

## GAUTENG DEPARTMENT OF EDUCATION

## SENIOR CERTIFICATE EXAMINATION

## AGRICULTURAL SCIENCE HG

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Possible Answers  
Feb / Mar 2006

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**SECTION A****QUESTION 1A  
MULTIPLE-CHOICE QUESTIONS**

- 1.1 C
- 1.2 B
- 1.3 B
- 1.4 A
- 1.5 C
- 1.6 C
- 1.7 A
- 1.8 C
- 1.9 A
- 1.10 B
- 1.11 A
- 1.12 A
- 1.13 C
- 1.14 A
- 1.15 A
- 1.16 D
- 1.17 B
- 1.18 C
- 1.19 C
- 1.20 B
- 1.21 C
- 1.22 D
- 1.23 C
- 1.24 A
- 1.25 A
- 1.26 A
- 1.27 C
- 1.28 A
- 1.29 D
- 1.30 A

2 marks each 30x2=[60]

**QUESTION 1B**

- 1.31 Minerals / organic matter
- 1.32 Aggregation
- 1.33 Density

- 1.34 Macropores
- 1.35 Capillary
- 1.36 Peptides
- 1.37 Embryonic phase
- 1.38 Ablactation / appeen
- 1.39 Parthenocarpy
- 1.40 Hormone

2 marks each 10x2=(20)

**QUESTION 1C**

- 1.41 I
- 1.42 L
- 1.43 G
- 1.44 A
- 1.45 J
- 1.46 K
- 1.47 B / A / G
- 1.48 D
- 1.49 E
- 1.50 L

2 marks each 10x2=(20)

**TOTAL FOR SECTION A: [100]**

**SECTION B****QUESTION 2**

- 2.1 Iron compounds underwent certain chemical changes  
 Enough air  
 Low moisture  
 Good air/moisture ratio  
 Subsoil is well drained (4)
- 2.2 \* Windbreaks or strip cultivation - where wind erosion is a problem  
 \* Application of fertilizers must be done judiciously - nitrogen fertilizers must be given in small doses and short intervals. Balanced fertilization - sandy soil is deficient in most essential plant nutrients.  
 \* Irrigation must be done with great care - no flood irrigation on sandy soils. Intervals must be shorter.  
 \* Application of lime must be done with great care - soil pH of sandy soil can rise rapidly (10)
- 2.3 Colloidal matter - clay and humus  
 Clay - cohesive forces - very strong play important role in the formation of aggregates  
 Organic matter - formation aggregates  
 Type of clay mineral - will determine the type of structure which will be formed -  
 Montmorillanite - blocky koalinite - play structure  
 Climate - rainfall and temperature influence erosion  
 Presence of organic colloids determine by vegetation which is directly depended on the climate.  
 Alternating moisture and drought - hard compact dad will be broken up  
 Drying out leads to shrinking - leads to a cementing of the clay particles  
 Plant roots (10)
- 2.4 First the master horizons in the soil profile are clearly demarcated  
 Then the diagnostic horizons are identified  
 With this knowledge the soil form can now be determined  
 After this the series characteristics of the soil are determined  
 With knowledge of the series characteristics the soil series may now be determined (8)

- 2.5 Seeds germinate quicker  
Germination percentage is higher  
Optimum growth and production of crops take place at a temperature of approximately 25°C  
Rapid growth warm soils deliver early crops, cold soils late crops  
Morning sun great influence on ripening  
Northern slopes - early crops  
Frost damage - southern slopes  
Soil microbes - 25°C - more active more plant nutrients will be released  
High temperatures activate the soil microbes - decrease of soil humus  
weakening of soil structure  
Higher the soil temperature, quicker chemical reactions - plant nutrients  
Soil water will dissolve much more plant nutrients  
Higher soil temperatures lead to a high rate of evaporation plant growth handicap (10)
- 2.6 Regularly cultivated soil  
Sandy well aerated soils  
Warmer regions  
The more favourable climatic conditions, more dense plant growth  
Under vlel and marshy conditions  
Well-planned crop rotation system (6)
- 2.7 Refers to the size and shape of soil particles (2)  
[50]

