

GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION
POSSIBLE ANSWERS FOR : AGRICULTURAL SCIENCE SG

SECTION A

QUESTION 1

| | | | |
|--------|---|--------|---|
| 1.1.1 | C | 1.1.11 | A |
| 1.1.2 | B | 1.1.12 | B |
| 1.1.3 | B | 1.1.13 | B |
| 1.1.4 | A | 1.1.14 | A |
| 1.1.5 | B | 1.1.15 | C |
| 1.1.6 | D | 1.1.16 | A |
| 1.1.7 | C | 1.1.17 | B |
| 1.1.8 | D | 1.1.18 | B |
| 1.1.9 | A | 1.1.19 | D |
| 1.1.10 | A | 1.1.20 | A |

20x2 = (40)

| | |
|--------|------------------------------|
| 1.2.1 | Hygroscopic water / adhesion |
| 1.2.2 | Cardiac opening |
| 1.2.3 | Emulsify |
| 1.2.4 | Incentive wage |
| 1.2.5 | Over capitalization |
| 1.2.6 | Micro-irrigation / spray |
| 1.2.7 | Open drains |
| 1.2.8 | Ablacation |
| 1.2.9 | Pistil |
| 1.2.10 | Endosperm |
| 1.2.11 | Carbonic acid |
| 1.2.12 | Zinc |
| 1.2.13 | Line breeding |
| 1.2.14 | Ovulation |
| 1.2.15 | Southern Slope |

15x2 = (30)

1.3.1 Potassium sulphate

1.3.2 Urea

1.3.3 Prostrate

1.3.4 Reticulum

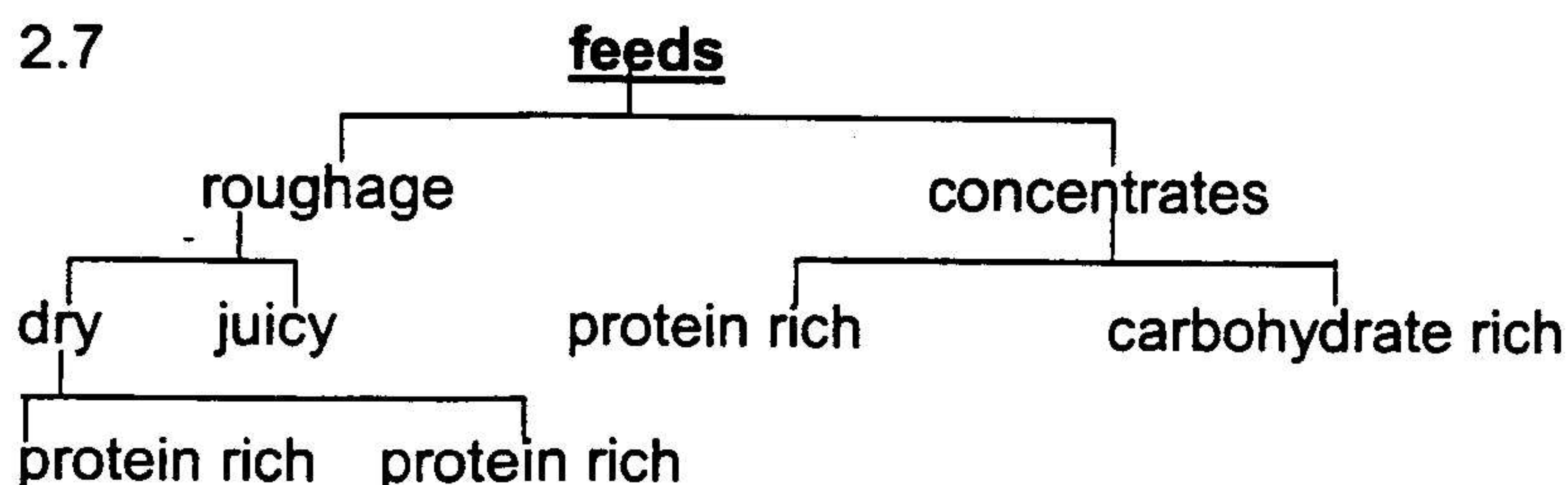
1.3.5 An-oestrus / defective ovulation

(5)
TOTAL FOR SECTION A: [75]

