Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2018

AGRICULTURAL SCIENCES P1

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. 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 your 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 number (1.1.1–1.1.10) in the ANSWER BOOK. for example 1.1.11 A.

1.1.1 The component of the gastric juice that destroys bacteria swallowed with food is …

A pancreatic juice.
B bile.
C hydrochloric acid.
D succus entericus.

1.1.2 The water-soluble vitamin that causes uncoordinated movement of hind legs in pigs when deficient is …

A ribloflavin.
B cobalamine.
C pyridoxine.
D thiamine.

1.1.3 The additional quantity of feed given to chickens in order to produce more eggs is a … ration.

A supplementing
B digestible
C maintenance
D production

1.1.4 Gross energy is the amount of energy released as heat after a feed is completely burnt down into ...

A carbon dioxide, manure and water.
B carbon dioxide, methane and water.
C water, uric acid and urine.
D carbon dioxide, water and heat.

1.1.5 The following occurs in an extensive production system.

(i) More animals are kept on a small area of land.
(ii) Emphasis is on survival rather than productivity.
(iii) Low input and human interference.
(iv) Few animals grazing freely on large area.

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

1.1.6 The following statement is NOT the effect of incorrect handling of farm animals.

A Animals will fear being approached.
B Animals become agitated during handling.
C Animals will be much more difficult to handle.
D They become tame when handled.

1.1.7 Zoonotic diseases that can be transmitted from animals to humans.

A Anthrax and rabies
B Hypocalcaemia and polyneuritis
C Tuberculosis and heart water
D Ringworm and swayback

1.1.8 The parasite in the alimentary canal of an animal responsible for anaemia is …

A mite.
B blowfly.
C roundworm.
D nasal worm.

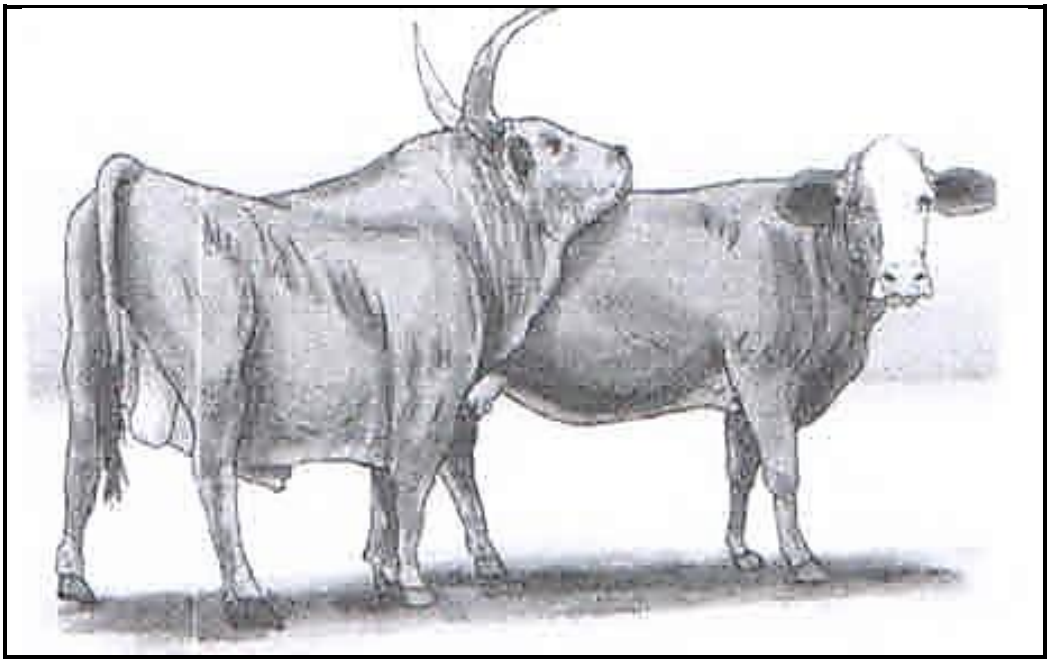
1.1.9 During lactation in cows the following occurs.

