

GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

AGRICULTURAL SCIENCE HG

FEB / MAR 2006

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

Various answers are given to each question (1.1 – 1.30), 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.:

1.31

A	B	C	D
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1.1 An example of working or floating capital could be _____.

- A. pastures
- B. cows
- C. fertilisers
- D. a windmill

- 1.2 Farmers can decrease the risk to their income by _____ certain capital items.
- A. selling
 - B. insuring
 - C. trading in
 - D. repairing
- 1.3 The first step in any process of planning as well as in farming is _____.
- A. problem solving
 - B. the formulation of objectives
 - C. the creation of capital
 - D. the collection of information
- 1.4 The amount of nitrogen (kg) in one 50 kg bag of (46%) urea is _____ kg N.
- A. 23
 - B. 46
 - C. 12
 - D. 30
- 1.5 A very important requirement when taking soil samples is that the sample must be _____.
- A. dry
 - B. very well mixed
 - C. representative
 - D. clearly labelled
- 1.6 The primary product of the process of photosynthesis is _____.
- A. sucrose
 - B. starch
 - C. glucose
 - D. cellulose
- 1.7 The micro-element copper is absorbed by the plant in the ionic form and can be applied to the soil in the form of _____.
- A. copper sulphate
 - B. copper chloride
 - C. copper oxichloride
 - D. borax

- 1.8 The male sex organ of the flower is represented by the _____.
- A. sepal corolla
 - B. petal corolla
 - C. stamen crown
 - D. receptacle
- 1.9 An example of a simple fleshy fruit is _____.
- A. an apricot
 - B. a strawberry
 - C. a fig
 - D. an apple
- 1.10 Dolomitic agricultural lime is applied to soils which are predominantly acidic and which are also poor in _____.
- A. Ca
 - B. Mg
 - C. K
 - D. Mn
- 1.11 The formation and development of fruit from flowers is called _____.
- A. fruit setting
 - B. flower formation
 - C. seed formation
 - D. ab lactation
- 1.12 The dominant factor which determines whether a region is suitable for the cultivation of a particular crop is the _____.
- A. climate
 - B. soil
 - C. vegetation
 - D. terrain
- 1.13 The aim in placing cover materials over the pipes of a pipe drain is to prevent drains from _____.
- A. washing open
 - B. breaking
 - C. silting up
 - D. weathering

- 1.14 The main aim of soil surveys is _____.
- A. optimal use of soil
 - B. provision of food
 - C. provision of fodder
 - D. classification of the soil
- 1.15 Starches are hydrolysed in the animal body to maltose by the action of the enzyme _____.
- A. maltase
 - B. amylose
 - C. lipase
 - D. lactose
- 1.16 The most important seat of water absorption of a plant root is the region of _____.
- A. cell division
 - B. elongation
 - C. growth
 - D. the root hair
- 1.17 Two elements important for stimulating the root development of plants are _____.
- A. Ca and P
 - B. P and K
 - C. Zn and Mn
 - D. Mn and Cu
- 1.18 The compartment of the compound stomach of the ruminant where true enzymatic digestion takes place, and which corresponds to the stomach of the pig, is the _____.
- A. rumen
 - B. reticulum
 - C. abomasum
 - D. omasum
- 1.19 Bile is a secretion of the _____.
- A. pancreas
 - B. small intestine
 - C. liver
 - D. villus

- 1.20 The following mineral elements will be found in relatively large quantities in the skeleton and teeth:
- A. Ca and Na
 - B. Ca and P
 - C. Zn and Ca
 - D. Mg and P
- 1.21 Lucerne hay is very rich in _____.
- A. carbohydrates and phosphates
 - B. fats and oils
 - C. protein and calcium
 - D. protein and magnesium
- 1.22 The female mating organ is the _____.
- A. vulva
 - B. cervix
 - C. penis
 - D. vagina (sheath)
- 1.23 The _____ will remain until the end of pregnancy.
- A. Graafian follicle
 - B. ovary
 - C. corpus luteum
 - D. medulla
- 1.24 The release of milk during the drinking action of the calf is due to the action of the hormone _____.
- A. oxytocin
 - B. prolactin
 - C. testosterone
 - D. oestrogen
- 1.25 Unless the animal is sick, or pregnant, or is experiencing other oppressive factors, oestrus will occur every _____ days in a sexually mature cow.
- A. 21
 - B. 19
 - C. 23
 - D. 30