### QUESTION 3

- 3.1.1 A Longitudinal muscles  
B Circular  
C Villus  
D Artery  
E Vein  
F Lymph  
G Lieberkuhn  
H Lymph vessel  
I Gablet cell  
J Columnar epithelial (10)
- 3.1.2 Small intestine (1)
- 3.1.3 (a) D (2)  
(b) E (2)
- 3.2 It moistens the food - easily swallowed  
Chemical changes starch to sugar  
Alkaline - creates suitable medium for amylase  
Serve solvent - tasting  
Lubricates the mouth - protect  
Binding agent - compact bolus (8)

- 3.3.1 Keratomalaise (1)
- 3.3.2 Deficiency Vit A (2)
- 3.3.3 Lowered resistance against bacterial infections  
Normal development of skeleton will be influenced  
Change in bone formation  
Lower fertility  
Degeneration of the nervous system  
Retardation of the normal growth  
Anorexia (8)
- 3.3.4 Supplement Vitamin A (2)
- 3.4 Provides amino acids - body for repair and growth  
Required for the production of hormones, enzymes  
An excess of protein is - source of energy  
Excess can be converted to animal fat  
Proteins serve as building blocks such as wool eggs  
Required for reproduction  
Plays an important role in the regulation of metabolism (8)
- 3.5 Composition of the feed  
Composition of the ration  
Preparation of the feeds  
Type of animal  
Quantity of feed taken in  
Age of the plant  
Individually (6)

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**QUESTION 4**

- 4.1.1 (A) Uterine horn (G) Fornix  
(B) Carunde (H) Vagina  
(C) Uterine body (I) Urethral orifice  
(D) Fallopian tube (J) Clitoris  
(E) Ovary (K) Vulva  
(F) Cervix (11)
- 4.1.2 (a) D  
(b) I  
(c) H  
(d) E (4)

- 4.2.1 Stops eating and walks around  
She urinates  
Isolates herself  
Chases other cows away  
Ligaments relax around the tail root - pelvis - vagina  
Foetus much more mobile  
Vulva enlarge becomes softer  
Udder swollen and often leaks  
Mucus strings (8)
- 4.2.2 Outstretched amnion, forelegs and head are forced into pelvic girdle  
Abdominal and diaphragm muscles contract  
Uterus muscles contract  
Amnion breaks  
Cow lies on the ground  
Foetus forced through the vagina and vulva  
Calf moves in a downward direction  
Foetus still attached to the birth membranes through the umbilical cord (10)
- 4.3 Sperms are transported from the testes  
Water is absorbed, suspension becomes more concentrated  
Sperms reach maturity achieve full mobility  
Storage organ  
Searches a buffer — protects (5)
- 4.4 Efficient preventative measure against diseases such as epizootic  
Causes a decrease in other diseases  
Many cows can be served by one bull  
Economical breeding method  
Variety of bulls  
Handy and accurate method of doing progeny testing  
Increases the commercial value of herd  
Calve percentage is better  
Bulls from overseas can be used  
Can be frozen and kept for long periods (10)
- 4.5 Mating between animals which are closer related to one another close relationships such as father and daughter. (2)  
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### QUESTION 5

- 5.1 Splitting of water/release of oxygen  
The chlorophyll pigment absorb red and blue photons - energy of the molecule is increased  
Energy is used to split water molecule into H and O.  
Oxygen is now released  
Part of the energy used to change ADP to ATP - ATP more energy than ADP energy is stored  
H atom combine with co-enzyme known as NADP - reduced co-enzyme  
NADPH<sub>2</sub> is formed (10)