(i) When milk production reaches its peak, the butterfat content is at its lowest.
(ii) If a cow is fed more fibrous feed, the milk will have a lower fat content.
(iii) The more concentrates in a feed, the lower the fat content in milk.
(iv) When milk production decreases, the butterfat content reaches its peak.

Choose the correct combination:

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

1.1.10 The stage of mating illustrated below displays …



A flehmen response.
B copulatory behaviour.
C dismounting behaviour.
D ejaculation process. (10 x 2) (20)

1.2 Indicate whether each of the descriptions in COLUMN B applied 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 number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

COLUMN A			COLUMN B
1.2.1	A	Eructation	The release of gases formed during microbial fermentation from the rumen
	B	Belching	
1.2.2	A	Passive transport	The movement of glucose molecules and amino acids across the membrane against concentration gradient
	B	Active transport	
1.2.3	A	Holding pen	An area where animals are kept before handling for a short period of time
	B	Holding shed	
1.2.4	A	Red water	Transmitted by a single-host tick
	B	Coccidiosis	
1.2.5	A	Embryo transfer	Transfer of nucleus of body cell to an unfertilised egg cell without a nucleus leading to an embryo
	B	Cloning	

(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 number (1.3.1–1.3.5) in the ANSWER BOOK.

1.3.1 A measure of more soluble carbohydrates such as starch and sugar in a dry matter feed

1.3.2 Preventative measure where animals are kept in isolation to detect the presence of disease before they are allowed to mix with other animals

1.3.3 Heat detection device that is strapped underneath the lower jaw end of the mounting cow and leaves a streak on the back of a mounted cow

1.3.4 The period in cow from fertilisation to parturition during which foetus develops

1.3.5 Sterile female calf born as a non-identical twin of a bull calf

(5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in each of the following statements. Write only the correct answer next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 Complete protein supplies a perfect mixture of all the essential amino acids in the correct amounts and proportions.

1.4.2 Free range system is a system of small wire cages where birds are kept to lay eggs for the entire production period.

1.4.3 Vas deference is a muscular tissue tube which serves as a common canal for excretion of both semen and urine.

1.4.4 Embryo transfer is the removal of viable embryo from the uterus of the donor.

1.4.5 Posterior presentation is when the foetus lies on its abdomen with its forefeet and nose stretched towards the pelvis and head resting on its forefeet.

(5 x 1) (5)

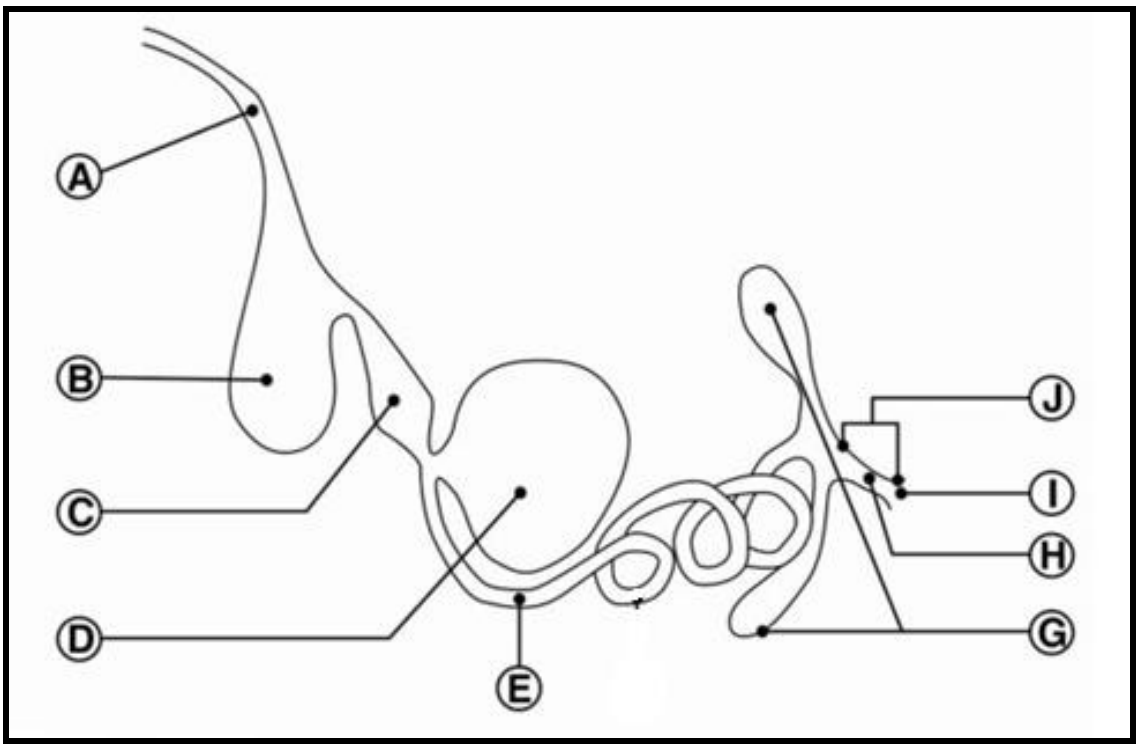
TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