- 1.26 The unification of the ovum and the sperm after mating in the cow takes place in the _____.
- A. Fallopian tube
 - B. uterine horns
 - C. uterine body
 - D. Graafian follicle
- 1.27 The primary sex organ of the bull is the _____.
- A. urethra
 - B. penis
 - C. testis
 - D. ovary
- 1.28 The soil fraction which has the smallest effect on the chemical properties of the soil is _____.
- A. sand
 - B. loam
 - C. the organic fraction
 - D. clay
- 1.29 The two most important factors which influence the field water capacity and wilting point of a soil, and also influence the accessibility of the soil water, are the _____ of the soil.
- A. texture and drainability
 - B. structure and percentage organic matter
 - C. structure and compaction
 - D. texture and structure
- 1.30 In Southern Africa, the soil that normally remains the coolest is that found on the _____ slope.
- A. southern
 - B. northern
 - C. eastern
 - D. western

30x2=[60]

QUESTION 1B

Complete each of the following statements by filling in the missing words. Write down only the question number and the answer in your answer book.

- 1.31 The colour of the soil is largely determined by the _____.
- 1.32 By structure of soil we understand the _____ of soil particles.
- 1.33 The term _____ is used to indicate the mass per unit volume.
- 1.34 In _____ one finds both free movement of air and seepage of water.
- 1.35 The upward motion of water from the soil water-table takes place according to the principles of _____.
- 1.36 Chymotrypsin is an enzyme which changes peptones to _____.
- 1.37 A phase during pregnancy when important systems, tissues and organs become differentiated is called the _____.
- 1.38 The dropping off of fruitlets or flowers is known as _____.
- 1.39 When fruit setting takes place without fertilisation it is known as _____.
- 1.40 _____ are organic substances which are secreted by endocrine glands. 10x2=[20]

QUESTION 1C

Match the **description** in **COLUMN A** with the **term** in **COLUMN B**. Write down only the numbers one below the other in your answer book and the correct letter next to each number.

COLUMN A		COLUMN B	
1.41	Protein molecule	A	Magnesium
1.42	Stimulates flowers	B	Iron
1.43	Activator of enzyme system	C	Lead
1.44	Chlorophyll molecule	D	Copper
1.45	Middle lamella	E	Zinc
1.46	Cysteine	F	Cobalt
1.47	Chlorosis	G	Potassium
1.48	Boiling water disease	H	Boron
1.49	Small leaf disease	I	Nitrogen
1.50	Internal corking	J	Calcium
		K	Sulphur
		L	Phosphorus

10x2=[20]

TOTAL FOR SECTION A: [100]

P.T.O.

