

GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

AGRICULTURAL SCIENCE HG

OCTOBER / NOVEMBER 2005
OKTOBER / NOVEMBER 2005

TIME: 3 hours

MARKS: 400

REQUIREMENTS:

- An approved (non-programmable) scientific calculator

INSTRUCTIONS:

- All questions are **COMPULSORY**.
- Answer all questions in your answer book.
- Read the questions carefully. Make sure that you understand what is asked.
- Number your answers correctly according to the numbering system on the question paper.
- Work neatly.
- Write your examination number on the cover of your answer book.

SECTION A

QUESTION 1A
MULTIPLE-CHOICE QUESTIONS

Several possible answers are given to each of the following statements or questions (1.1 – 1.20), of which only **ONE** is correct. Indicate the correct answer by drawing a cross (**X**) over the corresponding letter next to the question number on the **answer sheet** on the **inside cover** of your **answer book**, e.g.

1.21

A	B	C	D
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1.1 Regional and farm planning cannot be done without the help of _____.

- A. farmers
- B. computers
- C. aerial photographs
- D. soil surveys

- 1.2 The dominant factor which determines whether a region is suitable for the cultivation of a particular crop is the _____.
- A. climate
 - B. soil
 - C. farmer
 - D. terrain
- 1.3 The feed protein with the highest biological value of all feed proteins is _____.
- A. fishmeal
 - B. bonemeal
 - C. beef
 - D. egg
- 1.4 The major function of protein in the animal body is to promote _____.
- A. digestion
 - B. health
 - C. energy
 - D. growth
- 1.5 The process of oxidation of carbohydrates together with the release of CO₂ and H₂O and energy for metabolism is called _____.
- A. transpiration
 - B. photosynthesis
 - C. respiration
 - D. glycolysis
- 1.6 The foundation of the extensive cattle industry is _____.
- A. cultivated pastures
 - B. natural veld
 - C. trees and shrubs
 - D. grain production
- 1.7 An important requirement for the registration of a pesticide is its _____.
- A. degradability
 - B. period of activity
 - C. toxicity
 - D. None of the above.

- 1.8 Which one of the following organic compounds will decay the slowest in soil?
- A. Fatty acids
 - B. Fats
 - C. Proteins
 - D. Lignin
- 1.9 Pregnancy starts with fertilisation and ends with calving after approximately _____ days.
- A. 270
 - B. 262
 - C. 282
 - D. 295
- 1.10 A physiological factor which causes low fertility in breeding stock is _____.
- A. defective ovulation
 - B. injuries
 - C. difficulty in producing milk
 - D. deviation from normal routine
- 1.11 The sticky liquid which serves as a source of energy for the sperms is secreted by the _____.
- A. prostate
 - B. gland of Cowper
 - C. vesicular glands
 - D. testes
- 1.12 The enzyme which digests _____ is normally released only by microbes in the rumen.
- A. glycogen
 - B. protein
 - C. lipids
 - D. cellulose
- 1.13 The cheapest source of animal feed for the production of wool and meat is _____.
- A. crop production
 - B. natural veld
 - C. cultivated grazing
 - D. animal products

- 1.14 Bile is formed in the _____.
- A. gall bladder
 - B. kidneys
 - C. stomach
 - D. liver
- 1.15 Which one of the following is used as a source of energy and for isolation in the animal body?
- A. Proteins
 - B. Carbohydrates
 - C. Lipids
 - D. Vitamins
- 1.16 A figure of 8,5 on the pH-scale shows that soil is _____.
- A. very acidic
 - B. slightly alkaline
 - C. very alkaline
 - D. slightly acidic
- 1.17 The type of labour usually used to shear sheep is _____ labour.
- A. casual
 - B. seasonal
 - C. student
 - D. permanent
- 1.18 The type of marketing which is not influenced by the state or any other organisation, is called _____ marketing.
- A. cooperative
 - B. one-channel
 - C. free
 - D. controlled
- 1.19 The increasing scarcity of farm labour is a result of _____.
- A. competition from industries
 - B. political instability
 - C. poor labour management
 - D. a lack of training facilities
- 1.20 Which one of the following concepts does NOT fit?
- A. Undertaker / Entrepreneur
 - B. Capital
 - C. Planning
 - D. Labour

20x2=[40]

QUESTION 1B

Select the **term** in **COLUMN B** which can be best associated with the **disease** in **COLUMN A**. Write down only the letter (A – L) opposite the question number in your answer book.

