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Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2013

AGRICULTURAL SCIENCES P1

MARKS: 150

TIME: 2½ hours



This question paper consists of 17 pages including an answer sheet.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read all the questions carefully and make sure that you answer what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place your ANSWER SHEET for SECTION A (QUESTION 1) in your ANSWER BOOK.
8. Non-programmable calculators may be used.
9. Show all your calculations.
10. Write neatly and legibly.

SECTION A**QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and make a cross (X) over the appropriate letter in the block (A – D) next to the question number (1.1.1 – 1.1.10) on the attached ANSWER SHEET. No marks will be allocated if more than one cross (X) appears for an answer.

Example: 1.1.11

A	X	C	D
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- 1.1.1 Iodine shortage in an animal body can lead to a condition known as ...

A goitre.
B anaemia.
C parakeratosis.
D pica.

- 1.1.2 Protein is an expensive compound in feed mixture. In ruminant animals the required protein value for a ration is improved by the inclusion of ... to make the feed mixture more cost effective.

A carcass meal
B fish meal
C blood meal
D urea

- 1.1.3 Providing shelter in a cost effective production is essential for ...

A continuous production.
B optimum production.
C average production.
D selective production.

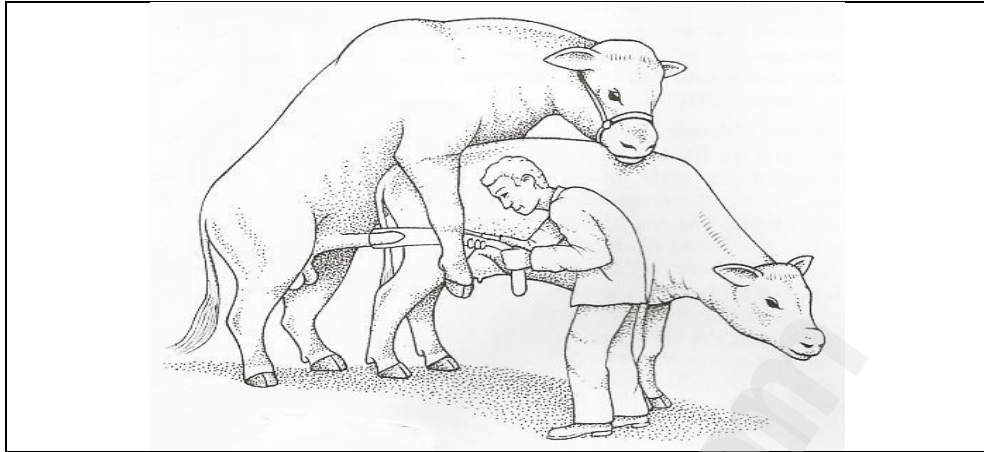
- 1.1.4 The part of the alimentary canal which keeps the excretions until they are excreted at certain times through voluntary muscular functioning.

A Caecum
B Anus
C Rectum
D Colon

- 1.1.5 Animals that are treated this way will probably react unpredictable:

A Whipped
B Treated in a familiar manner
C Treated in a calm manner
D Moved in groups

1.1.6



The picture above shows the bull mounting a teaser. This is the reflection of ...

- A artificial insemination.
- B semen collection through an artificial vagina.
- C transfer of the fertilised ova.
- D semen collection through electrical stimulation.

1.1.7 The phase of parturition whereby the cow starts to show various signs of discomfort and restlessness followed by the breaking of the membrane that allows the amniotic fluid to flow out is ...

- A expulsion of the afterbirth.
- B ejection of foetus.
- C miscarriage.
- D preparatory stage.

1.1.8 The intensive chicken housing system made of materials that are easy to clean, where the floor of the shed is covered by straw, sawdust or wood shaving is called a ...

- A free battery system.
- B close range system.
- C deep litter.
- D battery system.

1.1.9 It is important to do this when working with animals in a crush:

- A Use dogs to calm the animals
- B Be vigilant and carefully aware of safety measures
- C Whistle loudly to calm them down
- D Make sudden movements

1.1.10 Meat forms an important product in the livestock industry. One of the following is NOT a characteristic of a pale meat obtained from animals slaughtered under stressful conditions. It ...

