basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURALSCIENCES P1

NOVEMBER 2014

MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

SECTION A

QUESTION 1

1.1   1.1.1   C ✓✓
           1.1.2   D ✓✓
           1.1.3   B ✓✓
           1.1.4   B ✓✓
           1.1.5   D ✓✓
           1.1.6   D ✓✓
           1.1.7   B ✓✓
           1.1.8   D ✓✓
           1.1.9   C ✓✓
           1.1.10   A ✓✓   (10 x 2)   (20)

1.2   1.2.1   None ✓✓
           1.2.2   A only ✓✓
           1.2.3   Both A and B ✓✓
           1.2.4   B only ✓✓
           1.2.5   A only ✓✓   (5 x 2)   (10)

1.3   1.3.1   Fodder/feed flow ✓✓
           1.3.2   Neck/head clamp ✓✓
           1.3.3   Seminal vesicle/vesicular glands ✓✓
           1.3.4   Oogenesis/ovigenesis ✓✓
           1.3.5   Mastitis ✓✓   (5 x 2)   (10)

1.4   1.4.1   Mechanical/physical ✓
           1.4.2   Cafeteria style/ad lib/free choice ✓
           1.4.3   Isolation/separation ✓
           1.4.4   Iron/Fe/ferrous sulphate ✓
           1.4.5   Synchronisation ✓   (5 x 1)   (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMALNUTRITION

2.1   **Path of food in the stomach of a ruminant**

    2.1.1   **Identification of the type of animal**
- Ruminant/cattle/sheep/goats ✓   (1)

    2.1.2   **Identification of the processes illustrated by A, B and C**
        A. Swallowing/peristalsis/ingestion/intake of food ✓
        B. Regurgitation/retro-peristalsis ✓
        C. Re-swallowing/peristalsis ✓   (3)

    2.1.3   **Justification of the advantages of process B**
- Food broken down mechanically into finer particles ✓
- Increases surface area of food ✓
- Stimulates secretion of saliva to maintain rumen pH levels ✓
- Improves the mixing of food ✓
- The forming of bolus ✓   (Any 3)   (3)

2.2   **The quality of pastures and nutritional values over three seasons**

    2.2.1   **Description of the size of micro-organism population**
        (a)   Increase/high in population of amylolytic bacteria ✓✓
            (due to high energy in pasture)   (2)
        (b)   Decrease/low in population of proteolytic bacteria ✓✓
            (due to low quality protein in pasture)   (2)

    2.2.2   **Quality of supplementary feed in winter**
- Supplement high/rich in proteins/nitrogen/NPN ✓✓
- Rich in carbohydrates/energy ✓✓
- Supplementing with feed rich in minerals/vitamins ✓✓   (Any 1)   (2)

    2.2.3   **The vitamin that is likely to be deficient in winter**
        Vitamin A/retinol ✓   (1)

2.3   **Coefficient of digestibility of hay**

    2.3.1   **Coefficient of digestibility**
        DM of hay: 24kg x $\frac{12}{100}$ = 2,88kg or 24kg x 0,88 = 21,1kg

                24kg – 2,88kg   = 21,1kg ✓

        CD = $\frac{\text{Dry matter intake (kg) – dry mass of manure (kg)}}{\text{Dry matter intake (kg)}}$ x $\frac{100}{1}$ ✓

        = $\frac{21,1kg – 7,3kg}{21,1kg}$ x $\frac{100}{1}$ ✓

        = 65,4 ✓% ✓   (5)

2.3.2 **Justification for not recommending the hay**
- Digestibility is 65,4% ✓
- therefore it needs supplementation to improve digestibility ✓ (2)

2.4 **Composition of animal feeds**

2.4.1 **Feed most likely to be fed to non-ruminant animals**
Feed A ✓ (1)

2.4.2 **Motivation for Feed A**
- Contains a low percentage of crude fibre/6% ✓
- High percentage of TDN/80% ✓
- Higher DP/8% ✓
- Therefore it is easily digestible ✓ (Any 2) (2)

2.4.3 **Calculation of nutritive ratio of Feed B**

NR = 1: $\underline{TDN - DP}$ ✓
            DP

$= 1: \underline{50\% - 4\%}$ ✓
              4%
Or
$= 1: \underline{46\%}$ ✓
          4%

$= 1: 11.5/1:12$ ✓ (3)

2.5 **Fodder flow programme**

2.5.1 **Months in which there will be more feed**
2/two months ✓ (1)

2.5.2 **Month in which the feed will be most insufficient**
September/Sep. ✓ (1)

2.5.3 **Calculate the shortage of feed during the month of October**
- 120 tons – 80 tons = 40 tons ✓
- 40 tons x 1000 kg ✓ **or** $\underline{40 \text{ tons x 1000 kg}}$ ✓
                                            1 ton
- = 40 000 kg ✓ (3)

2.5.4 **THREE cost-effective measures of using feed for Jan and Feb**
- Cutting fodder ✓
- Baling/making hay/ensiling (making silage) ✓
- Storage ✓ (3)
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QUESTION 3: ANIMALPRODUCTION, PROTECTION AND CONTROL

