



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION – 2008

AGRICULTURAL SCIENCE P2

HIGHER GRADE

MAY/JUNE 2008

MEMORANDUM

MARKS: 200

This memorandum consists of 12 pages.

SECTION A**QUESTION 1**

1.1 Multiple choice

- 1.1.1 A ✓ ✓ (2)
- 1.1.2 C ✓ ✓ (2)
- 1.1.3 B ✓ ✓ (2)
- 1.1.4 D ✓ ✓ (2)
- 1.1.5 D ✓ ✓ (2)
- 1.1.6 B ✓ ✓ (2)
- 1.1.7 D ✓ ✓ (2)
- 1.1.8 C ✓ ✓ (2)
- 1.1.9 A ✓ ✓ (2)
- 1.1.10 D ✓ ✓ (2)

1.2 Correct terms

- 1.2.1 Pregnancy/gestation ✓ ✓ (2)
- 1.2.2 Entrepreneurship/management ✓ ✓ (2)
- 1.2.3 Sweetveld ✓ ✓ (2)
- 1.2.4 Osteomalacia/osteoporosis ✓ ✓ (2)
- 1.2.5 Rennin ✓ ✓ (2)

- 1.3 Replacement of word (s)
- 1.3.1 Biuret ✓ ✓ (2)
- 1.3.2 Production ✓ ✓ (2)
- 1.3.3 Ovulation ✓ ✓ (2)
- 1.3.4 Over-capitalisation ✓ ✓ (2)
- 1.3.5 Mulching ✓ ✓ (2)
- 1.4 Matching the columns
- 1.4.1 D ✓ ✓ (2)
- 1.4.2 F ✓ ✓ (2)
- 1.4.3 A ✓ ✓ (2)
- 1.4.4 H ✓ ✓ (2)
- 1.4.5 B ✓ ✓ (2)

TOTAL SECTION A: [50]

SECTION B**QUESTION 2 : ANIMAL NUTRITION**

2.1 Measures of feed energy:

2.1.1 A – faeces/manure✓ (1)

B – methane✓ (1)

C – Metabolisable/metabolic✓ (1)

D – heat loss✓ (1)

E – Nett✓ (1)

2.1.2 Gross energy

- is the energy liberated as heat when a compound is completely oxidised✓
 - to carbon dioxide, water and other gases✓
- (2)

Digestible energy

- difference between the gross energy of the food ✓ (2)
- and the energy excreted in the faeces✓

2.1.3 Nett energy

- used for maintenance✓
- used for production of products such as milk , wool, eggs✓ (2)

2.2 Functions of bile

- neutralises the chymus coming from the stomach✓
- creates an alkaline medium which activates lipase✓
- emulsifies fats✓
- enhance peristalsis of the alimentary canal✓
- improve the solubility of fats for absorption✓
- purifies the small intestine✓
- helps with the absorption of fat soluble vitamins✓
- it is antiseptic and counteracts putrefaction of the canal✓
- slows down passage of digested food in the alimentary canal ✓ (Any 5) (5)

2.3 Nutrients for lactating cows:

2.3.1 Proteins

- the ration should contain a high percentage of digestible proteins for both maintenance and production of milk✓
 - if a ration is deficient in protein, tissue reserves of protein may be used for milk production✓
 - prolonged shortages of proteins will limit milk production✓ (2)
- (Any 2)

2.3.2 Carbohydrates

- is required for the formation of milk fats✓
- is required for the formation of milk sugar✓
- it must be in the form of Nett energy✓ (Any 2) (2)

2.3.3 Minerals

- essential minerals are important for milk production✓
- especially calcium and phosphorus✓ (Any 2) (2)

2.4 Digestibility of feeds:

2.4.1 **NO CREDIT FOR THE FORMULA**

Digestibility co-efficient of concentrate

$$= \frac{(6 \text{ kg} - 5\%) \checkmark - (1.5 \text{ kg})}{(6 \text{ kg} - 5\%)} \times \frac{100}{1}$$

$$= \frac{5.7 - 1.5 \checkmark}{5.7 \checkmark} \times \frac{100 \checkmark}{1}$$

$$= 73.68 (74)\% \checkmark \quad (5)$$

2.4.2

- used for the evaluation of the feed✓
- indicates how much of the feed is digested by the animal and available as nutrients✓
- determines the rate of feed conversion by the animal which relates to the economics of feeding (cost of feeding) ✓ (3)