- A is more firm.
- B is tough.
- C has less mass.
- D is of poor quality.

(10 x 2) (20)

1.2 In the table below, a statement and two answers are given. Decide whether the statement in COLUMN B relates to A only, B only, both A and B or none of the answers in COLUMN A. Choose the correct answer and make a cross (X) in the appropriate block next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET.

Example:

	COLUMN A	COLUMN B
1.2.6	A: Mechanical	The physical digestion of food in the mouth
	B: Chemical	

Answer:

	The statement refers to:			
	Only A	Only B	A and B	None
1.2.6	☒ A	☐ B	☐ C	☐ D

	COLUMN A	COLUMN B
1.2.1	A: Pulse rate	This is equal to the number of heart beats in one minute
	B: Respiratory rate	
1.2.2	A: Sanitation	Animal diseases can be prevented by careful supervision of these practices
	B: Isolation	
1.2.3	A: Chorion	This is the membrane that protects shocks and serves as a lubricant during calving
	B: Amnion	
1.2.4	A: Maize meal	Contains a small percentage of digestible nutrients and the high crude fibre content
	B: Silage	
1.2.5	A: Biuret	A substance added to maize when feeding sheep in times of drought to reduce acidity
	B: Urea	

(5 x 2) (10)

- 1.3 Give ONE TERM/PHRASE for each of the following descriptions. Write only the term/phrase next to the question number (1.3.1 – 1.3.5) on the attached ANSWER SHEET.
- 1.3.1 The secondary reproductive organ of a cow where fertilisation takes place
- 1.3.2 The production/farming system where the farmer is producing at a large scale solely for the profit making
- 1.3.3 The protective measure where the imported animals are kept in isolation for a fixed period of time to enable officials from the veterinary services to test and examine the animals for diseases.
- 1.3.4 The vitamin that is necessary for the clotting of blood in farm animals
- 1.3.5 The bacterial disease that causes a drop in the milk production of lactating cows (5 x 2) (10)
- 1.4 Change the UNDERLINED WORD(S) in the following statements to make them TRUE. Write only the appropriate word(s) next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET.
- 1.4.1 Contagious diseases refer to the diseases that cannot be passed from one animal to another.
- 1.4.2 Non-identical twins of the opposite sex of which the female is sterile is called the surrogate.
- 1.4.3 The mineral essential for the synthesis of vitamin B₁₂ in the rumen of a ruminant animal is copper.
- 1.4.4 A feed flow program is based on the temperature requirements of animals in the herd and the availability of feed components for the optimum production.
- 1.4.5 If the semen for Artificial Insemination (AI) is to be stored for a short period such as few days, the sample must be stored at a temperature of -196 °C. (5 x 1) (5)

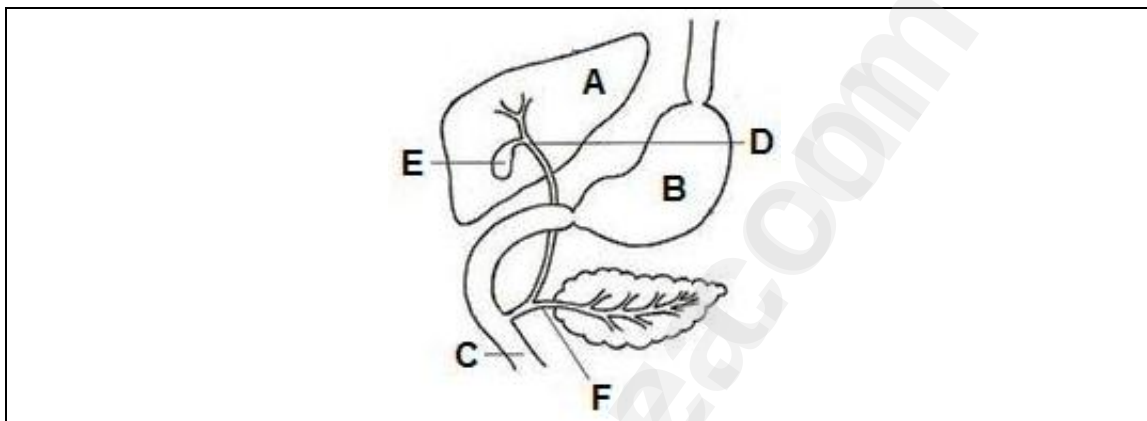
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

