

EXAMINATION		NATIONAL SENIOR CERTIFICATE	
GRADE		12	
DATE		MAY/JUNE 2024	
SUBJECT		AGRICULTURAL SCIENCES	
PAPER		1	
MARK TOTAL		150	
DURATION (HOURS)		2½	
NUMBER OF PAGES		15	



SOUTH AFRICAN COMPREHENSIVE ASSESSMENT INSTITUTE
SUID-AFRIKAANSE KOMPREENSIEWE ASSESSERINGSINSTITUUT



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 you answer only what is asked.
6. Number the answers according to the numbering system used in this question paper.
7. Place your answer sheet for SECTION A (QUESTION 1) inside your **ANSWER BOOK**.
8. Write neatly and legibly in **BLUE** pen only.
9. A non-programmable calculator can be used.
10. Show **ALL** calculations.



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) on the correct letter next to the question number (1.1.1 – 1.1.10) on the attached **ANSWER SHEET** for example:

1.1.1	A	B	C	D
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- 1.1.1 The stomach compartment of the ruminant animal that corresponds to the glandular stomach of the pig is the ...
- A. abomasum.
 - B. omasum.
 - C. rumen.
 - D. reticulum. (2)
- 1.1.2 ... secrete mucus in the duodenum that protects the duodenum from the acidic chyme.
- A. Islets of Langerhans
 - B. Brunner glands
 - C. Parotid glands
 - D. Glands of Lieberkühn (2)
- 1.1.3 All protein sources are evaluated by comparing them with ...
- A. incomplete proteins.
 - B. plant proteins.
 - C. ideal protein.
 - D. non-essential amino acids. (2)
- 1.1.4 Urea is a ... substance that is added to a ration to supplement the protein component of the feed.
- A. nitrogenous
 - B. non-nitrogenous
 - C. non-protein nitrogenous
 - D. protein nitrogenous (2)
- 1.1.5 In an intensive animal production unit ...
- A. more labourers are employed per unit of production output.
 - B. a large area of land with a low production output is used.
 - C. mechanisation and other technology are NOT important.
 - D. environmental control and management are very important. (2)



- 1.1.6 Prior to mating, it is common practice in the sheep farming sector to supplement feed ewes to increase ovulation rate, which is known as ...
- A. cafeteria style.
 - B. creep feeding.
 - C. flushing.
 - D. dosing. (2)
- 1.1.7 A labour-saving feeding method that allows animals, including pigs, poultry and dairy cows to feed themselves to dry food, minerals, and concentrates and eat as much as they like.
- A. Dosing
 - B. Soil sod
 - C. Ad lib
 - D. Injection (2)
- 1.1.8 Equipment used to restrain a large ruminant to administer medication:
- A. Crush
 - B. Kraal
 - C. Catchment camp
 - D. Grazing camp (2)
- 1.1.9 A single duct that extends from the junction of the ampullae to the end of the penis and serves as an excretory duct for both urine and semen:
- A. Prostate
 - B. Vas deferens
 - C. Seminal vesicles
 - D. Urethra (2)
- 1.1.10 The CORRECT sequence of the reproductive stages:
- A. Fertilisation; gestation; birth; lactation.
 - B. Birth; fertilisation; gestation; lactation.
 - C. Lactation, fertilisation; gestation; birth.
 - D. Gestation, lactation, fertilisation; birth. (2)

(10 x 2) = [20]

1.2 In the table below, a description and **TWO** possible answers are given. Indicate whether the description in **COLUMN B** applies to **A ONLY**, **B ONLY**, **BOTH A and B** or **NONE** of the items in **COLUMN A** and make 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
A	Maize meal	An example of a concentrate that is rich in protein.
B	Bone meal	

Answer:

The statement refers to:			
A ONLY	B ONLY	BOTH	NONE
	X		

COLUMN A			COLUMN B
1.2.1	A	Diffusion	Passive absorption of volatile fatty acids through the rumen wall.
	B	Osmosis	
1.2.2	A	Bile	Liver secretion.
	B	Heparin	
1.2.3	A	Large scale production system	A farming system used to produce food mainly for the family.
	B	Intensive system	
1.2.4	A	Dosing	Administering medicine for the treatment of external parasites.
	B	Spraying	
1.2.5	A	Abortion	Termination of pregnancy before its normal term with the expulsion of a visible foetus.
	B	Maceration	

(5 x 2) = [10]



1.3 Give the **CORRECT AGRICULTURAL TERM** for each of the following descriptions. Write only the term next to the question number (1.3.1 – 1.3.5) on the attached **ANSWER SHEET**, for example, **1.3.6 Bile**.

