



**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2020



**AGRICULTURAL SCIENCES P1
MARKING GUIDELINE**

MARKS: 150

This marking guideline consists of 9 pages.

SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|------------------------------|----------|------|
| 1.1 | 1.1.1 | B √√ | | |
| | 1.1.2 | D √√ | | |
| | 1.1.3 | A √√ | | |
| | 1.1.4 | C √√ | | |
| | 1.1.5 | C √√ | | |
| | 1.1.6 | B √√ | | |
| | 1.1.7 | A √√ | | |
| | 1.1.8 | D √√ | | |
| | 1.1.9 | A √√ | | |
| | 1.1.10 | B √√ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | None √√ | | |
| | 1.2.2 | Both A and B √√ | | |
| | 1.2.3 | B only √√ | | |
| | 1.2.4 | A only √√ | | |
| | 1.2.5 | A only √√ | | (10) |
| 1.3 | 1.3.1 | Maintenance ration √√ | | |
| | 1.3.2 | Vaccination/immunisation √√ | | |
| | 1.3.3 | Corpus luteum/yellow body √√ | | |
| | 1.3.4 | Ejaculation √√ | | |
| | 1.3.5 | Prolactin √√ | | (10) |
| 1.4 | 1.4.1 | Essential amino acids √ | | |
| | 1.4.2 | Contagious/infectious √ | | |
| | 1.4.3 | Di-oestrus √ | | |
| | 1.4.4 | Vas deferens √ | | |
| | 1.4.5 | Prolapse √ | | (5) |



TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 Alimentary canal of a farm animal****2.1.1 Indication of the age of animals****Diagram A** – Young animal/calf ✓**Diagram B** – Adult animal ✓

(2)

2.1.2 Reason visible in diagram A and diagram B to justify the answer**Diagram A**

- Presence of oesophageal groove ✓
- Under-developed rumen/reticulum/omasum ✓
- Fully developed abomasum ✓

(Any 1) (1)

Diagram B

- Rumination process/regurgitation ✓
- Developed rumen/reticulum/omasum ✓

(Any 1) (1)

2.1.3 Identification of the processes**Arrow A** – Swallowing ✓**Arrow B** – Regurgitation ✓

(2)

2.1.4 Explanation of the importance of regurgitation in digestion

- Regurgitation breaks down food into smaller particles ✓ to increase the surface area for digestion ✓

(2)

2.1.5 Difference of part F/caeca with that of a pig

- A pig has one caecum ✓

(1)

2.1.6 Identification of the letter

- D ✓

(1)

2.2 Mineral deficiency symptoms/supplementation and type of animal**Writing the missing information**

A – Calcium ✓

B – Iron ✓

C – Soil sods/injection ✓

D – Mineral lick ✓

(4)

2.3 Nutritional composition of feeds

2.3.1 Classification of feeds

Concentrates ✓

(1)

2.3.2 TWO importance of feeding animals with concentrates

- Provides energy and protein requirements of an animal ✓
- Necessary for fattening/finishing animals ✓
- For the production of protein rich products ✓
- To balance roughage ✓
- Essential for growth ✓

(Any 2 x 1) (2)

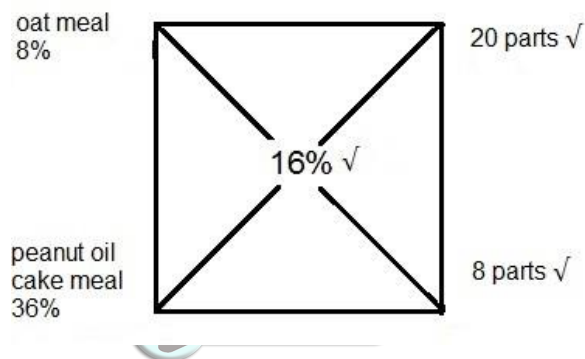
2.3.3 Identification of the feed

(a) Wide nutritive ratio: Oat meal ✓

(b) Narrow nutritive ratio: Peanut oilcake meal ✓

(2)