3.1   **System of farming**

    3.1.1   **Identification of a production system**
         Back yard/free-range/subsistence ✓ (1)

    3.1.2   **THREE advantages of back yard system to rural communities**
- Less expensive/cheaper ✓
- Easy to manage ✓
- No special equipment needed ✓
- No specialised/expert knowledge needed ✓
- More environmental friendly ✓ (Any 3)   (3)

    3.1.3   **THREE problems of backyard system**
- Easy to contact disease ✓
- Poor feeding/feeding on less nutritious food ✓
- High risk towards predators ✓
- More feed energy is utilised for non-production purpose/low production output/slow growth rate ✓
- High risk towards theft of animals ✓
- Expose to extreme environmental conditions ✓ (Any 3)   (3)

3.2   **Structures, apparatus and appliances used in the handling of farm animals in an animal production system**

    3.2.1   Barbed wire fence to divide area of farmland ✓ (1)

    3.2.2   Kraal made from branches and sticks ✓ (1)

    3.2.3   A shed made from wooden poles and canvas ✓ (1)

    3.2.4   Red flags with warning signs ✓ (1)

3.3   **Production systems**

    3.3.1   **Farming system by FARMER A**
         Extensive system ✓ (1)

    3.3.2   **TWO reasons**
- Fewer workers/2 workers ✓
- Limited facilities/1 cattle handling facility/1 farm shed/8 wind pumps/1 dipping station ✓
- Fewer/smaller number of animals over a large area/400 cattle on 4800 ha ✓
- Cattle kept on natural pasture ✓ (Any 2)   (2)

    3.3.3   **Difference in feeding strategies**
- FARMER A is feeding livestock on natural pasture ✓
- FARMER B is feeding livestock through a feedlot ✓ (2)

3.3.4 **TWO measures to increase production for FARMER A**
- Supplementary feeding/nutrition ✓
- Control adverse environmental conditions through shelter ✓
- Control of pests and diseases ✓
- Correct breeding methods ✓
- More effective grazing system/rotational grazing ✓ (Any 2) (2)

3.4 **The health of an animal**

3.4.1 **Part of an animal body in which the thermometer is inserted**
Rectum/anus ✓ (1)

3.4.2 **Health indicators of acute condition**
(a) Increased/high body temperature ✓ (1)
(b) Faster/rapid respiratory rate ✓ (1)
(c) Faster heart beat ✓ (1)

3.5 **Ticks and control**

3.5.1 **Type and name of tick**
- One-host tick ✓
- Blue tick ✓ (2)

3.5.2 **Disease transmitted**
- Red water ✓
- Anaplasmosis/gall sickness ✓ (Any 1) (1)

3.5.3 **Justification of chemical considered eco-friendly**
- Residual action ✓
- Non-systemic ✓
- Ox-pecker compatible ✓ (Any 2) (2)

3.5.4 **Method of applying the chemical**
Pour-on ✓ (1)

3.5.5 **Evidence of the role of state in controlling remedies and medicines**
- Registration number/Reg. No. G2837/Act 36/1947 ✓
- Active ingredients and their quantities/Deltrametrin 0.50% m/v, Amitraz 2,0% m/v, Piperonyl Butoxide 2,0% m/v ✓ (2)

3.6 **Plant poisoning**

3.6.1 **TWO plants that are poisonous**
- Poison bulb/leaf ✓
- Thorn apple ✓
- Datura *spp* ✓
- *Lantana camara* ✓
- Drimia species (Slangkop) ✓
- Tulp ✓
- Seneciosis spp.✓
- Pachystriga pygmaeum (Gousiektebossie) ✓
- Diplodiosis ✓
- Geeldikkop ✓
- Vermeersiekte ✓
- Vuursiektebossie ✓
- Lupins ✓
- Blue-green algae ✓
- Buffalo grass ✓
- Devil's thorn ✓   (Any 2)   (2)

3.6.2 **THREE measures of preventing plant poisoning**
- Remove poisonous plants from pastures/burn the infested areas/application of herbicides/chemicals ✓
- Remove animals from camps infested with poisonous plants ✓
- Feed/water animals well/provide proper nutrition ✓
- Avoid overgrazing ✓
- Practice rotational grazing ✓
- Inspect hay kept in stables ✓
- Knowledge on poisonous plants ✓
- Do not feed animals moulded hay/cut from areas with poisonous plants ✓   (Any 3)   (3)
                                                                       [35]

QUESTION 4: ANIMALREPRODUCTION

4.1 **Female reproductive organs**

4.1.1 **Identification of parts of a female animal**
- A - Uterine horn ✓
- B - Fallopian tube/oviduct ✓
- C - Ovary ✓
- F - Vagina ✓   (4)