1.3.1 Feeds with a small volume per unit of mass and a high nutritive value.

1.3.2 A structure built by farmers, for example a shed, that offers shade and shields livestock from wind, rain, and cold.

1.3.3 The structure that develops on the ovary in place of a burst follicle.

1.3.4 When a male animal is interested in a female animal but lacks the ability to serve and fertilise the female.

1.3.5 The hormone in cows responsible for udder and milk production.

(5 x 2) = [10]

1.4 Change the **UNDERLINED WORD(S)** in each of 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 Volatile fatty acids are organic compounds forming the building blocks of protein and cannot be synthesized by animals.

1.4.2 Ectothermic animals maintain a constant body temperature even though the environmental temperature may vary.

1.4.3 Bulls, rams and boars have a urethra, an S-shaped bend in the penis which permits it to be retracted completely into the body.

1.4.4 Seminal vesicle transports sperm cells from the epididymis to the urethra.

1.4.5 Mummification is the condition where the vagina protrudes beyond the vulva, leading to infection.

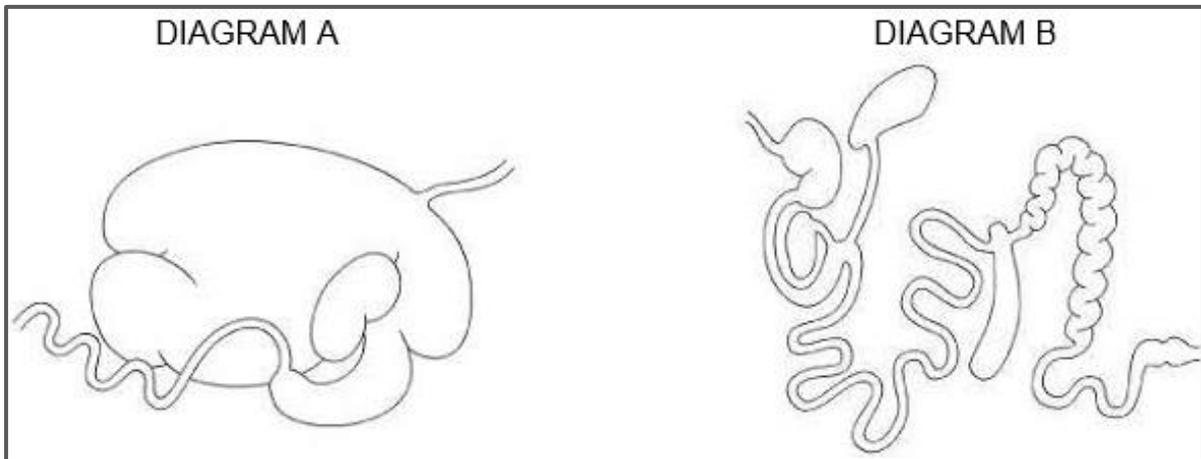
(5 x 1) = [5]

TOTAL SECTION A: [45]

SECTION B

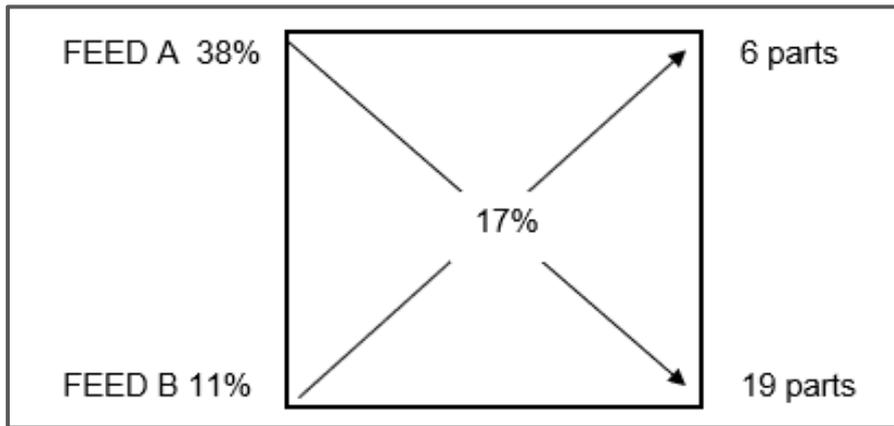
QUESTION 2: ANIMAL NUTRITION

2.1 The diagrams below show the alimentary canals of farm animals:



- 2.1.1 Classify the **TWO** animals represented by **DIAGRAM A** and **DIAGRAM B** respectively. (2)
- 2.1.2 Name **TWO** adaptation features of the animal in **DIAGRAM A** that enables it to survive by feeding primarily on hay. (2)
- 2.1.3 Give a reason why the animal in **DIAGRAM B** cannot be fed a ration that is high in crude fibre content. (1)
- 2.1.4 Explain how the animal in **DIAGRAM A** benefits from the consumption of a non-protein nitrogenous substance such as urea. (2)