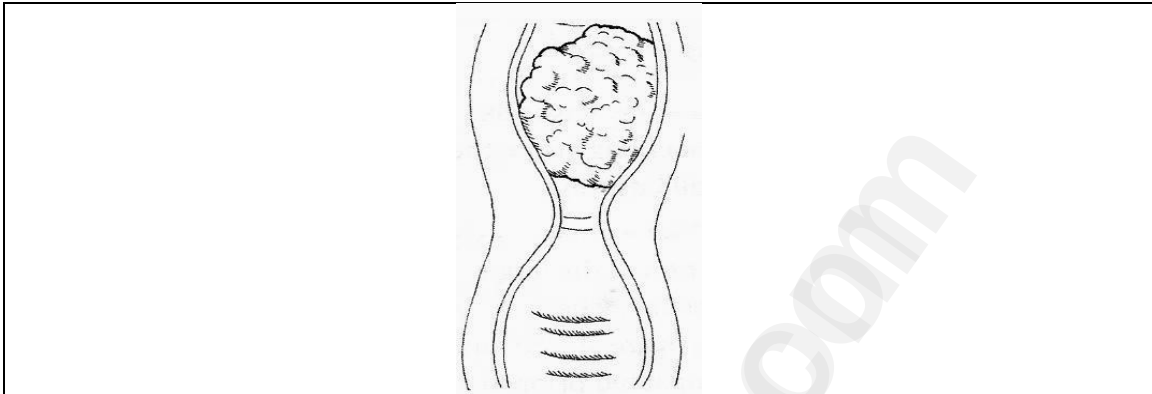
QUESTION 2: ANIMAL NUTRITION

- 2.1 The diagram below illustrates the organs responsible for the secretion of digestive juices.



- 2.1.1 Suggest the name of the farm animal which is associated with the organs of secretion above. (1)
- 2.1.2 Justify the answer given in QUESTION 2.1.1 above. (2)
- 2.1.3 Identify the digestive juices secreted in the organs represented by the letters A, B and C. (3)
- 2.1.4 State ONE common characteristic that binds the digestive juices in liver and pancreas. (1)

- 2.2 The oesophagus (gullet) is a tube-like structure that leads from the back of the throat (pharynx) to the stomach and provides the pathway for the food movement. Analyse the following structure and answer the questions that follow.



- 2.2.1 What process is depicted by the illustration above? (1)
- 2.2.2 Briefly explain the process you have mentioned in QUESTION 2.2.1. (2)
- 2.2.3 The process shown above can be reversed by the body of an animal. Supply the name of the reverse process. (1)
- 2.3 The data below represents selected feeds for animal nutrition:

FEEDS	PROTEIN CONTENT (%)	CARBOHYDRATE CONTENT (%)	METABOLIC ENERGY (%)
Silage	24,7	26,2	8,4
Carcass meal	79,4	0,0	9,4
Groundnuts oil cake meal	56,0	19,5	10,6
Lucerne hay	13,9	38,4	7,3
Maize meal	10,6	3,8	13,4
Veld grass	6,9	40,3	9,8

- 2.3.1 Suggest the feed that will be the most suitable for production. Support your answer. (2)
- 2.3.2 Deduce the reason for the highest metabolic energy in maize meal. (2)
- 2.3.3 Identify TWO feeds that are the best examples of protein-rich concentrates. (2)
- 2.3.4 Name the group or type of feed to which silage belongs. (1)
- 2.3.5 Ruminants can utilise and digest veld-grass more than the non-ruminants. Justify this statement. (2)

- 2.4 During the digestive process, feed that is taken in by an animal is usually digested and absorbed through the villi and later used for body functions. In an experiment conducted by a farmer, a cow eats 30 kg of hay with a moisture content of 20%. 14 kg of manure was excreted with a moisture content of 40%.