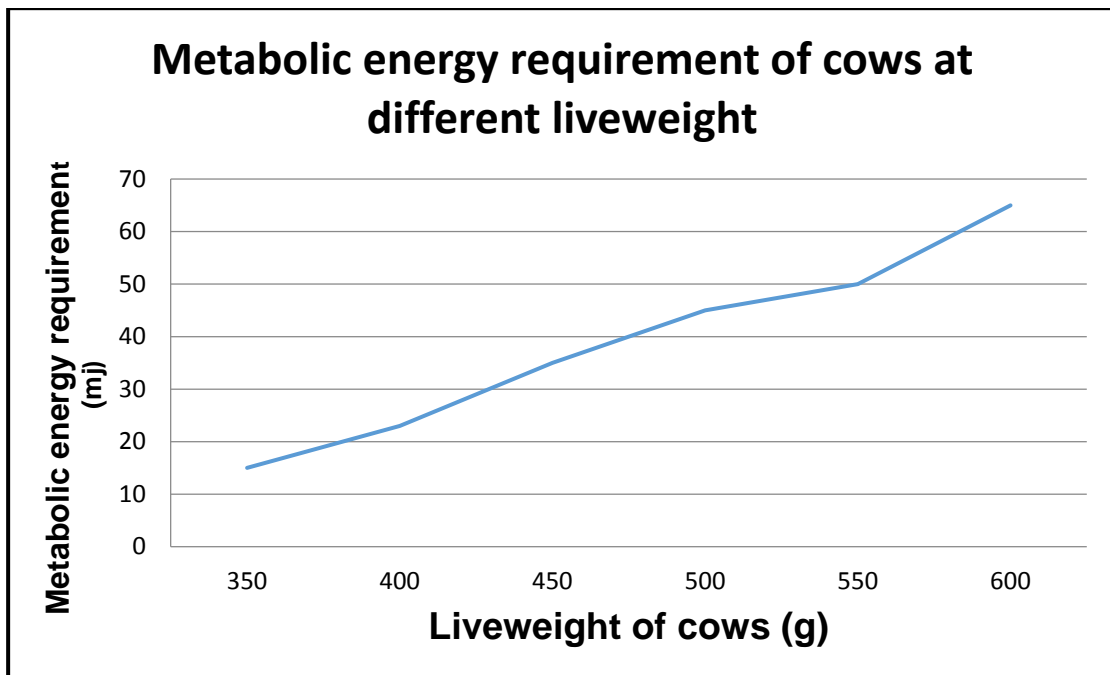
2.3.4 Calculation of the ratio of each feed to get the 16% DP



Ratio of oatmeal to peanut oilcake meal is 20 : 8 ✓

(4)

2.4 2.4.1 Line graph

**Criteria/rubric/marketing guideline**

- Correct heading ✓
- X-axis: Correctly calibrated and labelled (Live weight) ✓
- Y-axis: Correctly calibrated and labelled (Metabolic energy requirement) ✓
- Line graph ✓
- Accuracy ✓
- Correct units (Mj/g) ✓ (6 x 1) (6)

2.4.2 **Deduction of the trend of metabolic requirement per live weight of a cow**

- Metabolic energy requirement increases ✓ with the increase in live weight ✓ (2)

2.4.3 **Calculation of the metabolic energy requirement of a cow with a live weight of 400 kg in 5 days**

$$\begin{aligned} &\text{Metabolic energy requirement} \times \text{number of days} \\ &= 23 \text{ mJ/day} \times 5 \text{ days} \checkmark \\ &= 115 \text{ mJ} \checkmark \end{aligned} \quad (2)$$

2.4.4 **TWO importance of calculating energy value of a feed**

- To determine animal's diet ✓
- To determine feeding standards ✓
- To determine ration formulation ✓ (Any 2 x 1) (2)

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Animal handling****3.1.1 Identification of the picture**

- (a) Picture C ✓
- (b) Picture D ✓
- (c) Picture B/C ✓
- (d) Picture A ✓ (4)

3.1.2 Indication of how the techniques are used

- (a) Hobbling – Tying an animal with a device such as rope to hamper its ability to walk ✓
- (b) Immobilising – Put an electric current through their body to prohibit movement ✓ (2)

3.2 Factors to increase production**3.2.1 Indication of the production system**

- Intensive production system ✓ (1)

3.2.2 Identification of the factors to increase production

- A – General enterprise management ✓
- B – Breeding/reproduction ✓
- C – Nutrition/feeding ✓ (3)

3.2.3 ONE factor to increase production which is not illustrated

- Environment ✓ (1)

**3.2.4 Indication of the way farmers can address the environment**

- Provision of housing/shelter ✓ (1)

3.3 Animal behaviour**3.3.1 Type of animal showing the behaviour**

- A – Pigs ✓
- B – Cattle ✓
- C – Poultry ✓
- D – Sheep ✓ (4)

3.3.2 THREE signs of pigs under stress

- Tail biting ✓
- Ear biting ✓
- Cannibalism ✓
- Belly nibbling ✓
- Snout rubbing ✓ (Any 3 x 1) (3)

3.4 Life cycle of a parasite**3.4.1 Classification of the parasite – External parasite ✓****Name – Blowfly ✓ (2)****3.4.2 Type of an animal susceptible to the parasite**

- Wool sheep ✓ (1)

3.4.3 THREE stages of the life cycle of a parasite visible in the picture

- Larvae ✓
- Pupae ✓
- Adult ✓ (3 x 1) (3)