SECTION B **QUESTION 2**

- 2.1 – Wilting point is a stage when the soil does not have enough accessible water to support normal growth.
 – Field capacity is the percentage of water retained by the soil, after irrigation and drainage have taken place.
 – The quantity of water which is held by soil at a moisture tension between wilting point and field capacity. (4)
- 2.2 – Fertilizers must be applied judiciously.
 – Nitrogen fertilizers should be given in small doses but at short intervals.
 – Avoid flood irrigation as this will leach fertilizers. Use sprinkler irrigation.
 – Sandy soil is deficient in most essential plant nutrients therefore balance fertilisation of all nutrients must be applied.
 – Lime must be applied with care as it increases the pH value of soil and can lead to shortage of micro-elements.
 – Where wind erosion occurs plant wind breaks or practice strip cultivation. (10)
- 2.3.1 – He has to check the lower incisors milk teeth replaced by permanent incisors during first 3 years of life.
 – 1 pair permanent incisors = younger than 1 yr 10 months
 – 2 pairs permanent incisors = animal younger than 2 years 6 months
 – 3 pairs permanent incisors = animal younger than 3 years
 – 4 pairs permanent incisors = animal younger than 4 years (6)
- 2.3.2 estimated according to wear (erosion) of permanent teeth. (2)
- 2.4.1 – moistens and lubricates the mouth
 – help in forming bolus
 – supplies alkaline medium for action of amylase
 – amylase converts starch to maltose
 – neutralises acids in the mouth (4)
- 2.4.2 Simple stomach (1)
- 2.5.1 a – hydrochloric acid (1)
 b – lowers the pH of stomach for pepsin and rennin action
 – neutralises alkaline medium of saliva
 – destroys bacteria in food / prevents rotting or putrefaction
 – activates pepsinogen to be changed to pepsin
 – converts sucrose to glucose and fructose (5)

- 2.6 – Normal vision sharpness
 – Normal skeleton formation
 – Maintenance of epithelial tissue
 – Normal reproduction (4)



(8)
 [45]

QUESTION 3

3.1.1

- | | | |
|-------------------|------------------|------|
| A. Ovary | G. Vagina | |
| B. Rectum | H. Uterine body | |
| C. Anus | I. Uterine horn | |
| D. Fallopian tube | J. Bladder | |
| E. Cervix | K. Pelvis | |
| F. Vulva | L. Mammary gland | (12) |

3.1.2

- (a) A ovary
 (b) E cervix / H
 (c) G vagina
 (d) H uterus (4)

- 3.2 The artificial change and control of oestrus cycle of all the cows in a herd so that they all come into oestrus at approximately the same time. (2)

- 3.3 – Removal of the corpus luteum
 – Administering of progesterone
 – Administration of oestrogen/stilboestrol
 – Administration of gonadotropic hormones, leutenising hormone & follicle-stimulating hormone (4)

- 3.4 – Restlessness, walks around lowing and searching
 – Stops eating
 – Urinates and defecates frequently
 – Isolates herself
 – Vulva enlarges, becomes softer, mucus strings observed
 – Udder painfully swollen, milk leaks
 – Chooses a place where she can remain and chases other cows away (6)

- 3.5 – Climate
 – Infections of sex organs
 – Congenital defects
 – Feeding and care
 – Diseases (5)

- 3.6 – The placing of semen from the bull in the reproductive canal of the cow to lead to the fertilisation of the ovum without natural mating having taken place. (3)
- 3.7 – Inbreeding: - Mating of animals that are more closely related to one another than the average relationship in the herd. (2)
- Line breeding is the mating of related animals to retain the relationship with an outstanding ancestor. (3)
- 3.8 3.8.1 cross-breeding
 3.8.2 in-breeding
 3.8.3 line breeding
 3.8.4 upgrading
 3.8.5 species crossing
 3.8.6 line/in-breeding
 3.8.7 cross-breeding (7)
- [45]**

QUESTION 4

- 4.1 Capillary water (1)
- 4.2 – Serves as a solvent for food
 – Transport medium of dissolved substances
 – Regulates temperature
 – Aids with various processes: absorption, secretion and excretion
 – Essential for various chemical reactions in plants, e.g. photosynthesis and respiration (6)
 – Provides mechanical rigidity (turgor) to cells
- 4.3 – Stimulates root development
 – Stimulates flower formation: greater seed plus fruit production
 – Improves quality of products (keeping quality)
 – Essential for compounds important for energy changes in plants (4)
- 4.4 – Boiling water disease in wheat / wilted leaves and chlorotic leaf tips
 – Small oranges with cracked skins and gummy secretions
 – Chlorotic and scorched leaves (3)
- 4.5.1 2 parts N, 3 parts P, 5 parts K. Figure in brackets is the %(kg) nutrients per 100 kg of the mixture (4)

4.5.2 Step 1 $2+3+5 = 10$

Step 2 $\frac{2}{10} \times 20 = 4\%$ (2)

$\frac{3}{10} \times 20 = 6\%$ (2)

$\frac{5}{10} \times 2 = 10\%$ (2)