2.4.1 Use the appropriate formula to calculate the digestibility co-efficient of this feed. Show all your calculations. (4)

2.4.2 Indicate the part of the digestive tract in which villi can be found. (1)

- 2.5 The animal nutritionist on a dairy farm was requested to come up with a balanced ration for lactating cows using the following feeds:

REQUIRED DIGESTIBLE PROTEIN VALUE (DP)	FEED	DIGESTIBLE PROTEIN VALUE (DP) %
17%	A	24
	B	31

2.5.1 Determine the ratio at which feed A and B should be mixed to realise the required digestible protein value by using the Pearson square method. (4)

2.5.2 Calculate the percentage of feed B that should be added to the feed mixture to get the desired digestible protein in the ration of the cows. Show ALL your calculations. (2)

- 2.6 Biological value indicates the quality of protein in a feed.

2.6.1 Briefly explain the reason why the biological value of animal protein is higher than that of plant protein. (2)

2.6.2 Indicate TWO important functions of proteins in the animal body. (2)

[35]

Start this question on a NEW page

QUESTION 3: ANIMAL PRODUCTION

3.1 Read the following scenario of two dairy farmers.

Farmer A operates a farm on a small scale in the rural area of the country. The farm is approximately 20 hectares with 50 cows. The animals are milked by the herd boys using limited resources. Milking is done inside the kraal where the cows can be handled calmly. Farmer B on the other side operates a large dairy production with about 1 600 cows. Farm B is situated in the Free State area and the milking facilities are equipped with the latest technology for environmental control such as ventilation to ensure an optimum production level.

- 3.1.1 Which farmer from the scenario above uses indigenous knowledge when milking the cows? Justify your answer. (2)
- 3.1.2 The milking in Farmer A's farm is done inside the kraal where the cows can be handled calmly. Identify any TWO types of equipment that can be used to handle farm animals. (2)
- 3.1.3 Explain the term *optimum production*. (2)
- 3.1.4 Suggest the name of the first milk produced by the cows with a lot of nutrients for the calf. (1)
- 3.1.5 Predict the effect of extreme temperatures on feed intake by animals. (2)
- 3.2 Farm animals are taken from different farms when they are transported to the abattoir for slaughtering.
- 3.2.1 Indicate TWO requirements for the movement or the transportation of animals on public roads as required by the government regulation or legislation. (2)
- 3.2.2 Design a simple sample of an expected permit when transporting farm animals. (4)

- 3.3 The following pictures illustrate two production systems. PICTURE A shows cattle ranching enterprise and PICTURE B shows a piggery unit.



- 3.3.1 Indicate the farming enterprise from the pictures above (A or B), which has the highest risk factor with regard to climate. Justify your answer. (2)
- 3.3.2 Identify the system of production represented by PICTURE B and support your answer. (2)
- 3.3.3 Tabulate TWO differences between the production systems illustrated above. (2)
- 3.4 The table below shows the production of eggs in the egg laying enterprise for a period of nine months:

MONTHS OF THE YEAR	NUMBER OF EGGS PRODUCED
Jan	500
Feb	550
Mar	520
Apr	490
May	460
Jun	430
Jul	300
Aug	280
Sep	260

- 3.4.1 Draw a bar graph to represent the number of eggs produced over the period of nine months. (5)
- 3.4.2 Calculate the Mean value of the data provided in the table above and show all your calculations. (3)

- 3.5 There are different factors that determine animal behaviour. Name TWO of these factors. (2)
- 3.6 The following are some of the activities that are taking place as early as two weeks after lambing.