2.2 Two feeds (maize meal and sunflower oilcake meal) are mixed to obtain a ration with the desired protein content.



2.2.1 Indicate the parts of the ration that represent maize meal and sunflower oilcake meal. (2)

2.2.2 Calculate the percentage of **feed B** in the mixture. Show **ALL** calculations. (3)

2.2.3 Calculate the quantity of maize meal (in kg) in 450kg of mixture. Show **ALL** calculations. (2)

2.3 The table below shows the mineral deficiency symptoms, methods of supplementing and the types of animal affected.

MINERAL DEFICIENCY SYMPTOM	METHOD OF SUPPLEMENTATION	ANIMAL INFECTED
A	Intravenous injection with calcium borogluconate	Dairy cows
B	C	Pigs in cement pigsty
Wasting disease	D	Cattle

2.3.1 Supply the missing information for **A**, **B**, **C** and **D** in the table shown above. (4)

2.4 The data below shows how much daily metabolic energy is needed to maintain cows at their live weight.

LIVE WEIGHT OF COW(KG)	METABOLIC REQUIREMENT IN (MJ/DAY)
300	12
350	15
400	22
450	32
500	45
550	55

2.4.1 Draw a line graph with the above information to represent it in a line graph. (6)

2.4.2 Deduce the trend of metabolic requirement per live weight of a cow. (2)

2.4.3 Calculate the metabolic energy requirement for the maintenance of a cow with a live weight of 400kg in 5 days. (2)

2.4.4 Name TWO reasons why it is important to calculate the energy value of feed. (2)

2.5 Vitamin deficiencies in farm animals may occur when there is not enough pasture during winter months.

2.5.1 For each of the following symptoms, name the vitamin which is deficient:

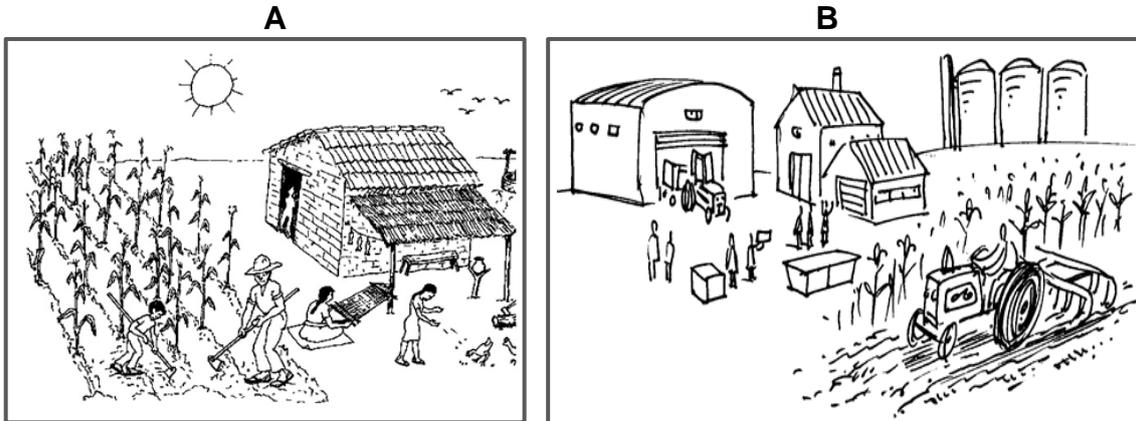
- a) Rickets in young animals and osteomalacia in adult animals.
- b) Poor night vision.
- c) Curled toe paralysis in chickens. (3)

2.5.2 Give TWO methods how vitamin deficiencies can be supplemented. (2)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Farming systems are classified by their nature and quantity of outputs.



3.1.1 Identify the two types of farming systems labelled **A** and **B** above. (2)

3.1.2 Give a definition for the farming system labelled **A**. (2)

3.1.3 Explain FOUR advantages of the farming system labelled **B**. (4)

3.1.4 Evaluate system **A** and give a reason why a smaller number of people are interested in using this type of system. (2)

3.2 Free range dairy production is one of the oldest forms of agriculture in South Africa. Pictures A and B represent free range and dairy shed feeding respectively.