COLUMN A		COLUMN B	
1.21	Keratomalaise	A	Vitamin B ₁
1.22	Rickets	B	Phosphorus
1.23	Blood clotting	C	Vitamin D
1.24	Fertility	D	Copper
1.25	Polyneuritis	E	Vitamin B ₁₂
1.26	Curled-toe paralysis	F	Iron
1.27	Pica	G	Cobalt
1.28	Anaemia	H	Vitamin A
1.29	Swayback	I	Vitamin E
1.30	Wasting disease	J	Iodine
		K	Vitamin B ₂
		L	Vitamin K

10x2=[20]

QUESTION 1C

Give ONE word for each of the following statements.

- 1.31 Oval-shaped plastids in the green leaves of plants
- 1.32 Colour pigments in fruit or flowers
- 1.33 The reduced co-enzyme which is formed during photosynthesis
- 1.34 The most important disaccharide which occurs in the higher plants
- 1.35 A form of radiant energy
- 1.36 The amorphous colloid with the greatest specific surface area
- 1.37 The cation associated with soil acidity
- 1.38 Excess glucose which is stored in the liver
- 1.39 Fruit development which takes place without a stimulus provided by pollination
- 1.40 The formation and development of fruit from flowers

10x2=[20]

QUESTION 1D

Fill in the missing word(s). Write only the correct answer next to the question number in your answer book.

- 1.41 The enzyme in saliva is _____. (2)
- 1.42 Pepsinogen changes _____ and _____ to peptides. (4)
- 1.43 Lipase changes fats to _____ and _____. (4)
- 1.44 Hydrochloric acid changes _____ to _____ and fructose. (4)
- 1.45 Bile activates _____. (2)
- 1.46 Trypsinogen changes _____ and _____ to peptides. (4)

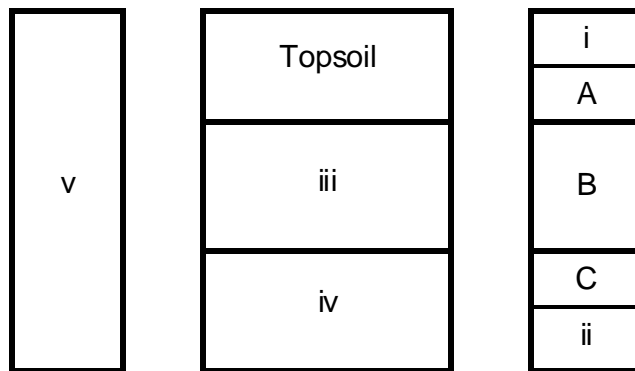
[20]

TOTAL FOR SECTION A: [100]

SECTION B

QUESTION 2

- 2.1 Study the diagram below which represents the major horizons of a soil and answer the questions that follow.



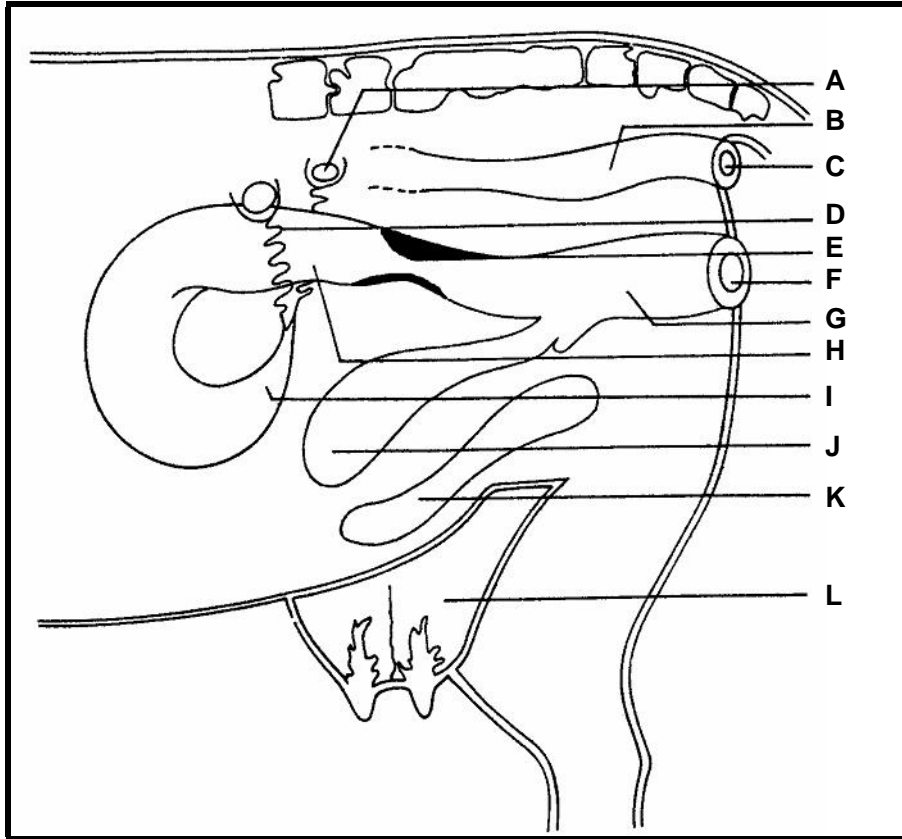
- 2.1.1 Write the numbers **i** to **v** below each other and indicate what each number represents. (5)
- 2.1.2 List **FOUR** factors which can change the above soil profile. (4)