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



2.1.1 Identify the type of a farm animal which has an alimentary canal shown in the diagram above. (1)

2.1.2 Give TWO reasons visible in the diagram to justify the answer in QUESTION 2.1.1. (2)

2.1.3 Identify the letter representing the part where the following occurs:

(a) Secretion of gastric juice (1)

(b) Secretion of succus entericus (1)

(c) Grinding of food (1)

2.1.4 Name TWO adaptation features of part labelled **D** which helps it to perform its function. (2)

2.1.5 Indicate the type of feed that is most suitable for the digestive system of the animal above. (1)

2.2 The table below shows the nutritional information of different feeds.

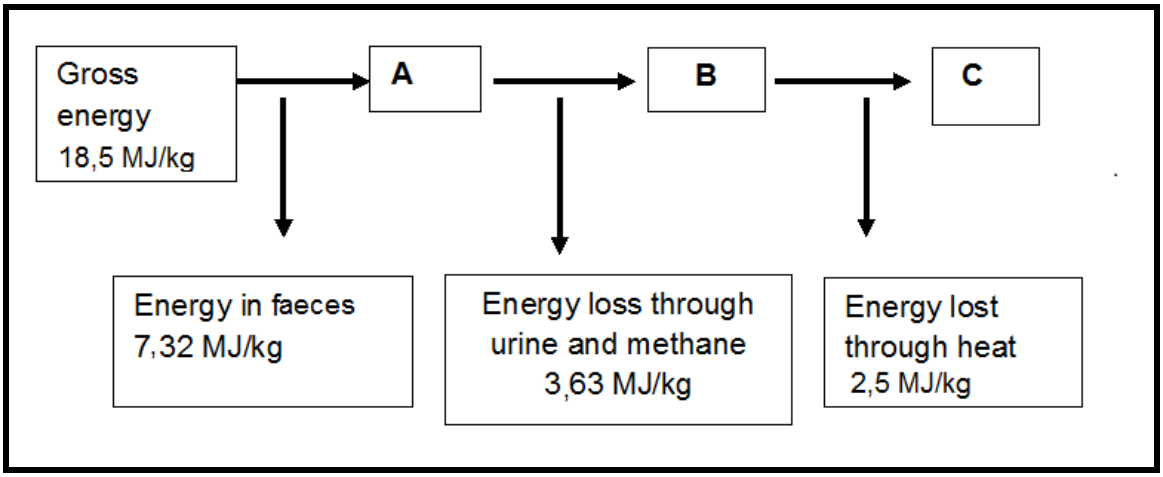
No.	Feed	Digestible protein (DP) (%)	Crude fibre (CF) (%)	ME (MJ/kg)
A	Lucerne hay	14	30	8
B	Soyabean oil-cake meal	38	8	17
C	Maize meal	9	2	12
D	Sorghum stalks	4	40	6

2.2.1 Classify the feeds **A, B, C** and **D** in the table above into protein/carbohydrates rich concentrates and roughages. (4)

2.2.2 Use the Pearson square method to compile a feedlot ration for sheep requiring a 17% DP using feed **B** and **C** in the table. (4)

2.2.3 Calculate the percentage of feed **B** in the ration in QUESTION 2.2.2. (3)

2.3 The schematic representation below shows the feed energy flow.



2.3.1 Indicate the letter representing the following types of energy:

(a) Energy available for maintenance and production. (1)

(b) Energy that remains after microbial digestion by ruminant animal. (1)

2.3.2 Calculate the amount of energy in **A** that the animal would get from the feed. (2)

2.4 Supplements are added to the diet of farm animals to ensure balanced nutrients necessary for optimal growth and production to maximize profit.

