SENIOR CERTIFICATE EXAMINATIONS/
NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1
2019
MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 pages.
SECTION A

QUESTION 1

<table>
<thead>
<tr>
<th>Sub-Question</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>C ✓✓</td>
</tr>
<tr>
<td>1.1.2</td>
<td>B ✓✓</td>
</tr>
<tr>
<td>1.1.3</td>
<td>B ✓✓</td>
</tr>
<tr>
<td>1.1.4</td>
<td>D ✓✓</td>
</tr>
<tr>
<td>1.1.5</td>
<td>A ✓✓</td>
</tr>
<tr>
<td>1.1.6</td>
<td>D ✓✓</td>
</tr>
<tr>
<td>1.1.7</td>
<td>B ✓✓</td>
</tr>
<tr>
<td>1.1.8</td>
<td>C ✓✓</td>
</tr>
<tr>
<td>1.1.9</td>
<td>A ✓✓</td>
</tr>
<tr>
<td>1.1.10</td>
<td>D ✓✓</td>
</tr>
</tbody>
</table>

(10 x 2) (20)

<table>
<thead>
<tr>
<th>Sub-Question</th>
<th>Marking</th>
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</thead>
<tbody>
<tr>
<td>1.2.1</td>
<td>B only ✓✓</td>
</tr>
<tr>
<td>1.2.2</td>
<td>None ✓✓</td>
</tr>
<tr>
<td>1.2.3</td>
<td>Both A and B ✓✓</td>
</tr>
<tr>
<td>1.2.4</td>
<td>A only ✓✓</td>
</tr>
<tr>
<td>1.2.5</td>
<td>B only ✓✓</td>
</tr>
</tbody>
</table>

(5 x 2) (10)

<table>
<thead>
<tr>
<th>Sub-Question</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1</td>
<td>Peristalsis ✓✓</td>
</tr>
<tr>
<td>1.3.2</td>
<td>Shed/feed shed/silo/barn ✓✓</td>
</tr>
<tr>
<td>1.3.3</td>
<td>Cloning/nuclear transfer ✓✓</td>
</tr>
<tr>
<td>1.3.4</td>
<td>Synchronisation of oestrus ✓✓</td>
</tr>
<tr>
<td>1.3.5</td>
<td>Freemartin ✓✓</td>
</tr>
</tbody>
</table>

(5 x 2) (10)

<table>
<thead>
<tr>
<th>Sub-Question</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4.1</td>
<td>Biological value/BV ✓</td>
</tr>
<tr>
<td>1.4.2</td>
<td>Chronic ✓</td>
</tr>
<tr>
<td>1.4.3</td>
<td>Hypoplasia ✓</td>
</tr>
<tr>
<td>1.4.4</td>
<td>Mummification ✓</td>
</tr>
<tr>
<td>1.4.5</td>
<td>Implantation ✓</td>
</tr>
</tbody>
</table>

(5 x 1) (5)

TOTAL SECTION A: 45
SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 Alimentary canal of a farm animal

2.1.1 Name of the animal
Poultry/fowl/chicken ✓

2.1.2 Identification of the letter
(a) C ✓
(b) E ✓
(c) A ✓

2.1.3 The role of part B in digestion
It moistens ✓ and softens/soaking food ✓

2.1.4 Identification of the letter corresponding to a pig stomach
A ✓

2.2 Digestion in the stomach and small intestines

2.2.1 Name of the enzymes
A Rennin ✓
E Lipase ✓

2.2.2 Identification of the labels
B Peptides/polypeptides/peptones/proteoses ✓
C Starch ✓
F Amino acids ✓

2.2.3 Part of the small intestines where digestion occurs
Duodenum ✓

2.2.4 Explanation of the importance of fat emulsification
It increases the surface area ✓ for easier digestion ✓

2.3 Minerals and vitamins

2.3.1 Zinc ✓

2.3.2 Vitamin A ✓

2.3.3 Phosphorus ✓

2.3.4 Vitamin K ✓

2.4 Nutritive ratio

2.4.1 Recommendation of the feed
(a) Feed B ✓
(b) Feed A ✓
(c) Feed C ✓
2.4.2 **Indication of the part representing digestible non-nitrogen**