- 2.1.3 Name the soil type that is characterised by the following soil profile:
- (a) A
R
- (b) B
C
- (c) O
G (6)
- 2.1.4 Which one of the A- and B-horizonts has the highest bulk density?
Substantiate your answer. (5)
- 2.2 Soil moisture
- 2.2.1 Name all the types of soil moisture that are not available to the plant,
and explain why the plant root cannot absorb this water. (6)
- 2.2.2 Explain FOUR measures which can be taken to reduce transpiration
losses. (8)
- 2.3 Discuss the physical influence of organic matter on soil. (8)
- 2.4 Labour
- 2.4.1 How can a farmer increase the productivity of his workers? (8)
- 2.5 Weathering of rocks
- 2.5.1 Which type of weathering would be dominant in warm humid regions? (2)
- 2.5.2 Give an example of weathering through water by hydrolysis. (4)
- 2.5.3 Which weathering process is responsible for the changing of hermatite
to limonite, and under which soil moisture conditions does it occur? (4)
- [60]**

QUESTION 3

3.1 Reproduction

3.1.1 Label the drawing of the reproductive system of a cow. (12)



3.1.2 Where does fertilisation take place in the cow? (2)

3.1.3 Which hormone is responsible for maintaining pregnancy? (2)

3.1.4 How many days after fertilisation does implantation occur? (2)

3.1.5 Name THREE muscles which assist with the expulsion of the foetus. (3)

3.1.6 Give the name of the hormone which is responsible for the powerful contraction of the above-mentioned muscles. (2)

3.2 Capital

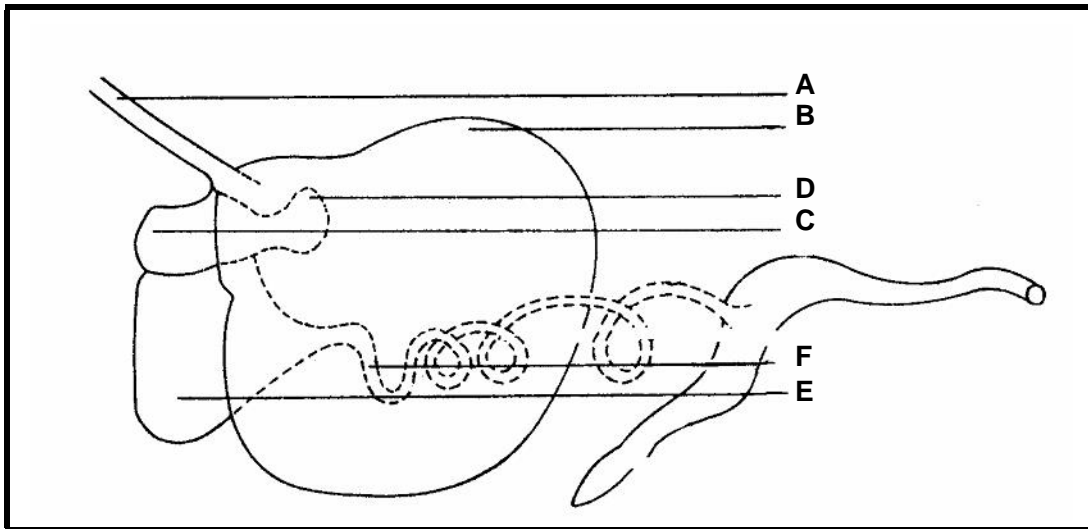
3.2.1 What is meant by the term **capital**? (2)

3.2.2 Distinguish between the various types of capital used in agriculture and give an example of each. (6)

- 3.3 Discuss the functions of soil. (8)
- 3.4 Natural pastures
- 3.4.1 List the FIVE pasture regions of Southern Africa. (5)
- 3.4.2 Discuss how pastures must be managed to maintain the maximum production of the pasture over a long period. (7)
- 3.4.3 List NINE advantages of hybrid power. (9)
- [60]**

QUESTION 4

- 4.1 Study the drawing below which represents the stomach of a ruminant and answer the questions that follow.