PICTURE A



PICTURE B



3.2.1 Tabulate TWO differences between the production systems labelled **A** and **B** above. (4)

3.2.2 Briefly discuss FOUR main conditions which affect or influence milk yield of dairy cows. (4)

3.2.3 Suggest THREE factors which cause dairy farmers to leave the dairy production industry. (3)

3.3 Read the following case study and answer the questions that follow:

It is simpler to handle cattle effectively the better the beef cattle farmer understands them. Therefore, understanding animal psychology is crucial for farmers who raise beef cattle. With a very narrow margin of error, beef cattle farmers who have studied animal psychology will be familiar with the behaviour of their animals and able to predict it in a given set of circumstances.

3.3.1 Briefly describe FOUR basic principles in handling beef cattle. (4)

3.3.2 Livestock handling facilities should be well constructed to make management of animals easier.

Discuss each of the following which should be taken into consideration when designing and building handling facilities for beef cattle:

- a) Location
- b) Materials

(2 x 2) = (4)

3.4 External parasites can have large economic losses as result. Study the photographs below and answer the questions.

PHOTOGRAPH A



PHOTOGRAPH B



3.4.1 Identify the disease in photograph A. (1)

3.4.2 Identify the organism responsible for the disease. (1)

3.4.3 The disease identified in QUESTION 3.4.1 is a 'notifiable disease'. Explain what a notifiable disease means. (2)

3.4.4 The organism identified in Question 3.4.2 is host specific. Discuss this statement. (2)

[35]

QUESTION 4: ANIMAL REPRODUCTION

4.1 Match the following organs or accessory glands with the descriptions that follows:

scrotum	prostate gland	testes
epididymis	Cowper's glands	

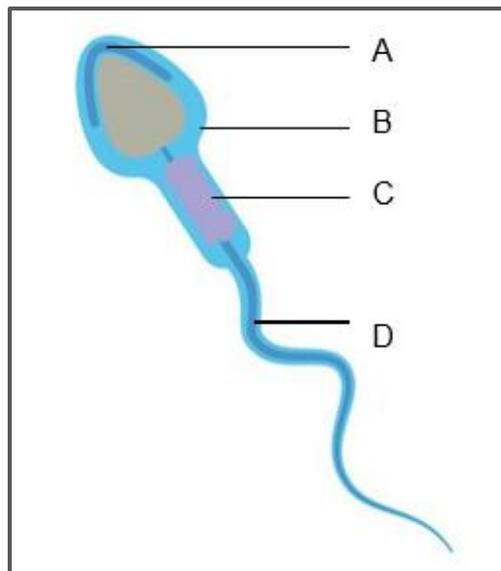
4.1.1 Surrounds the urethra completely. (1)

4.1.2 Produces the male sex hormone, testosterone. (1)

4.1.3 Sperms reach maturity and are being stored here. (1)

4.1.4 Located at the base of the penis on either side of urethra and secrete and alkaline fluid that cleans the urethra. (1)