Docking;	Castration;	Tattoo;	Dosing
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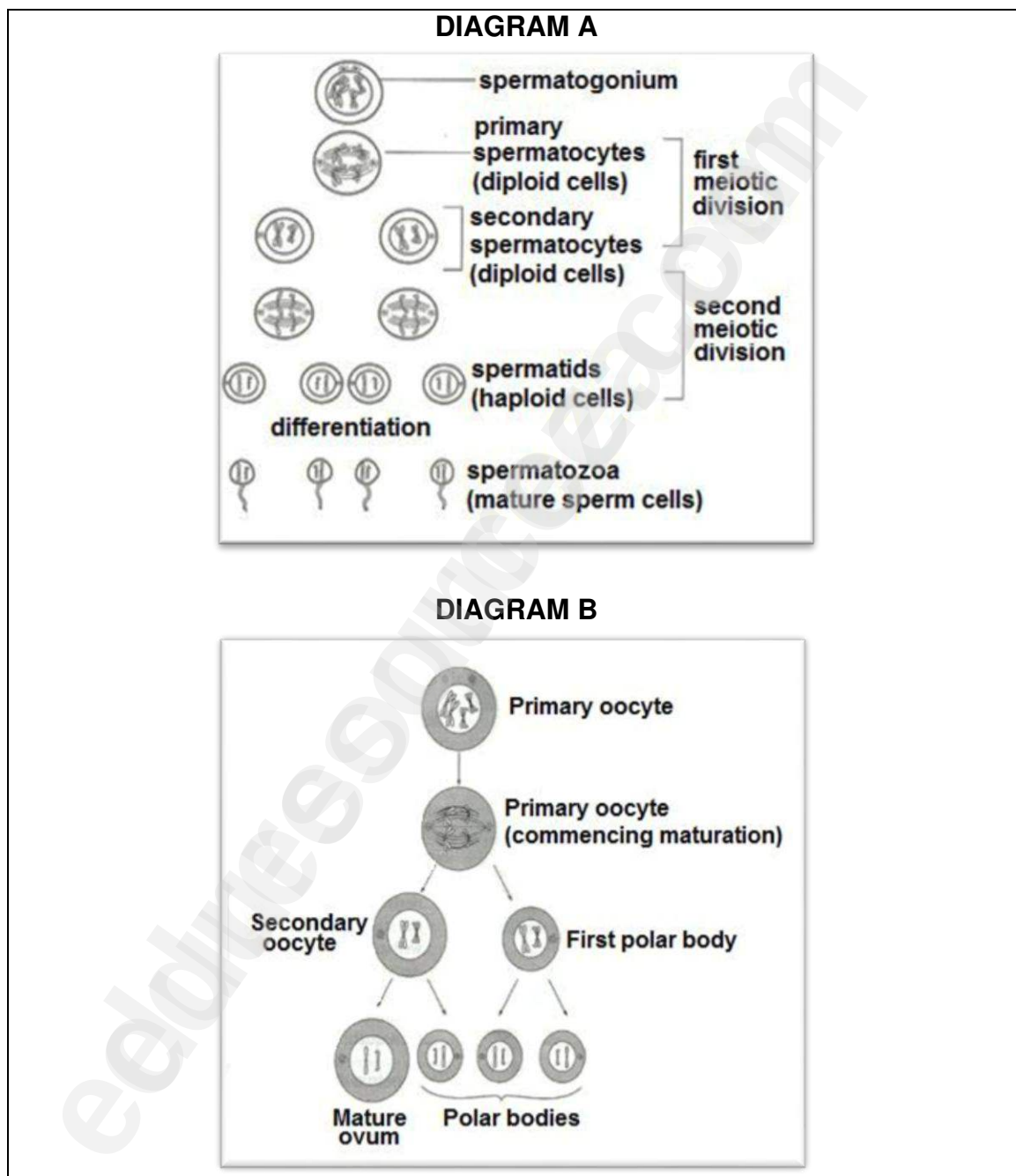
Choose an activity from the list above that is best associated with each of the following statements:

- 3.6.1 This is used to identify the lamb among others when they are grazing in the veld. (1)
- 3.6.2 The male lamb can quickly grow and become heavier after the operation has been done. (1)
- 3.6.3 Sheep blowflies can be hindered from attacking the sheep genitals through this activity. (1)
- 3.6.4 Internal parasites can easily be killed if the instructions are carefully followed in this activity. (1)
- [35]**

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QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

- 4.1 The illustrations below show the processes of the primary reproduction that takes place in animals.