- 4.1.1 Identify parts **A – F**. (6)
- 4.1.2 In which part is hydrochloric acid secreted? (2)
- 4.1.3 Give the functions of hydrochloric acid. (5)
- 4.1.4 Name TWO enzymes in the digestive system of the ruminant which are secreted by the pancreas. (2)
- 4.1.5 Name the end product(s) of the digestion of
- (a) starch. (2)
 - (b) fats. (4)
 - (c) proteins. (2)
- 4.2 Name the properties of silage. (11)

- 4.3 If a feed has a TDN content of 72% and a digestible protein content of 12%, calculate the nutritive ratio of the feed and indicate whether the NR is wide or narrow. (5)
- 4.4 Marketing
- 4.4.1 Name the factors which hamper the marketing of agricultural products. (8)
- 4.5 Breeding
- 4.5.1 Mention the disadvantages of inbreeding. (7)
- 4.5.2 What is the genetic effect of cross-breeding? (2)
- 4.5.3 Mention the advantages of inbreeding. (4)
- [60]**

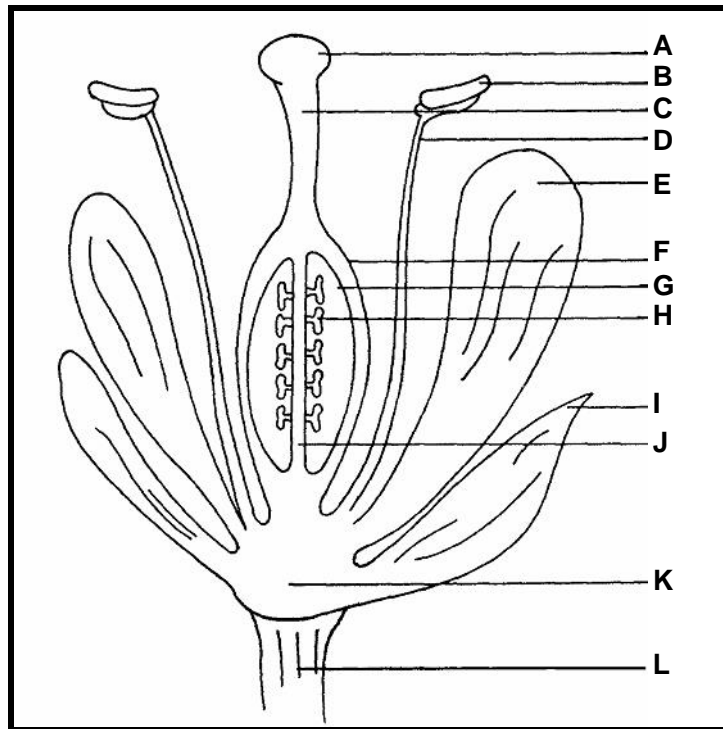
QUESTION 5

- 5.1 Indicate the most suitable fertiliser that would be recommended in each of the following cases:
- 5.1.1 Nitrogen fertiliser used as a leaf spray (2)
- 5.1.2 An alkaline soil with a deficiency in potassium (2)
- 5.1.3 An acid, sandy soil poor in nitrogen (2)
- 5.1.4 A soil with a low pH and a deficiency in magnesium (2)
- 5.1.5 A definite deficiency in the element copper in a peach orchard (2)
- 5.1.6 The simultaneous application of nitrogen and potassium by the use of irrigation water (2)
- 5.1.7 The application of nitrogen on a soil which has an a low pH (2)
- 5.2 Brack soil
- 5.2.1 Name FOUR physical signs of soil and plants which indicate that the soil is brack (alkaline). (4)
- 5.2.2 Explain the method used to reclaim an alkaline soil under irrigation if the soil analysis indicates an excessive amount of sodium salts adsorbed on the soil colloids. (6)

- 5.3 Discuss the requirements for photosynthesis. (10)
- 5.4 During a digestibility experiment a cow ate 15 kg of hay with a 10% moisture content and excreted 7 kg of manure with a moisture content of 20%. Calculate the digestive coefficient. (15)
- 5.5 Distinguish between the following fruits and give ONE example of each:
- 5.5.1 Multiple fruit (4)
- 5.5.2 Compound fruit (3)
- 5.5.3 Accessory fruit (4)
- [60]**

QUESTION 6

- 6.1 Discuss the dark phase in photosynthesis. (11)
- 6.2 6.2.1 Supply the sketch of the dicotyledonous flower with labels. (12)



- 6.2.2 Mention the functions of the different nuclei. (4)
- 6.2.3 Explain the difference between starch-free and starch containing seed. (4)

- 6.3 Discuss the advantageous effect of organic matter on soil. (10)
- 6.4 Mention the economic characteristics of soil. (7)
- 6.5 Mention the disadvantages of free marketing. (6)
- 6.6 Name SIX ways in which various agricultural practices can lead to the pollution of the environment. (6)

[60]

TOTAL FOR SECTION B: [300]

TOTAL: 400

END