4.2 The diagram below represents a gamete.

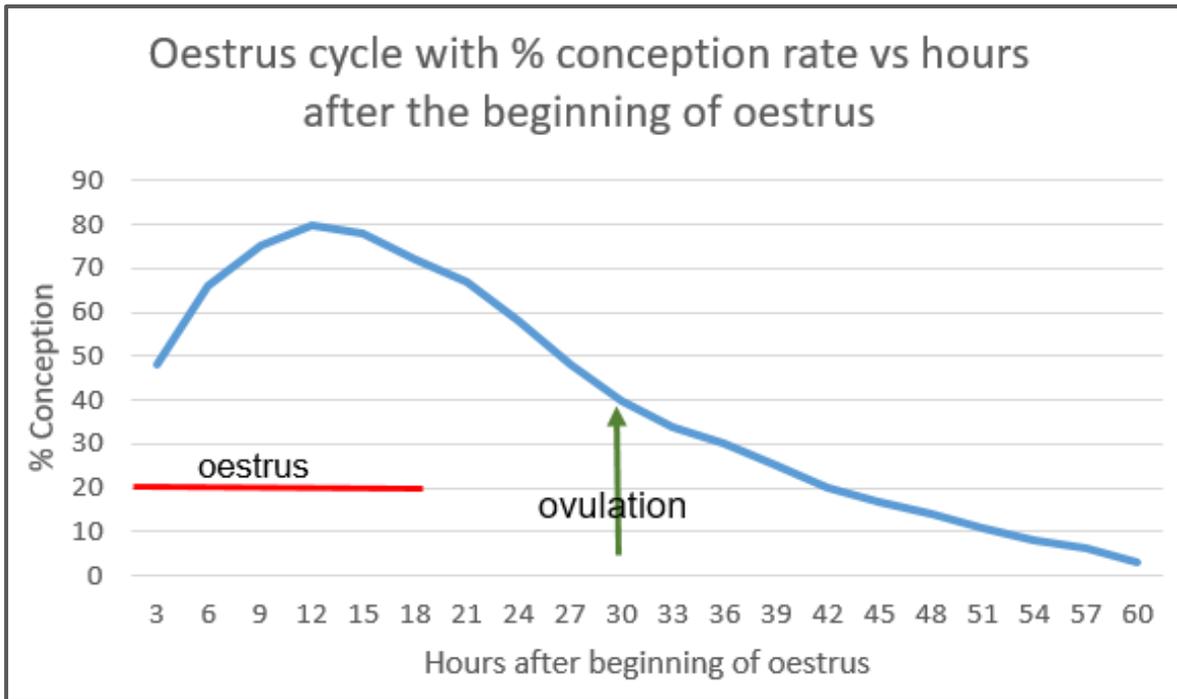


4.2.1 Identify **C** and **D** in the diagram above. (2)

4.2.2 Describe how part **A** enables the cell to penetrate the ovum. (2)

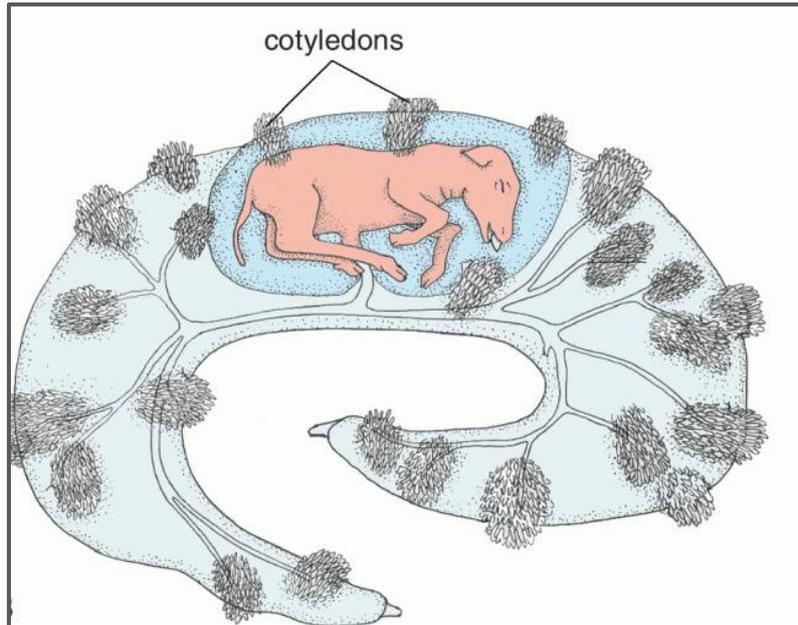
4.2.3 Name the process that leads to the formation of the cell above. (1)

4.3 Study the graph on oestrus cycle below and answer the questions that follow:



- 4.3.1 Define 'oestrus'. (2)
- 4.3.2 According to the graph deduce when the best time will be to do artificial insemination. (2)
- 4.3.3 Indicate the time duration a cow will be in oestrus. (2)
- 4.3.4 Explain FOUR signs you need to observe to confirm a cow is in season for AI purposes. (4)

4.4 Membranes develop around the embryo while it is attached to the uterus wall.



4.4.1 Name the THREE membranes that surrounds the embryo. (3)

4.4.2 Give the TWO functions of the membranes around the embryo (2)

4.4.3 Birth or parturition is at the end of the pregnancy.
Supply a description for each stage of parturition (birth):
First, second and third stage. (6)

4.4.4 Dystocia or difficult birth may have different causes.
Give an example of dystocia with:

- a) Maternal origin
- b) Foetal origin

(1 x 2) = (2)

4.5 The period from calving until the udder is dry is called the lactation period.

4.5.1 List THREE of the nutrients that make colostrum richer than milk. (3)

[35]

TOTAL SECTION B: [105]

GRAND TOTAL: [150]

ANSWER SHEET: AGRICULTURAL SCIENCES PAPER 1

[ATTACH TO ANSWER BOOK]

SECTION A

TOTAL SECTION: 45

EXAMINATION NUMBER:

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ID NUMBER:

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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

(10 × 2 = 20)

QUESTION 1.2

	Only A	Only B	BOTH	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

(5 × 2 = 10)

QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 × 2 = 10)

QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 × 1 = 5)

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