2.4.1 Explain how the substances below promote growth and production in animals:

(a) Tranquilisers (1)

(b) Antibiotics (1)

(c) Somatotropin hormone (1)

2.5

Type	**No. of animals**	**Intake per animal (kg)**	**Requirement per day** (kg)	**Total required for 120 days (ton)**	**Area 40(ha)**	**Production (kg/ha)**
Cows	60	10	600	72		3 200
Bulls	3	15	**------**	5,4		
Calves	50	4	200	**-------**		
Total	113					**---------**

2.5.1 Calculate the total dry matter produced in this veld in tons. (3)

2.5.2 Determine the total DM required by all animals for 120 days in tons. (3)

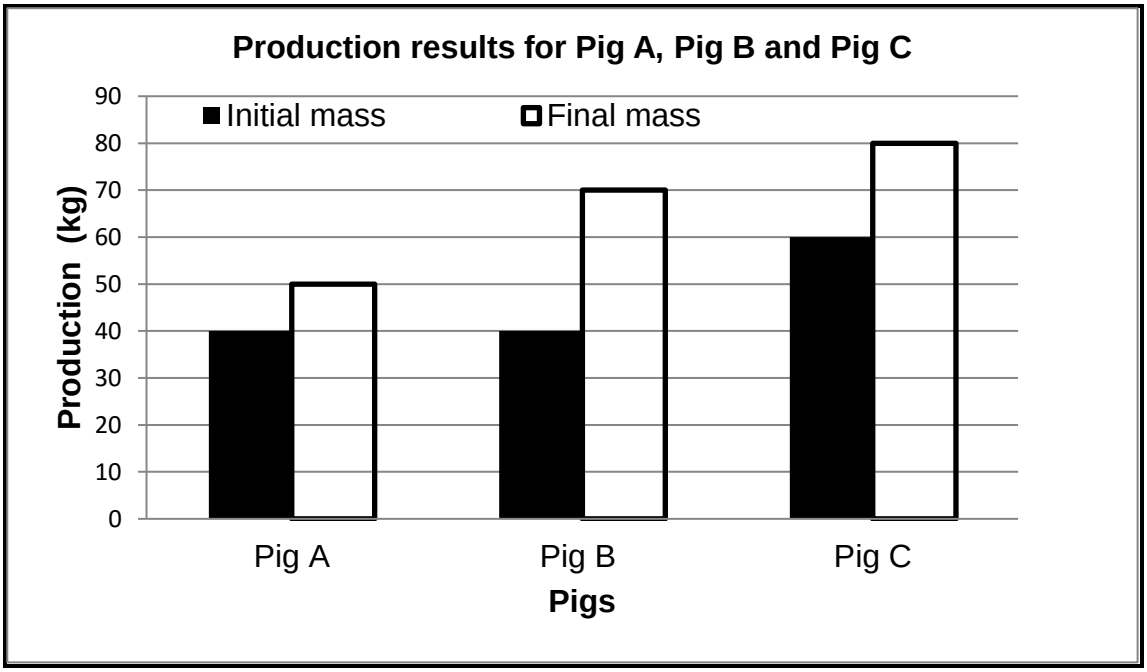
2.5.3 Suggest with a reason the season during which this feed flow programme is applicable. (2)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The graph below shows the production levels of different pigs raised under different conditions.



