Possible Answers November - 2004

GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

AGRICULTURAL SCIENCE HG

QUESTION 1A

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

30x2=**[60]**

QUESTION 1B

1.31.1 Islets of Langerhans

1.31.2 Enterocrynin

1.31.3 Glycogen

1.31.4 Sulphur

1.31.5 Silage

1.31.6 Free martin

1.31.7 Mitosis

1.31.8 Transpiration

1.31.9 Turgor

1.31.10 Dicotyledonous

10x2=**[20]**

1.32.1	F	1.32.6	C	
1.32.2	E	1.32.7	L	
1.32.3	J	1.32.8	G	
1.32.4	B	1.32.9	A	
1.32.5	H	1.32.10	I	10x2=**[20]**

TOTAL FOR SECTION A: [100]

SECTION B

QUESTION 2

2.1 Availability of soil is limited
Soil differs with respect to production capacity
durable
indestructible
good soil is limited
found in a specific environment
subject to the law of diminishing returns (7)

2.2 Fixed – permanent structures
Movable – medium term - livestock
Working – floating – short term – needed for production process (6)

2.3 Iron underwent chemical changes
much moisture
shortage of oxygen
waterlogged conditions
wet season of the year
soil has to be drained
indicates a degree of water saturation (7)

2.4 soil particles are large
total surface area is small
small surface area for chemical reaction
in the case of clay the surface area is relatively large. (4)

2.5 Activator for enzyme systems

2.5.1 Helps with maintenance of osmotic balance
Allows cytoplasm to remain in the desired jelly-like conditions
Improves quality of crops
Increases the plant disease resistance against drought (5)

Areas of dead tissues will develop
Leaves become slightly yellow
Firstly on older leaves (2)

2.6
A Oesophagus
B Simple stomach
C Duodenum
D Jejenum
E Ileum
F Colon
G Anus
H Rectum
I Caecum
J Pulorus (10)

2.7
– Sufficient mineral nutrients – they require macro and micro elements for growth and reproduction
– Easily digestible carbohydrates – such as starch and sugar are required for energy for growth maintenance and reproduction
– Sufficient nitrogen – used for the synthesis of microbe – proteins – mainly denied from ammonium urea and biuret are fed – as soon as they die off they are digested (9)
[50]

QUESTION 3

3.1
* Hard to till – because of cohesive forces between particles
* Water moves slowly – water-logging occurs easily
* Very fine texture – air circulation very slow – not suitable for deep rooted crops
* Clay layers in subsoil limit root growth plant roots follow path of least resistance
* High clay fraction in the topsoil can lead to the forming of a crust – can seal the top soil
* Drainage practically nil – when soils become brackish difficult to reclaim
* Absorption of water extremely low – makes irrigation very difficult (14)

3.2.1 N P K
4 3 1 (3)

3.2.2 P

$\frac{3}{8}$ off 32% (3 x 32) ÷ 8 or = 96 ÷ 8

32 ÷ 8 x 3 = 12% = 12% (3)

3.2.3 Macro elements Major (2)

3.2.4 The percentage of fertilizer in the mixture of 100 kg (2)

3.3 Applied to soils which are predominantly acid – poor in magnesium – and Ca much more favourable
Ca: Mg ratio is created – must be applied to soil with great care – after careful soil analysis (5)

3.4
* Antiseptic – destroys bacteria – prevents rotting
* It activates pepsinogen – change to pepsin
* Neutralises stomach – neutralises the alkaline medium of saliva
* Enzymes have a specific pH requirement and HCl creates a passive medium for rennin pepsin.
* Changes polysaccharide sucrose to – monosaccharide glucose and fructose (11)

3.5
* Improves the absorption of calcium and phosphorus
* Improves the deposition of calcium and phosphorous in growing bone
* Improves the re-absorption of inorganic phosphorus
* Plays role in RNA synthesis
* Improves the growth of animals
* Involved function of parathyroid hormone (6)

3.6 Hygroscopic adhesion water
Free water
Capillary water cohesion water
Soaking or swelling (4)
[50]

QUESTION 4

4.1
* Depth of soil and type
* quantity of moisture
* quantity of sunlight
* slope

(4)

4.2
* collection of plants
* which occur in a more or less stable association
* which exert a mutual influence on one another
* and towards the environment
* same requirements
* growth
* survival

(7)

4.3
* planning
* organisation
* co-ordination
* motivation
* decision-making
* control

(6)