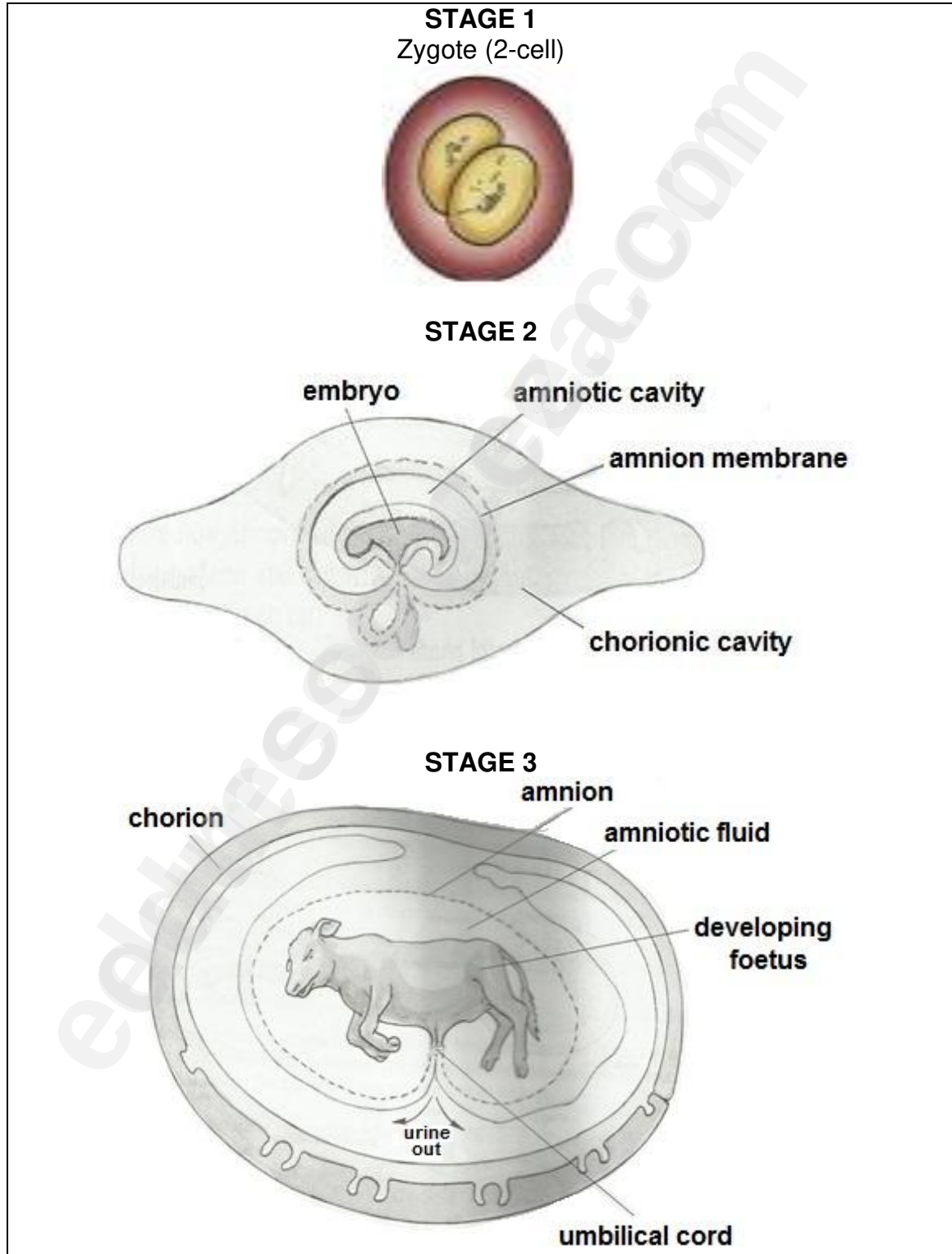


- 4.1.1 Identify the processes represented by the diagrams (**A** and **B**) shown above. (2)
- 4.1.2 Name the organs in male and female animals where these processes (**A** and **B**) are taking place. (2)
- 4.1.3 Tabulate any TWO congenital defects that can complicate the smooth running of the processes illustrated above. (2)