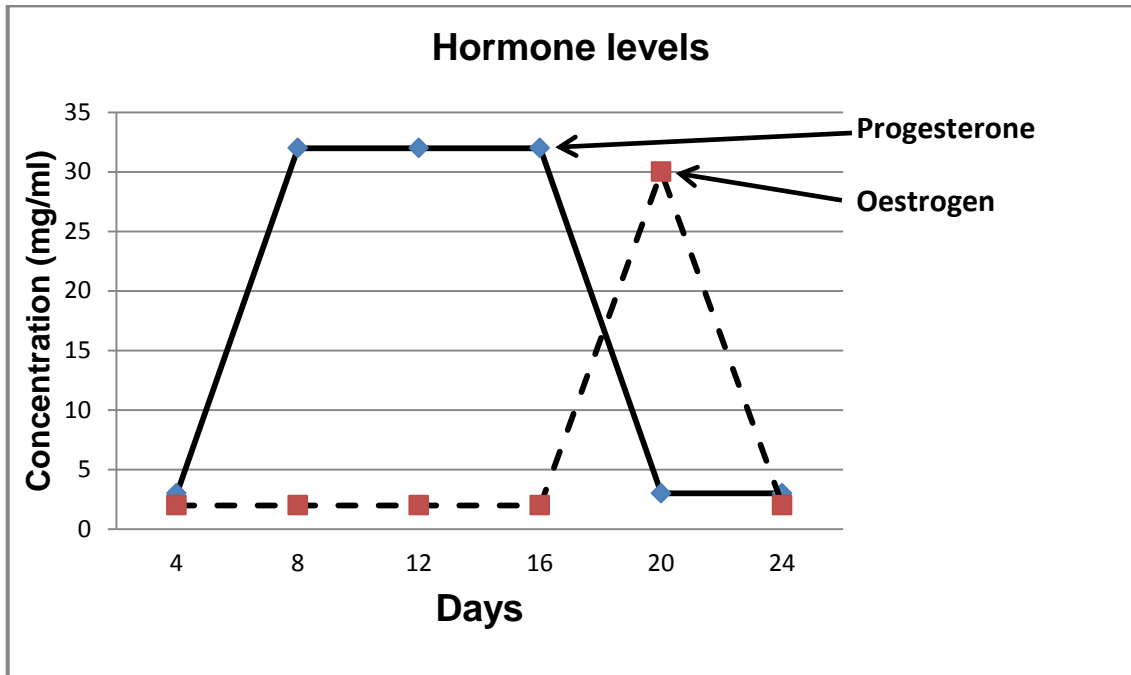4.1.2 **Letter and name with alkaline plug**
- G ✓
- Cervix ✓   (2)

4.2   **Levels of hormones during oestrus cycle**

4.2.1   **Graph of the hormone levels**

Criteria/rubric/marking guidelines
- Correct heading ✓
- Y-axis – correct calibrations and labelled (Concentration) ✓
- X-axis – correct calibrations and labelled (Days) ✓
- Correct unit ✓
- Accuracy ✓
- Line graph ✓   (6)

4.2.2   **Role of progesterone**
Inhibits/suppresses the secretion/functioning of oestrogen ✓   (1)

4.2.3   **Day when follicles will be fully developed**
Day 20 ✓   (1)

4.2.4   **Motivation**
Oestrogen is at its highest level/30mg/ml ✓
Or
Progesterone is at its lowest levels/3mg/ml ✓   (1)

4.3   **Schematic representation of a sperm cell**

4.3.1   **Identification of part B**
Nucleus ✓   (1)

4.3.2   **Part representing acrosome**
A ✓   (1)

4.3.3 The function of part labelled E
Movement/mobility/motility of the sperm cell ✓ (1)

4.3.4 Distinction between a sperm cell and semen
- **Sperm -** Male gamete/reproductive cell ✓
- **Semen -** Mixture of sperm cells and fluids produced by accessory glands ✓ (2)

4.3.5 TWO methods of collecting semen
- Artificial vagina ✓
- Electrical stimulator/electrojaculator ✓ (2)

4.4 Artificial insemination in farm animals

4.4.1 Definition of AI
- A technique whereby semen is artificially collected from bulls ✓
- and artificially placed into the reproductive tract of a female ✓ (2)

4.4.2 THREE requirements for successful AI
- Correct detection of heat/oestrus ✓
- Correct timing ✓
- Use of viable semen ✓
- Correct technique ✓
- Experienced and knowledgeable inseminator ✓
- Observation of hygiene ✓ (Any 3) (3)

4.5 Stages of embryo transfer

4.5.1 Identification of technique
Embryo transfer/ET ✓ (1)

4.5.2 Correct order of embryo transfer
- E/Synchronisation of both donor and recipient cows ✓
- C/Super ovulation of the donor cow ✓
- B/Artificial insemination of the donor cow ✓
- A/Flushing the embryo from the donor cow ✓
- D/Placement of the embryo in the recipient cow ✓ (5)

4.5.3 **TWO benefits of ET**
- More progeny are produced from the best cows ✓
- Profits are made from sales of quality genetics ✓
- Fast cost effective method to improve genetic make-up of the herd ✓
- Extended reproductive life of older and incapable cows ✓
- Genetics in the herd conserved ✓
- Animals can be bred for improved diseases resistance/ milk/meat production (Any 2) (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150