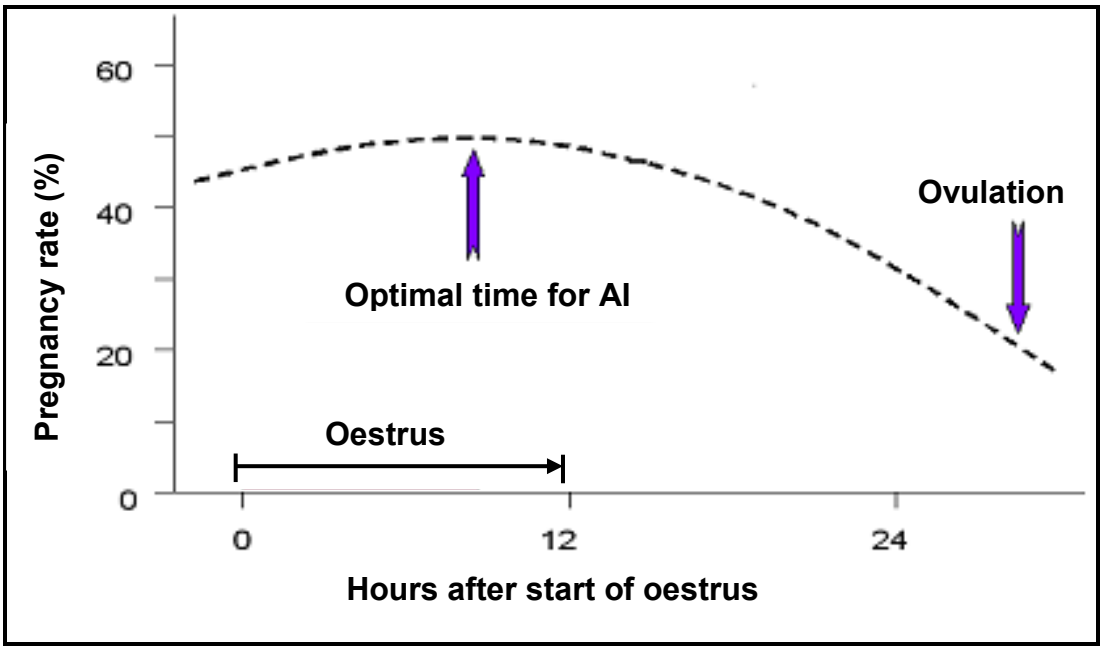
4.1.3 Indicate the role of gland **D**. (1)

4.2 Bulls may appear healthy and normal but lack the drive to service cows.

4.2.1 Give a term for the condition described in the statement above. (1)

4.2.2 State THREE causes of the condition given in QUESTION 4.2.1. (3)

4.3 The illustration below shows a process that occurs in female animals.



4.3.1 Identify the hours after oestrus when the highest pregnancy percentage rate may be achieved. (1)

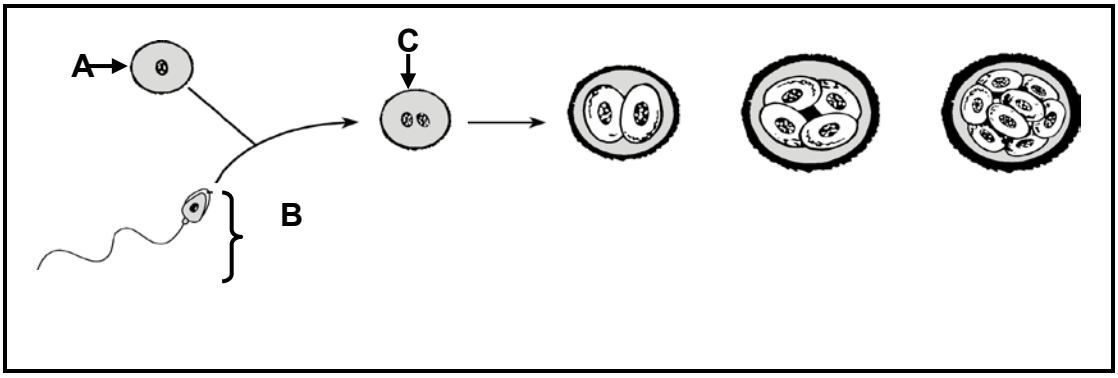
4.3.2 Give a reason why an inseminator will be able to inseminate the cow between the first hour and 12 hours after the start of oestrus. (1)

4.3.3 State TWO visible signs showing that the cow is in oestrus. (2)

4.3.4 Give ONE reason why a cow is inseminated hours before ovulation. (1)

4.3.5 Indicate ONE requirement of a successful insemination. (1)

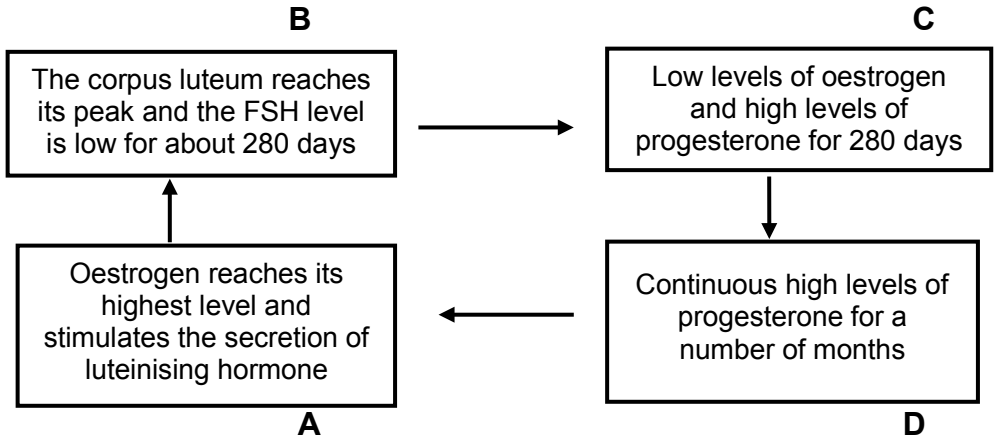
4.4 The diagram below represents a process that occurs in female animals.



4.4.1 Label **A**, **B** and **C**. (3)

4.4.2 Name the reproductive process represented in the diagram above. (1)

4.5 Hormones cause reproductive changes in cows that occur between one heat period and the next. Below is an illustration of the changes in the reproductive cycle of a cow.



4.5.1 Identify the process in the reproductive cycle of mature cows illustrated above. (1)

4.5.2 Name the THREE stages of the process identified in QUESTION 4.5.1. (3)

4.5.3 Indicate the normal presentation of the calf in the pelvis at birth. (1)

4.6 Problems are usually experienced by heifers that are calving for the first time.

4.6.1 Name the condition referred to in the statement above. (1)

4.6.2 Give TWO signs of an animal that is experiencing birth problems. (2)

4.6.3 State ONE cause of birth problems in heifers. (1)

4.6.4 Name the hormone that initiates milk release. (1)

4.6.5 Name the milk produced in the first three days after calving. (1)

4.7 Superior donor cows are treated with an intravaginal drug to stop the cows from coming to oestrus. FSH is injected every morning and night. Later prostaglandin is injected. After the repeated injections with formulated hormones, the superior cows are inseminated. After seven days the fertilised egg cells are removed to be implanted into the recipient cows.

4.7.1 Name the process explained in the scenario above. (1)

4.7.2 What is the importance of the process named in QUESTION 4.7.1? (2)

4.7.3 Explain what a *donor cow* is. (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150