- 5.2 Provides mechanical rigidity to the cells - when losing water it becomes wilted  
 Vital agent chemical reactions - photosynthesis  
 Important solvent - chemical reactions  
 Transport medium - motion of substances within cell take place through diffusion and streaming in the cytoplasm  
 High heat capacity - stabilising influence on the plant temperature (10)
- 5.3
- |   |   |   |    |
|---|---|---|----|
| N | P | K |    |
| 3 | 2 | 3 | 24 |
- N  $\frac{3}{8}$  of 24%  
 $24 \div 8 \times 3 = 9\%$
- P  $\frac{2}{8}$  of 24%  
 $24 \div 8 \times 2 = 6\%$
- K  $\frac{3}{8}$  of 24  
 $24 \div 8 \times 3 = 9\%$  (5)
- 5.4 Osmosis badly affected - normal absorption cannot take place - plants will - leaf loss and scorch  
 So high it can be toxic - bare patches occur  
 In the case of black brack the soil is structureless - hard badly drained and aerated  
 Microbic activity takes place very slow - little nitrate is formed slow decomposition  
 Badly aerated soil denitrification will take place - harmful to plants (10)
- 5.5 Rainfall  
 Humidity  
 Light  
 Temperature  
 Wind (5)
- 5.6 Best time beginning of January until end of February  
 Case of stone fruit 10-15 central leaves - each tree form new shoots  
 Selected at points around the tree at shoulder height  
 Repeat the process at about ten representative trees  
 Wash the leafs clean water for three minutes  
 Rinse in tap water  
 Washed distilled water  
 Shake drops off  
 Placed in clean linen bags  
 Dried for 24 hours at 70°C (10)

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## QUESTION 6

- 6.1.2 A Exine D Male gametes  
 B Intine E Vegetative nucleus  
 C Pollen tube (5)
- (a) Grows down the style, while the contents of the pollen grain move downwards in the tube  
 (b) One gamete combines with the endospermic cell with the ovum.  
 (c) Controls the growth direction (6)
- 6.2 Two separate fusions of gametes take place  
 The one male gamete fuses with the ovum to form a fertilised ovum (2n)  
 The other male gamete fuses with the endosperm cell to form the endosperm (3n) (6)
- 6.3 Rhizomes - thickened under-ground stem - grows parallel to soil surface  
 Bulbs - short, disc-shaped underground stem - number of fleshy leaves  
 Cuttings - plant shoots which are cut from the mother plant and which are used for propagating that plant  
 Runners - side shoots with very long joints - which develop adventitious roots  
 Tubers - short - thickened underground stem in which food is stored  
 Grafting - transferring of a part of one plant to another - plant of the same botanical species (18)
- 6.4 The floral covers of the wheat perform the same function as the sepals of the dicotyledonous flower  
 The petal crown is totally absent because the wheat flower is either self or wind-pollinated and therefore unnecessary to attract insects  
 The others of the wheat flower are much larger and contain a tremendous quantity of pollen  
 The stigma of the wheat flower is feathery - larger surface for pollen grains. (8)
- 6.5 Fertilisation (2)
- 6.6 Low temperature  
 Frost  
 Rain  
 Strong wind (5)

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## QUESTION 7

- 7.1 It is labour saving, no need to move pipes  
Vegetative growth of plants and plant production can be better correlated  
Weed and pest control is made easier because normal traffic through land does not have to come to a standstill  
Considerable water saving is possible, less evaporation (9)
- 7.2 Helps to combat certain diseases and insect pests  
Contributes to the maintenance of high organic fraction  
It prevents the one-sided utilisation of plant nutrients  
More economical way of maintaining soil fertility  
Two or more crops can be produced after the soil has been prepared  
Different root depths - contribute to a better utilisation of the soil in general  
Decreases slack periods  
Distributes the risk of crop failure over a wider spectrum (10)
- 7.3 Use of pesticides in too high concentrations  
Injudicious application of pesticides  
Unnecessary application of pesticides  
Soil erosion, pollution of water  
Wrong irrigation practices  
Over grazing - the natural habitat is disturbed (6)
- 7.4 Capital is scarce  
Subject to high risk  
Over capitalisation  
Under capitalisation  
High interest rates 5x2=(10)
- 7.5 Price of the product - the lower price the greater the demand  
The tastes and preferences of consumers - depends on culture and living standards  
The number of consumers - the greater the number of consumers the greater the demand  
Prices of competing and complementary products - if chicken serves the same purpose as red meat and is cheaper the demand for chicken will increase  
The range of products available to the consumer (12)
- 7.6 If the variable production factors on a piece of soil are increased one finds that the increase in production does not take place proportionally (3)

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TOTAL: 400