SECTION B

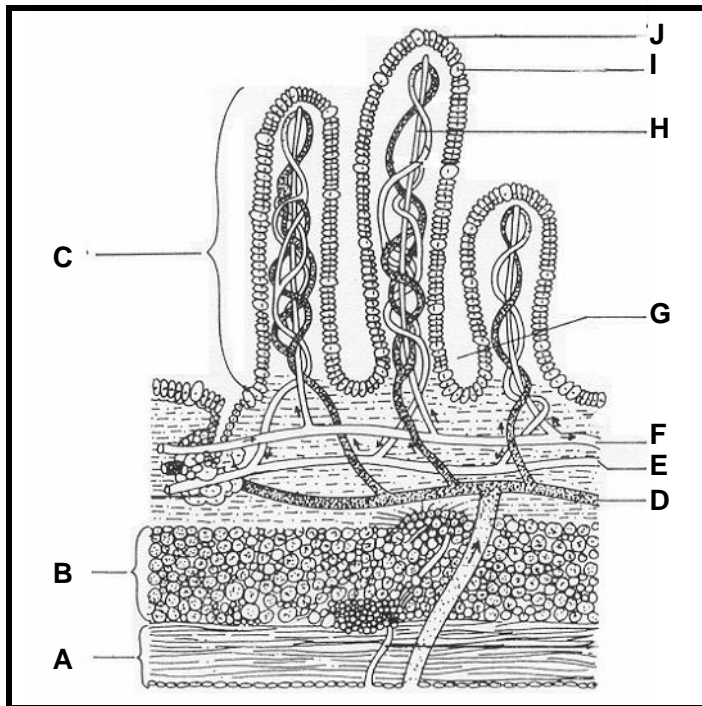
QUESTION 2

- 2.1 How would you, as a farmer, interpret red coloured soil? (4)
- 2.2 A sandy soil will usually be acidic and poor in plant nutrients. Under windy conditions it is prone to wind erosion. Discuss measures that should be taken by farmers to ensure good productivity on sandy soils. (10)
- 2.3 Briefly discuss the factors which play a role in the development of a soil structure. (10)
- 2.4 Outline the procedure used to classify soil in South Africa. (8)
- 2.5 Discuss the influence that temperature has on crop production. (10)
- 2.6 Under what conditions will humus increase or decay in soil? (6)
- 2.7 Define the concept **soil structure**. (2)

[50]

QUESTION 3

- 3.1 Below is a diagrammatic representation of a longitudinal section through the villus.



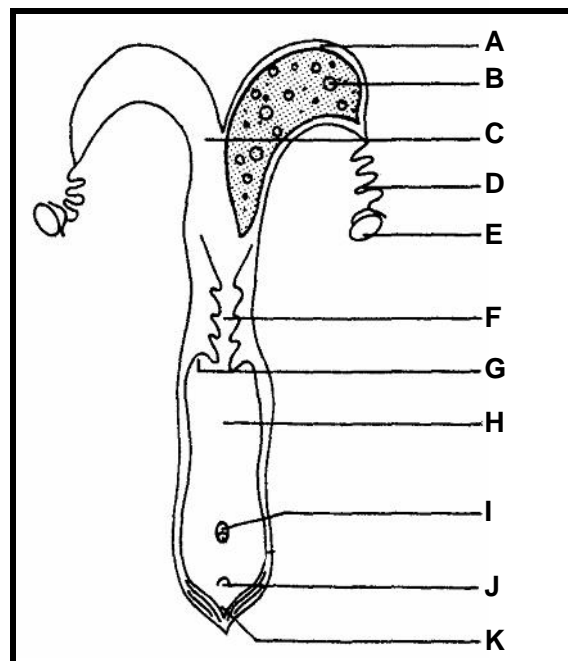
- 3.1.1 Label parts **A – J**.

(10)

- 3.1.2 In which part of the alimentary canal is the above structure found? (1)
- 3.1.3 Write down the **letters** that represent the structures in the diagram which
- (a) transport oxygenated blood to the villi. (2)
- (b) transport blood rich in nutrients from the villi to the liver. (2)
- 3.2 Discuss the functions of salivary glands in the alimentary canal of a pig. (8)
- 3.3 A farmer notices that some of the chicks on his farm have ulcerations of the cornea of the eyes.
- 3.3.1 What is the above condition called? (1)
- 3.3.2 Suggest a possible cause for the condition. (2)
- 3.3.3 What other symptoms can be associated with the condition described in Question 3.3? (8)
- 3.3.4 Suggest measures that can be taken to prevent this condition. (2)
- 3.4 Briefly discuss the functions of proteins in the animal body. (8)
- 3.5 List the factors which will determine the digestibility of feeds. (6)
- [50]**

QUESTION 4

- 4.1 Below is a diagrammatic representation of a partially opened reproductive tract of a cow.