2.5 Nutrition deficiencies:

Deficiency symptoms	Nutrient	Method of supplementation	
2.5.1 Milkfever	Ca / Calcium✓	Injection / dosing / licks✓ (Any 1)	(2)
2.5.2 Anaemia	Fe / Iron✓	Injection / red soil / soil sods✓ (Any 1)	(2)
2.5.3 Wasting disease	Co / Cobalt✓	Dosing / cobalt bombs✓ (Any 1)	(2)

2.6 Absorption of food in the small intestine of the fowl

- the small intestine is a very long tube thus increasing the absorption area✓
- very large absorptive surface area due to villi✓
- digested nutrients absorbed into the blood system through capillary blood vessels in the villi✓
- digested fats (glycerol and fatty acids) go into the lacteal or lymph system and are absorbed by the body✓
- nutrients are absorbed through the process of osmosis✓ (Any 4) (4)

[40]**QUESTION 3: ANIMAL REPRODUCTION**

3.1 Reproductive organs of the female animal:

- 3.1.1
- (a) – B (fallopian tube/oviduct/egg tube)✓ (1)
 - (b) – D (cervix)✓ (1)
 - (c) – F (clitoris)✓ (1)
 - (d) – A (uterine horn/uterus)✓ (1)
 - (e) – C (ovary) ✓ (1)
 - (f) – E (vagina) ✓ (1)

- 3.1.2
- implantation of the embryo after fertilisation✓
 - development of the embryo into the foetus✓
 - nourishment of the developing embryo✓
 - exchange of gases and waste material between the mother and the foetus✓ (4)

3.2 Accessory reproductive glands:

3.2.1 Pelvic cavity✓ (1)

3.2.2 Seminal vesicle/vesicular glands✓ (1)

3.2.3 - secretes 50 % of the volume of the semen✓
- supply nutrients to the sperm cells✓
- correct the pH balance of the seminal fluid✓
- correct osmotic pressure of the seminal fluid✓ (Any 3) (3)

3.2.4 - lubricates and cleanses the urethra before ejaculation✓ (1)
- the mobility of the sperm is improved ✓
- it contributes to the volume of the ejaculate✓
- corrects the pH balance✓ (Any 3) (3)

3.3 Animal breeding systems:

3.3.1 Inbreeding / linebreeding ✓ (2)

3.3.2 Species crossing / hybridisation✓ (2)

3.3.3 Cross breeding✓ (2)

3.4 Congenital defects✓

- defects with which the animal was born, e.g. penis too short or too small,
underdeveloped or undersized testicles✓ (2)

Defects in body structure✓

- in heavy bulls any defect of the spine or hindlegs will hinder service✓ (2)

Injuries✓

- injuries to the back, hindleg or penis will prevent effective service✓ (2)

Disease conditions✓

- any disease condition that causes pain or discomfort will hinder service e.g.
inflammation of the feet or sex organ✓ (2)

- 3.5
- correct technique✓
 - clean sterile instruments✓
 - correct timing in the oestrus cycle/heat spotting/heat is spotted in morning cow inseminated in evening/ heat spotted in evening inseminated next morning✓
 - use of healthy viable semen✓
- (4)

- 3.3
- cow tends to stop eating/loss of appetite✓
 - walks around searching and lowing/restlessness✓
 - urinates and defecates regularly✓
 - isolates herself from other cattle✓
 - often chases other cows✓
 - shows nesting behaviour✓
 - vulva enlarges and becomes soft✓
 - mucous strings may be observed✓
 - udder is swollen and often leaks milk✓
- (Any 4) (4)

[40]

QUESTION 4: OPTIMAL RESOURCE UTILISATION

- 4.1 Plant succession:
- progressive development of the natural vegetation from a pioneer stage towards a climax plant community✓ ✓
- (2)

Retrogression:

- takes place when a developed plant community (climax) is replaced by lower plant communities (intermediate stage of development) ✓ ✓
- (2)

4.2 Irrigation:

- 4.2.1
- (a) – Drip✓ (1)
 - (b) – Sprinkler/spray✓ (1)
 - (c) – Micro-jet/microspray/drip✓ (1)
 - (d) – Sprinkler/spray✓ (1)

- 4.2.2 Tensiometer/ American Standard Class A pan/Scheepers pan✓ (1)

4.2.3 **NO CREDIT FOR THE FORMULA**

Quantity of water (Et) = Eo x f

= 12 mm ✓ x 0.40 ✓

= 4.8mm ✓

(3)

4.2.4 This means that if 12mm of water evaporated from the evaporation pan in a certain period ✓ 4.8mm of water would have been withdrawn from the soil ✓ in that period of time ✓