4.1.4 Which type of cell division contributes mostly during the formation of these processes? (1)

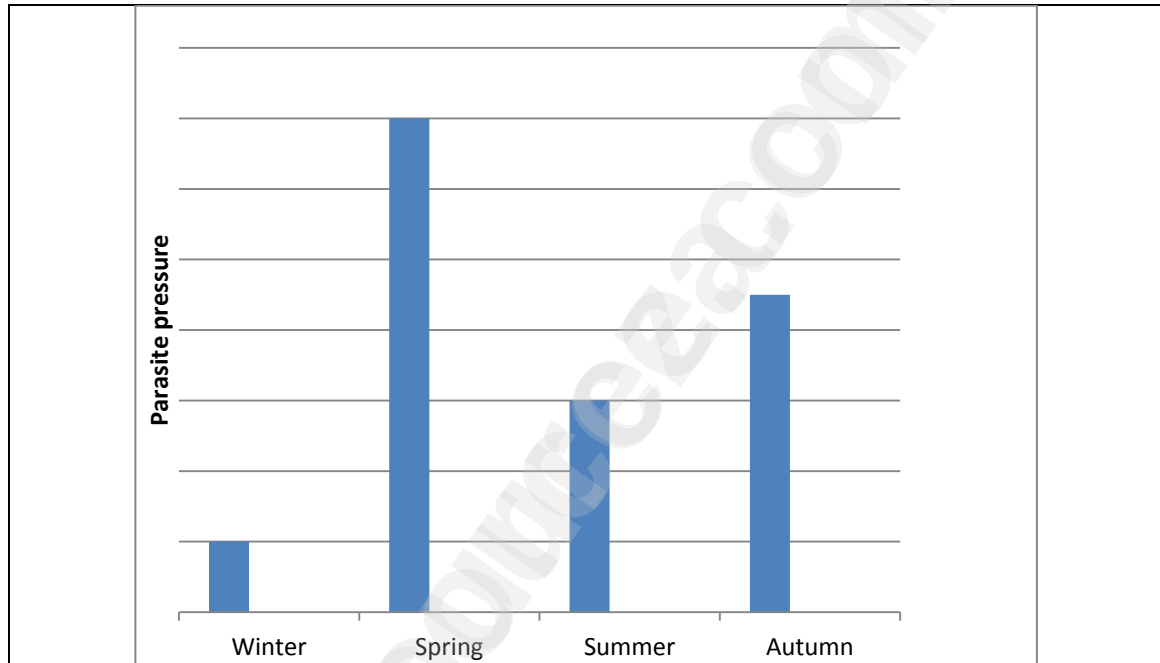
4.1.5 Compare the TWO processes represented by **A** and **B** above. (2)

4.2 Analyse the illustrations below and answer the questions that follow.



- 4.2.1 Tabulate the differences between the three stages of foetal development depicted in the illustrations above. (3)
- 4.2.2 Mention any THREE signs of parturition in cows. (3)
- 4.2.3 Explain how the identical twins and the fraternal twins are formed during the fertilisation process. (4)

- 4.3 The graph below indicates the seasonal trends in the occurrence of parasites that vary with regard to season and the management thereof.