3.4.4 ONE precautionary measure to prevent the infestation by the parasite.

- Timing of shearing and crutching ✓
- Clipping and cleaning of coat around the affected area ✓
- Tail docking ✓ (Any 1 x 1) (1)

3.5 Animal diseases**3.5.1 Disease that can be transmitted by each of the following methods**

- (a) Transmitted by a bont tick – Heart water ✓
- (b) Transmitted by contaminated shearing equipment – Lumpy wool ✓
- (c) Ingesting eggs from feed contaminated with manure – Coccidiosis ✓
- (d) Transmitted through inhalation – Bovine tuberculosis ✓ (4)

3.5.2 Indication of a non-infectious disease

Anaemia ✓ (1)

3.6 Indication of where the practice to control disease is the role of state or the farmer**3.6.1 Application of prescribed medication**

Farmer ✓ (1)

3.6.2 Importation of vaccines

State ✓ (1)

3.6.3 Ensuring proper sanitation in a milking parlour

Farmer ✓ (1)

3.6.4 Export and import bans

State ✓ (1)

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QUESTION 4: ANIMAL REPRODUCTION**4.1 Reproductive system****4.1.1 Identification of the animal with the reproductive system**

- Cow ✓ (1)

4.1.2 TWO reasons visible to support the answer

- Presence of ovary ✓
- Presence of fallopian tubes ✓
- Presence of cervix ✓
- Presence of the vagina ✓ (Any 2 x 1) (2)

4.1.3 Identification of the letter

- (a) D ✓
- (b) C ✓
- (c) B ✓ (3)

4.1.4 TWO hormones produced in part labelled D/ovary

- Oestrogen ✓
- Progesterone ✓ (2)

4.2 Infertility and sterility in bulls**4.2.1 Differentiation between sterility and infertility**

Sterility is the total loss of fertility ✓ and infertility is the temporal loss of fertility ✓ (2)

4.2.2 TWO congenital defects leading to sterility in bulls

- Hypoplasia ✓
- Cryptorchidism ✓
- Hermaphroditism ✓
- Sperm defects ✓ (Any 2 x 1) (2)

4.2.3 TWO conditions that may cause inability of a bull to copulate

- Injuries to the penis ✓
- Defective penis/corkscrew/too short ✓
- Poorly developed hind legs ✓
- Diseases causing inflammation of the joints ✓ (Any 2 x 1) (2)

4.3 Semen collection, dilution and storage**4.3.1 TWO requirements for semen collection**

- Equipment must be sterile and readily available ✓
- Bull must be clean during semen collection ✓
- Collecting vial must be warmed to prevent damage to sperm cells caused by cold shock ✓
- Area where semen is collected must be close to a laboratory ✓
- Presence of a teaser bull ✓ (Any 2 x 1) (2)

4.3.2 Indication of the main purpose for diluting the semen

- To increase the volume of the semen ✓ (1)

4.3.3 TWO advantages of storing semen for the farmer

- Extending the productive life of superior bulls ✓
- No need to keep and maintain expensive bulls ✓ (2)

4.4 Embryo Transplant/transfer**4.4.1 Re-arranging the steps to ensure successful embryo transfer**

- Treatment of the cow with the gonadotropin hormone ✓
 - Semen is placed into the reproductive tract of a cow ✓
 - Foley catheter is used to recover the embryo ✓
 - Isolation and classification of the embryo ✓
 - Transfer of embryo to the uterus of a cow ✓
- (5)

4.4.2 TWO types of cows involved in embryo transplant

- Donor ✓
 - Surrogate/recipient ✓
- (2)

4.4.3 TWO disadvantages of the embryo transplant

- It is expensive ✓
 - Requires skill and experience ✓
 - Synchronisation of the recipient and donor is difficult ✓
 - Donor may not become pregnant ✓
 - Recipient cow could abort ✓
 - Labour intensive ✓
 - Time consuming ✓
 - Decreases genetic variability ✓
 - Greater management demand ✓
- (Any 2 x 1) (2)

4.5 Normal lactation**4.5.1 Identification of the week when the cow reached her maximum production**

Week 8 ✓ (1)

4.5.2 TWO benefits of the milk produced within the first 3 days of parturition for the calf

- It provides antibodies to increase the calf's resistance to diseases ✓
 - Supplies nutrients to the calf ✓
 - Necessary for the normal growth, functioning and maturation of the alimentary canal ✓
- (Any 2 x 1) (2)

4.5.3 Explanation of the relationship between the percentage of butter fat content and quantity of milk produced

When milk production reached its maximum during week 8 and decreased until week 42 ✓ butterfat content decreased at week 8 and increased until week 42. ✓ (2)

4.5.4 Period in lactating cow after 42 weeks

Dry period ✓ (1)

4.5.5 Importance of dry period

It gives the glandular tissue of the udder time to recover. ✓ (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150