3.1.1 Identify the pig that has been raised under the following conditions:

(a) Always kept under the intensive production system (1)

(b) Extensive production system (1)

(c) Most improved environmental conditions (1)

3.1.2 Give a reason for the answer in QUESTION 3.1.1 (c). (1)

3.1.3 Suggest THREE factors that might have contributed to the highest improved production in pig **B**. (3)

3.2 The pictures below show the different facilities used in an intensive production system.

FACILITY 1 **FACILITY 2**

FACILITY 3

3.2.1 Identify the facility labelled **2** and **3**. (2)

3.2.2 Indicate the purpose for which structures labelled **A** and **B** in facility **1** are used. (2)

3.3 Handling farm animals is an important aspect in the management of any herd. Various animals are handled differently and respond according to the way they are handled.

3.3.1 Indicate the animal to which the flowing basic guidelines apply when handling them:

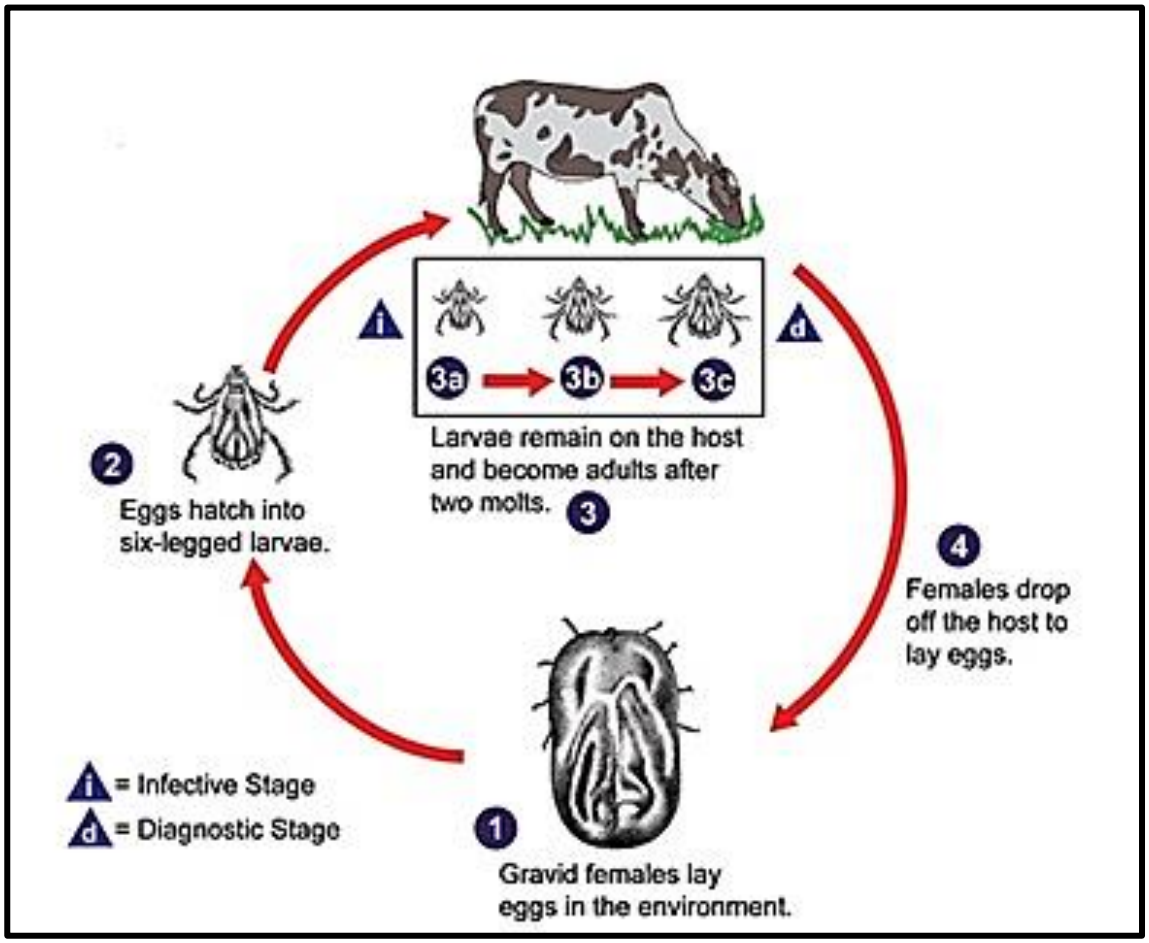
(a) Carry by both legs (1)