Step 3 $4+6+10 = 20\%$ (1)
[25]

QUESTION 5

- 5.1.1 –A anther
–B palea
–C stigma
–D filament
–E swelling bodies with ovary
–F lemma (6)

5.1.2 – bearded spike (1)

5.1.3 – beard (1)

5.1.4 – encloses / possesses female gametes, for fertilisation and development of wheat grains. (1)

5.2

| Monocot | Dicot |
|-------------------------|-------------------------------------|
| - absence of petals | Brightly coloured petals present |
| - absence of pedicel | Pedicel connects flower to plant |
| - receptacle absent | Receptacle present carries corollas |
| - gluma for protection | Sepal corolla for protection |
| - large anthers | Anthers small |
| - large feathery stigma | Small, sticky stigma |

(6)

5.3 Falling off of flowers without forming fruit during the first ten days (1)

5.4 Rhizomes, bulbs, cuttings or slips, runners, tubers (4)
[20]

QUESTION 6

- 6.1 Soil, climate, vegetation, terrain, water (5)
- 6.2 – Provides air for respiration for plants and micro-organisms
 – Releases nutrients to plants
 – Serves as a growth medium for plants
 – Allows infiltration of water
 – Stores and releases water for usage by plants (5)
- 6.3 – Type of crop grown
 – Quantity of water available
 – Cultivation method to be applied
 – Water quality
 – Infiltration tempo of soil
 – Topography (5)
- 6.4 – Water is applied directly to crops
 – Little labour necessary
 – Weed and pest control easy
 – Water correctly measured
 – Brackish soil and saline water may be used
 – Less H₂O needed
 – Steep slopes can be irrigated
 – Can be used on soil with high or low infiltration rates (5)
- 6.5 – Spacing
 – Diameter of pipes
 – Depth
 – Slope (4)
- 6.6 Artificial removal of excess free water from the soil surface or root zone (2)
- 6.7 – A-pan
 – Tensiometer (2)
- 6.8 – Utilize soil for the production aim for which it is most suited
 – To obtain its maximum agricultural potential (2)
- 6.9.1 – Taking aerial photographs
 – Visiting survey area
 – Preliminary mapping of land and veld types
 – Studying profile holes and identifying soil forms
 – Morphological properties determined
 – Interpretation of all acquired information (6)
- 6.10 $E_t = E_o \times f$
 $E_t = 20 \text{ mm} \times 0,6$
 $= 12 \text{ mm}$ (3)

- 6.11 – Sample compiled from 12 to 12 samples taken
 – Scattered over the whole area
 – Holes dug 600 mm square and 1 m deep with spade
 – Separate samples taken from each soil layer
 – Soil from similar layers mixed together
 – 2 kg sample taken from each similar layer

(6)
 [45]

QUESTION 7

| 7.1 | ASPECT | BARE CULTIVATION | MULCH CULTIVATION |
|-------|--------------------|---|--|
| 7.1.1 | (a)aeration | Macropores destroyed, air forced out by heavy implements | Macropores not disturbed Good aeration |
| 7.1.2 | (b)compaction | Compacted due to use of heavy implements | Cultivation implements not used, therefore little or no compaction |
| 7.1.3 | (c) water capacity | Deteriorated structure thus water-holding capacity low | Improved structure thus increased water capacity |
| 7.1.4 | (d)soil temp | Due to absence of soil cover, great difference between max. and min. temp | Less fluctuations between min. and max. temp |

(8)

- 7.2 Soil – nature easily erodable
 - Solpe; slopes very rapidly
 - Climate
 - Overgrazing
 - Repeated veld burning which leads to deterioration of plant growth ... increased danger to erosion

(5)

- 7.3 Water supply
 - Consolidation of unecomonic farm units
 - Adapting production systems to scientific methods

(3)

- 7.4 Technical proficiency
 - Humanitarian skills
 - Conceptual skills

(3)

- 7.5 Fixed - permanent assets, e.g land
 - Movable - medium-term assets, e.g implements
 - Working / floating - short term assets e.g fuel seed

(9)

- 7.6 - Price of a product
- Taste and preferences of consumers
- Real income of consumers
- Number of consumers
- Price of competing and complementary products
- Range of products available (6)
- 7.7.1 - The producer markets his products to whomever he wishes, whenever he wishes. (2)
- 7.7.2 - Sales usually for cash
- Very little delay in receiving payment
- Entrepreneur can show initiative and drive
- Stimulates entrepreneur to work harder
- Intermediaries limited in marketing process
- Production of quality products encouraged (6)
- 7.8 - Financing
- Bearing risk (3)
- Market information [45]

TOTAL FOR SECTION B: [225]

TOTAL: 300

END