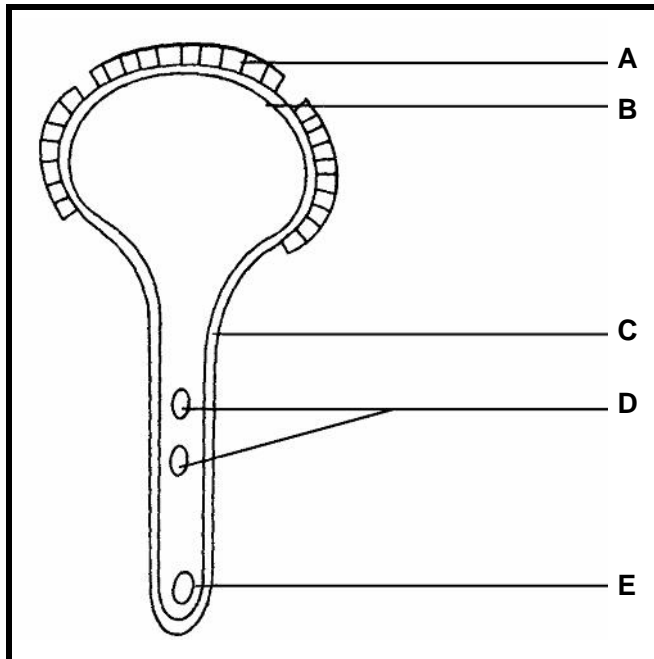
- 4.1.1 Label parts **A – K**. (11)
- 4.1.2 Write down only the letters (A – K) which represent structures in the diagram where the following takes place:
- (a) Fertilization
 - (b) Excretion of urine
 - (c) Accommodation of the penis during copulation
 - (d) Production of ova (4)
- 4.2 Answer the following questions on parturition in cows:
- 4.2.1 What are the important signs of parturition? (8)
- 4.2.2 What are the indications that the foetus is about to be ejected? (10)
- 4.3 Mention FIVE functions of the epididymis as a reproductive organ in bulls. (5)
- 4.4 Artificial insemination has many more advantages than natural mating. Discuss the relevance of this statement. (10)
- 4.5 Explain what is meant by **inbreeding**. (2)
[50]

QUESTION 5

- 5.1 Discuss the light-phase of the process of photosynthesis. (10)
- 5.2 Discuss the different functions of water in plants. (10)
- 5.3 Calculate the percentage plant nutrients in the following fertiliser mixture:
 3 : 2 : 3 (24)
- Show all your calculations. (5)
- 5.4 Discuss the detrimental effects of brackish soil on plant growth. (10)
- 5.5 Various factors influence the climate of an area. Name FIVE of these factors. (5)
- 5.6 Explain the taking of leaf samples. (10)
[50]

QUESTION 6

6.1 Below is a diagrammatic representation of a germinating pollen grain.



6.1.1 Label parts **A – E**. (5)

6.1.2 Write down the functions of the structures represented by the following letters:

- (a) C
- (b) D
- (c) E

3x2=(6)

6.2 Explain the concept of **double fertilization** in dicotyledonous plants. (6)

6.3 Mention SIX forms of asexual reproduction and briefly explain each. (18)

6.4 Differentiate between the structure of a monocotyledonous and a dicotyledonous flower. (8)

6.5 What is the most important stimulus for fruit setting? (2)

6.6 Which climatic factors will influence the adaptation of crops? (5)

[50]

QUESTION 7

- 7.1 Discuss the advantages of micro-irrigation systems. (9)
- 7.2 Discuss the advantages of crop rotation. (10)
- 7.3 How can farming lead to pollution? (6)
- 7.4 Name and discuss FIVE problems associated with capital in farming. (10)
- 7.5 Discuss factors influencing the demand for a product. (12)
- 7.6 Briefly explain what is meant by the **law of diminishing returns**. (3)
- [50]**

TOTAL FOR SECTION B: [300]

TOTAL: 400

END