(b) Catch above the joint of the hind leg (1)

(c) Make use of a plywood board when it is moved (1)

3.4 List THREE types of abnormal behaviour commonly displayed by pigs when under stress. (3)

3.5 The illustration below shows the life cycle of a parasite that affects farm animals.



3.5.1 Classify the parasite above based on the life cycle and supply the name. (2)

3.5.2 Give a reason for the classification in QUESTION 3.5.1. (1)

3.5.3 Name a protozoan disease that can be transmitted by the parasite above. (1)

3.5.4 Indicate TWO management practices a farmer can put in place to prevent the infestation of this parasite. (2)

3.6 Swine fever is a contagious, pandemic and zoonotic disease that is affecting farmers severely. It is a notifiable disease and spreads rapidly resulting in a large number of animals being affected. Its outbreak meets the criteria classified as an epidemic. The pathogen can remain viable even in an unprocessed meat. Once detected susceptible animals are killed and their products destroyed.

3.6.1 Name the pathogen that causes swine fever and the animals mostly affected by the disease. (2)

3.6.2 Swine fever is classified as an epidemic disease. Justify this statement with TWO reasons. (2)

3.6.3 Identify the term from the scenario which means that the disease can be transmitted from animals to human beings. (1)

3.6.4 Identify the role of the state from the scenario in preventing further spread of the disease. (1)

3.6.5 Indicate the duty of owners of animals in controlling swine fever once detected. (1)

3.7 Sustainable use of medication is a new approach that combines the advantages of modern, traditional and complementary treatment systems to provide better health care for animals. The main advantage of the approach is that, it is environmentally friendly.

3.7.1 Name TWO methods that the farmer can use to test animals' health. (2)

3.7.2 Suggest THREE precautions that must be taken into account before treating animals to ensure the sustainable use of medication. (3)

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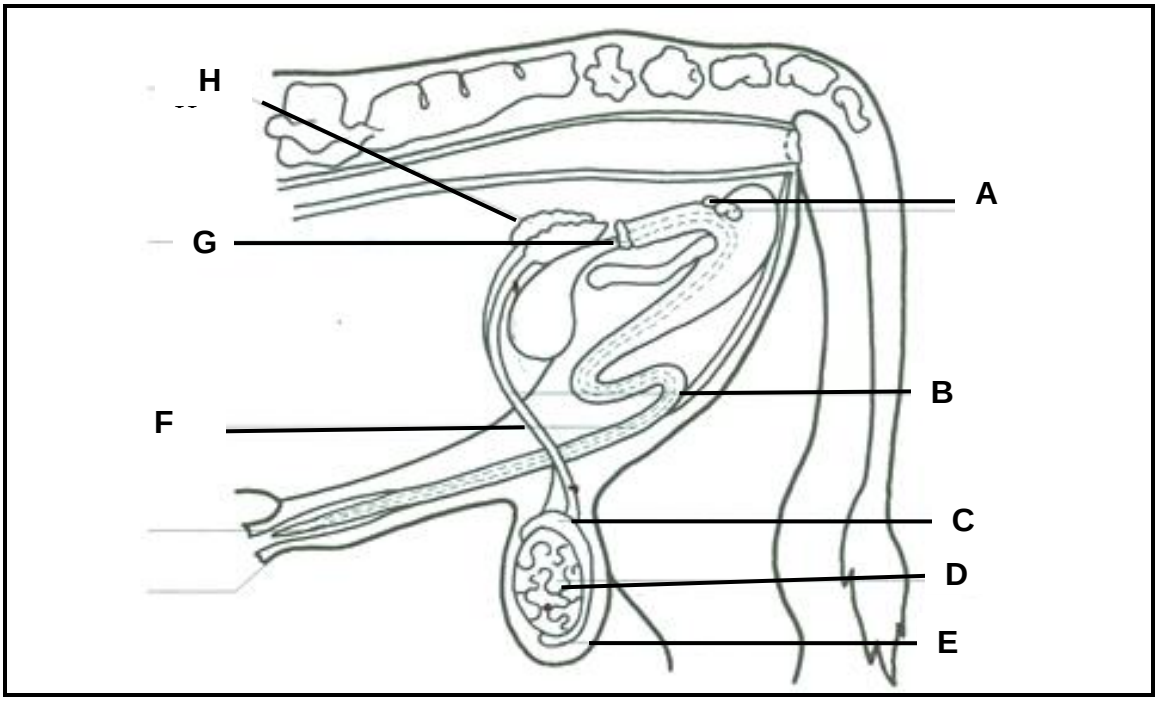
QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