4.4
* price of product
* taste and preference of consumers
* number of consumers
* real income of consumers
* prices of competing prices
* range of products available

(6)

4.5
* High percentage of organic matter will increase organic fraction of soil-improve soil structure
* contains all three main nutrient elements – most of the macro and the most important micro-elements
* contains great number of proteins, source of reserve nitrogen
* increased organic fraction also increases the organic colloid – the cation adsorption capacity will increase.
* provides carbon nutrients to soil microbes – microbiological activity increase

(12)

4.6
* Initial growth quicker
  fertiliser is reached quickly
* Under poor soil conditions such as
  found in badly drained soils higher yield is possible
  fertiliser more in the reach of the plant roots
* In the case of fast growing crops – higher yields

(6)

4.7 Animals exhibit pica
bent legs which cannot support body mass
knee and hock joints thicken
animals deformed
general stiffness
curvature of the spine
sporadic convulsion
fast breathing
decrease appetite (9)
[50]

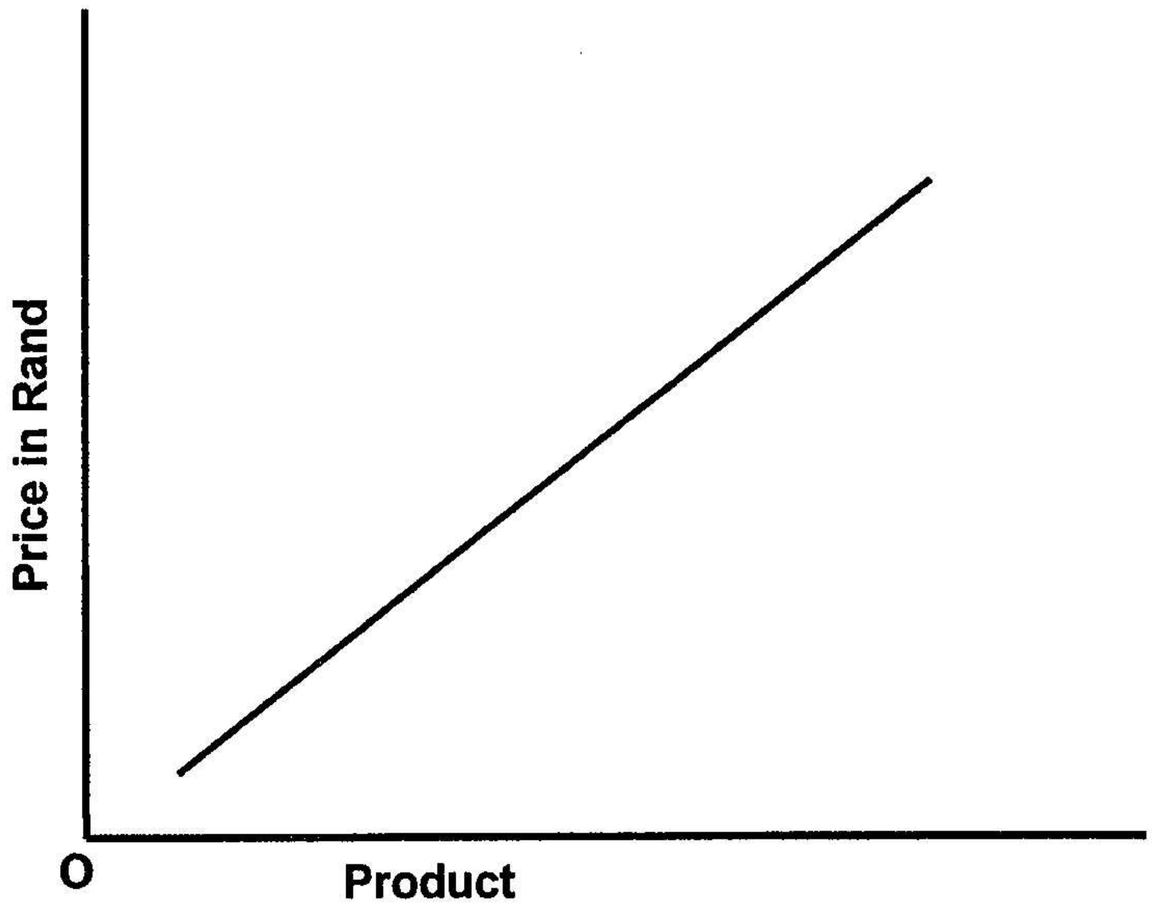
QUESTION 5

5.1 when even distribution of water is important
soil is too porous for flood irrigation
steep slopes
stream of water is too small
land is uneven
different parts different infiltration (6)