(3)

4.3. Green houses:

4.3.1 Green house/tunnel/fibre-glass house/glass house ✓

(1)

- 4.3.2
- crops can be cultivated out of season ✓
 - crops not normally grown in an area can be grown ✓
 - crops can be produced for a specific market ✓
 - high quality products can be produced ✓
 - damage due to rain, wind, hail frost is eliminated ✓

(4)

(Any 4)

4.4. Drainage systems:

- 4.4.1
- open drains ✓
 - stone or rock drains ✓
 - pipe drains ✓

(3)

4.4.2 Clear plan of drainage lines on the farm should be drawn up. This is later used for digging up defective or blocked pipes. ✓ ✓

Inspection pits must be installed at regular distances along the drainage system. The pits must be large enough for a person to climb into. ✓ ✓

Outlets of the drainage system must be covered with wire mesh to stop mice and other rodents moving into the drain. ✓ ✓

Open drainage ditches must be cleaned regularly because weeds will hinder the flow of water. ✓ ✓

(Any 3 x 2)

(6)

- 4.5
- aerial photographs of the survey area✓
 - veld reconnaissance/visit the survey area✓
 - preliminary mapping of the land✓
 - soil survey is done to classify soil✓
 - planning and marking of profile test holes✓
 - description of the soil profile✓
 - final soil mapping✓

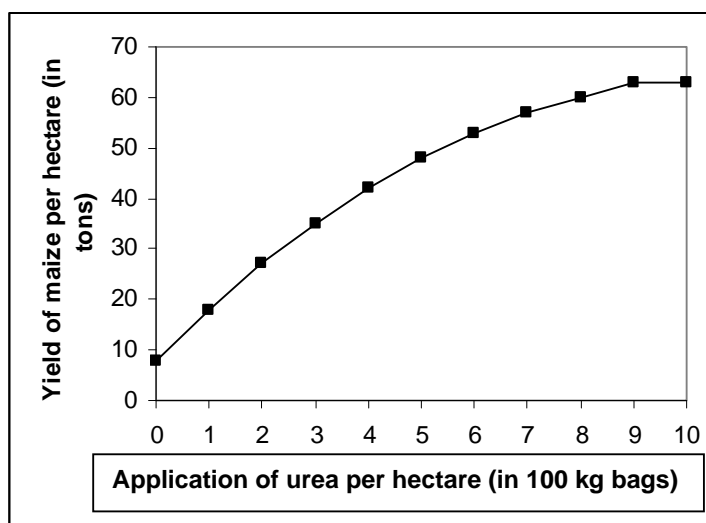
(Any 6) (6)

[35]

QUESTION 5 : AGRICULTURAL ECONOMICS

5.1 Graph:

5.1.1



Mark allocation:

Identifying and labeling of Y axis – 1 mark

Identifying and labeling of X axis – 1 mark

Plotting of points (any 10 dots) – 10 x 0.5 = 5 marks

Drawing the line (joining the dots) – 1 mark

(8)

5.1.2 Law of Diminishing Return✓

(1)

- 5.1.3
- even though the fertilizer urea was increased consistently/uniformly, the increase in production was not proportional and not consistent✓ ✓
 - because the soil has reached its maximum production potential✓

(3)

- 5.2 Implements – movable capital✓
 Dam – fixed capital✓
 Cattle – movable capital✓
 Animal feed – floating/working capital✓ (4)
- 5.3 - sales are usually for cash
 - producer receives payment immediately
 - quality products are produced
 - producer is encouraged to work harder
 - producer can show initiative
 - intermediaries/middleman is limited (Any 4) (4)
- 5.4 Supply:
 - the quantity of the product that is produced or offered to the purchaser✓
 - at varying prices✓
OR
 - quantity of the product offered for sale✓
 - at a certain price in a particular time ✓ (2)
- Demand:
 - quantity of the product that can be purchased at a given time✓
 - by the consumers at all alternative prices✓
OR
 - quantity of products sold ✓
 - at a particular time for a particular price✓ (2)
- 5.5 Seasonal workers ✓
 - employed seasonally during peak periods for repetitive tasks✓
 - e.g. harvesting/ shearing / planting / any other relevant example✓ (3)
- Casual workers✓
 - employed temporarily for non-repetitive work✓
 - e.g. building/erecting fences / any other relevant example✓ (3)

- 5.6
- planning✓
 - organisation and co-ordination✓
 - motivation✓
 - decision-making✓
 - control✓

(5)

[35]

TOTAL SECTION B: 150

GRAND TOTAL : 200