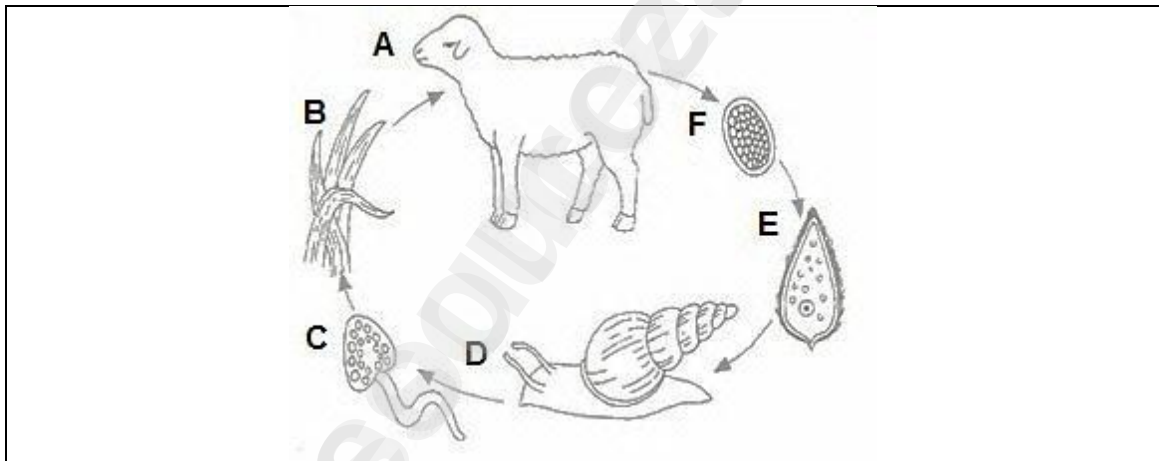


- 4.3.1 Identify the season with the highest parasite infestation and give the reason for that. (3)
- 4.3.2 Suggest any TWO good herd management practices that may lead to less parasite infestation. (2)
- 4.3.3 Indicate the season with the lowest parasite pressure. (1)
- 4.3.4 Briefly outline the negative effect of tapeworms on an animal body. (2)

- 4.4 Ticks cause harm to animals by sucking blood from them and transmitting diseases. Farmers need to know the life cycle and habits of ticks in order to control them successfully. Ticks occur mainly in warmer regions of the country. Some varieties, such as blue ticks are found in nearly all parts of South Africa. The blue tick is the major carrier of red water and gall sickness in cattle. They are specialising in damaging the skin of an animal. They can also easily affect the teats on the udder of an animal if drastic steps are not taken which can lead to the sudden drop in milk production of the lactating cows.

- 4.4.1 What type of parasites do ticks belong to? Justify your answer by choosing a statement in the scenario which relates to that. (2)
- 4.4.2 Briefly explain how ticks can be controlled. (1)
- 4.4.3 Identify a protozoan disease that can be caused by ticks. (1)

- 4.5 The illustration below shows the life cycle of a fluke worm found on different host animals and where it feeds, falls and moults.



- 4.5.1 Provide labels for letters **A**, **B**, **C** and **F**. (4)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

ANSWER SHEET: AGRICULTURAL SCIENCES P1**NAME AND SURNAME:** _____**SECTION A****QUESTION 1.1**

1.1.1	A	B	C	D
1.1.2	A	B	C	D
1.1.3	A	B	C	D
1.1.4	A	B	C	D
1.1.5	A	B	C	D
1.1.6	A	B	C	D
1.1.7	A	B	C	D
1.1.8	A	B	C	D
1.1.9	A	B	C	D
1.1.10	A	B	C	D

(10x2) (20)

QUESTION 1.2

	ONLY A	ONLY B	BOTH A and B	None
1.2.1	A	B	C	D
1.2.2	A	B	C	D
1.2.3	A	B	C	D
1.2.4	A	B	C	D
1.2.5	A	B	C	D

(5x2) (10)

QUESTION 1.3

- 1.3.1 _____
- 1.3.2 _____
- 1.3.3 _____
- 1.3.4 _____
- 1.3.5 _____

(5x2) (10)

QUESTION 1.4

- 1.4.1 _____
- 1.4.2 _____
- 1.4.3 _____
- 1.4.4 _____
- 1.4.5 _____

(5x1) (5)