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



4.1.1 Identify the letter from the diagram above representing the part where the following occurs:

(a) Secretes a sticky liquid that provides energy for the sperms (1)

(b) Transports sperm cell to the urethra through peristalsis movement (1)

(c) Produces testosterone (1)

(d) Secretion of milky alkaline mucus that gives semen its smell (1)

4.1.2 Part labelled **E** regulates temperature for the sperms. Justify this statement by explaining how this is done under extreme temperature conditions. (2)

4.2 The table below shows the levels of oestrogen and progesterone in a cow over a period of 28 days.

DAYS	PROGESTERONE (mlU/mℓ)	OESTROGENE (mlU/mℓ)
2	5	4
4	5	4
6	5	4
8	5	10
10	5	15
12	5	33
14	5	30
16	5	10
18	10	5
20	20	5
22	30	4
24	42	3
26	42	3
28	42	2

4.2.1 Present the information in the table above in the form of a line graph from day 6 to 28. (6)

4.2.2 Identify the day when the cow was on oestrus. (1)

4.2.3 Give a reason for the answer in QUESTION 4.2.2. (1)

4.2.4 Suggest with a reason the stage of oestrus in the cow on day 28. (2)

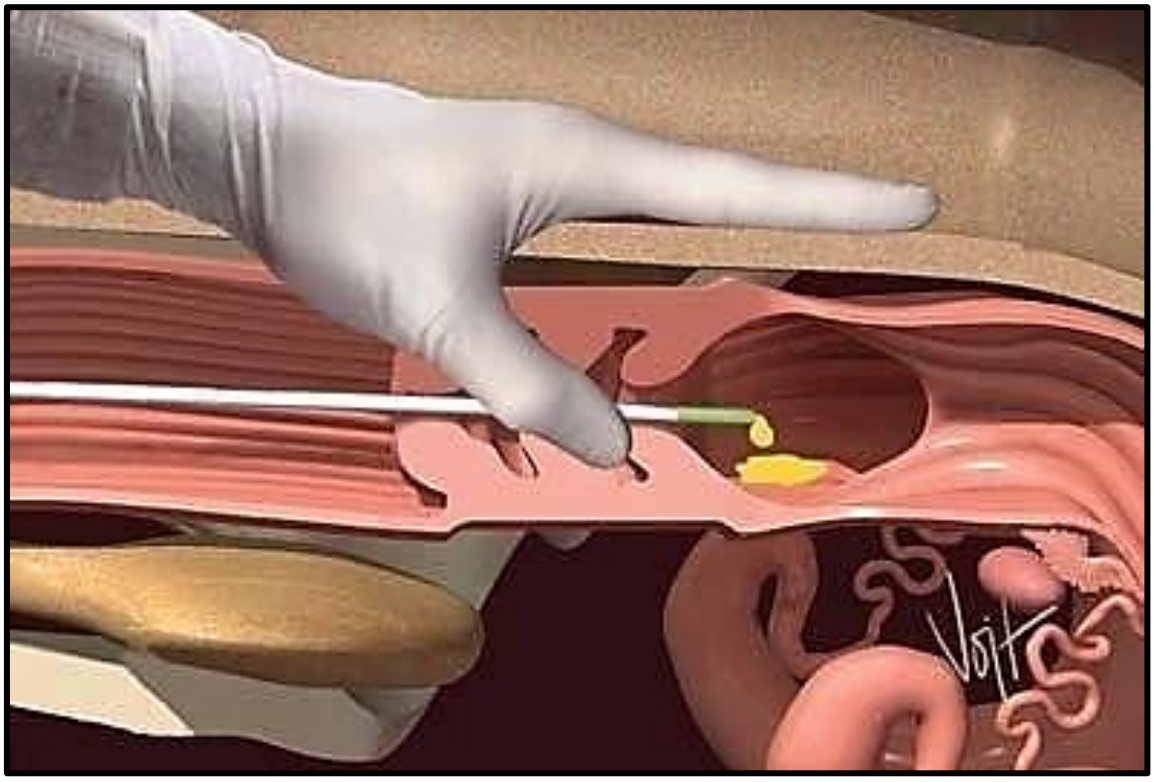
4.3 Farmers or breeders can increase the herd rapidly by bringing a group of cows into oestrus at the same time so that they calve simultaneously.