5.2 soil texture
depth of the soil water table
occurrence of compacted layers
type of crop
the irrigation method (5)

5.3 planning and development of production
standardisation and grading
sale
storage
transport
processing
financing
bearing risk
market information (10)

5.4



(3)

5.5.1 A micropyle

5.5.2 B embryo

5.5.3 C ovule membranes

5.5.4 D germ sac

5.5.5 E endosperm

5.5.6 F cotyledons

5.5.7 G umbilicus (7)

5.6 * Clay may be washed from the A-horizont to the B-horizont – B horizont now has a finer texture – higher bulk density
* Vegetation – humus in A can lead to a crumbed structure – lower bulk
* Continuous soil cultivation or tillage can form plough layer in B horizont which will increase bulk density (8)

5.7 Antibiotics growth regulators
Hormones
Thyroid regulators
Tranquillisers
Synthetic amino acids
Vitamins
Non-protein nitrogen (5)

5.8 Sexual immaturity
Lack of experience
Over-exertion
Malnutrition
Psychological factors
Diseases (6)
[50]

QUESTION 6

6.1 Seedbed preparation
Cultivation of crop during the growing season
General weed control
Introduction of organic material
Introduction of fertilisers (5)

6.2 To combat diseases and insects pests
Maintain a high organic fraction
Prevent one-sided utilisation nutrients
Maintaining soil fertility
Two or more crops
Different root depths better utilisation of nutrients
Decrease slack periods
Distributes the risks (7)

6.3 Prices vary considerably
Small bargaining power
Marketing cost high
Producer runs a very high risk
Producer responsible for own marketing
Cartels are formed (6)

6.4 * System must be adaptable
* should make provision for deviation
* must be economical in terms of time and money
* system must be simple and clearly understandable
* must lead to corrective action (6)

6.5 the quantity of water – which is held in soil – at a moisture tension between – field capacity and the wilting point (4)

6.6 Guard against excessive nitrogen fertilization
select cultivars with low transpiration ratio
choose cultivars short growing season
eradicate weeds (4)

6.7 * soil air contains ten times more carbon dioxide than atmospheric air – carbon dioxide is a respiration product of plant roots – organisms – CO_2 never constant
* soil air usually more or less saturated with moisture – vapour in the atmosphere varies tremendously
* in soil with a high microbe activity the soil air will contain less oxygen (5)

6.8 ALKALINITY
* pH rise to above 8.5 – harmful to plant tissues
* Na^+ ion has a deflocculating effect soil becomes structureless
* strong development of prismatic structure
* organic matter dissolves – transported upwards – upper layer black
* removal of humus – soil structure is further detrimentally affected

SALINITY
* high osmotic pressure – decrease the accessibility of soil water
* white salt precipitates will form
* can be toxic – bare patches
* soil surface tends to powder (13)
[50]

QUESTION 7

7.1 Worker must be aware that steps will be taken.
Steps not against worker but against mistake
Steps should be implemented as soon as possible.
Actions must be consistent and fair
Relationship should be restored after action (5)

7.2 Indicate a condition ruling where the quantity of a product which buyers require is exactly equal to the quantity which sellers wish to sell. (5)

7.3 Active acidity – represented by H^+ – in the soil solution
Reserve acidity – represented by H^+ and Al^{3+} adsorbed to colloids
H^+ ions moving from colloid into soil solution.
Mobility of the H^+ ions of great importance – the activity can easily be neutralized (8)

7.4 Takes place under fynbos – in humid regions – temperate climate
Sandy on acid – organic matter – accumulates on the soil surface
Organic matter decays to form soluble substances which are able to mobilize iron and aluminium – leach from the upper horizons and collect in a deeper horizon – dark red or greyish coloured B – horizon is formed (8)

7.5 A. Stigma
B. Anther
C. Style
D. Filament crown
E. Petal crown
F. Gynoecium
G. Sepal crown
H. Septum
I Receptacle
J Pedicel (10)

7.6 Fruit without seeds normally have a poor shape
Seedless fruit are usually smaller
Seedless fruits also ripen later
The quality and shelf-life of seedless fruit are usually not as good (4)

7.7 Tongue
Machine
Split (3)

7.8 Produce more than pure breeds
Grow faster
Higher wearing mars
Usually more fertile
Better adaptability
More disease resistant
Utilise food better
Possess better mother instincts (7)
[50]

TOTAL: 400