4.3.1 Give the term referring to the process stated above. (1)

4.3.2 Different techniques are used to do the process stated in QUESTION 4.3.1. Name any TWO of these techniques. (2)

4.3.3 State TWO disadvantages of the process in QUESTION 4.3.1 for the breeder. (2)

4.4 The picture below shows a reproductive process performed in a cow.



4.4.1 Identify the process performed in the animal above. (1)

4.4.2 Name TWO requirements for the success of the process in QUESTION 4.4.1 that are visible in the picture. (2)

4.4.3 Indicate TWO economic benefits of the process for the farmer. (2)

4.5 Pregnancy in cows takes about 280 days and is divided into stages characterised by major developments.

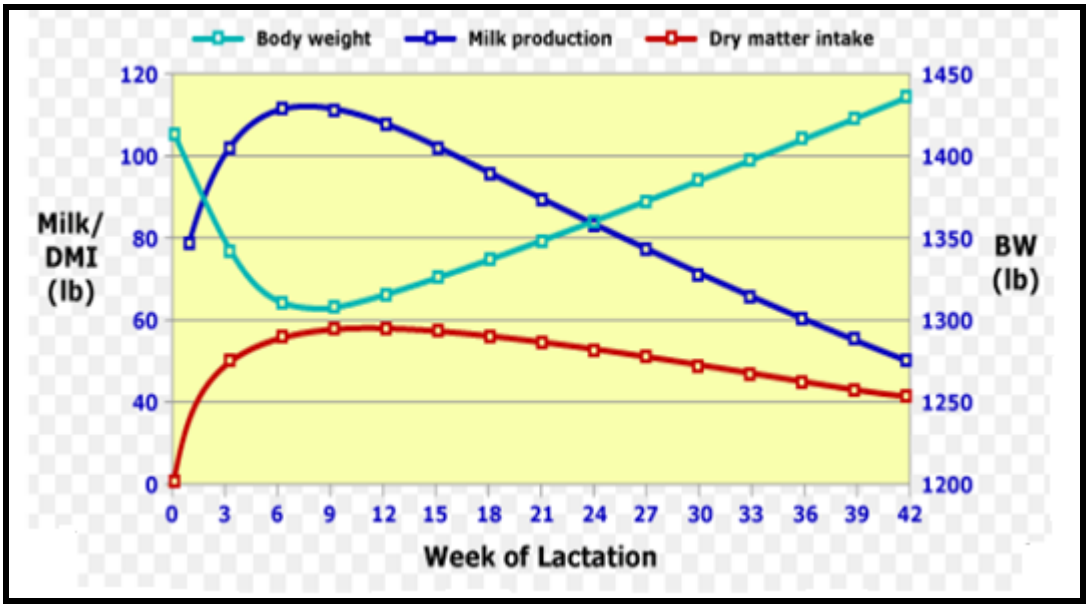
Indicate the stage of pregnancy during which the following developments occurs:

(a) Uro-genital and vascular systems develop (1)

(b) Bone calcification and organ functioning begin (1)

(c) Blastocyst attaches to the endometrium (1)

4.6 The graph below shows milk production, dry matter intake and body weight over a period of 42 weeks.



4.6.1 Indicate the time in weeks when the following occurred:

(a) Peak milk production (1)

(b) Drying up of a cow. (1)

4.6.2 The milk produced during week 1 plays an important role in the calf. Justify this statement with TWO reasons. (2)

4.6.3 Explain the relationship between milk production, body weight and dry matter intake from the graph. (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150