8 ✓

2.4.3 **Justification for recommending feed A for a calf**

It is rich in protein/narrow nutritive ratio ✓ needed for growth ✓

(2)

2.5 **Pearson square**

2.5.1 **The method used to prepare a ration**

Pearson square method ✓

(1)

2.5.2 **Calculation of the ratio of maize : sunflower oilcake meal**

Maize 14% 29 parts ✓

\[
\text{Sunflower 45%} \quad \text{2 parts ✓}
\]

Ratio of maize to sunflower oilcake meal is 29:2 ✓

(4)

2.5.3 **Calculation of percentage of sunflower oilcake meal**

\[
29 + 2 = 31 ✓
\]

\[
\frac{2}{31} \times 100 ✓
\]

\[
= 6,45/6,5% ✓
\]

OR

\[
\frac{2}{31} ✓ \times 100 ✓
\]

\[
= 6,45/6,5% ✓
\]

(3)

2.6 **TWO roles of a good fodder flow programme**

- To ensure safe use of the resources ✓
- To meet animal feed requirements ✓
- Margin over feed costs ✓
- Manageability ✓
- Focus on weekly/monthly/annual production and consumption ✓
- Ensure the continual supply of fodder to animals ✓

(Any 2) [35]
QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Farming systems

3.1.1 Identification of farming systems
A Subsistence ✓
B Commercial ✓

3.1.2 Comparing subsistence and commercial farming systems
(a) Purpose of the output
Subsistence - Output is mainly for feeding the family/not for profit ✓
Commercial - Output is mainly for selling/profit ✓

(b) Impact on environment
Subsistence - No/little impact as there is no pollution ✓
Commercial - Huge impact because of high production of manure/higher rate of pollution ✓

3.1.3 Disadvantage of farming system B
Large scale spread of diseases/loss of production ✓

3.1.4 Economic benefit of farming system B over A
High production/income/profit for the farmer ✓

3.2 Facilities used in an animal production enterprise

3.2.1 Identification of the facilities
A Water trough ✓
B Feed trough ✓

3.2.2 Indication of the purpose for facility C
To restrain farm animals ✓

3.3 Life cycle of a parasite

3.3.1 Classification of parasite
Internal/endoparasite ✓

3.3.2 Reason
It lives in the body of the host ✓

3.3.3 Identification of intermediate host
Snailslug ✓

3.3.4 Environmental condition for survival of an intermediate host
Wet/moist condition ✓
3.3.5 TWO precautionary measures to prevent parasite infestation
- Avoid/fence off wet areas during grazing ✓
- Rotational grazing/resting veld ✓
- Zero grazing ✓
- Veld burning ✓
- Breed animals resistant to parasite infestation ✓
- Clean drinking water ✓
- Provision of good nutrition ✓

(Any 2) (2)

3.4 Animal handling
3.4.1 TWO reasons for handling farm animals
- Normal management programmes of animals/dehorning/marking/castration/docking ✓
- Prevention/treatment of parasites/dosing/vaccination ✓
- Determination of the animal’s age ✓
- Determination of pregnancy ✓
- Generation of data such as growth rate, mass and market readiness ✓
- Transportation of animals ✓

(Any 2) (2)

3.4.2 Effect of incorrect handling practice
(a) Animals will flee/lash out/injures the handler/get startled ✓ (1)
(b) Sheep will be injured/damage the skin ✓ (1)
(c) There will be fighting/aggression ✓ (1)

3.5 TWO basic housing requirements
- Protection from extreme climatic conditions/direct solar radiation/rain/wind ✓
- Sufficient/adequate lighting ✓
- Provision of cooling/heating systems ✓
- Provision of bedding ✓
- Food and clean water should be easily accessible ✓
- Easy movement of workers should be ensured ✓
- Housing construction must be cost-effective ✓
- Appropriate size to minimize over-crowding ✓

(Any 2) (2)

3.6 Diseases caused by micro-organisms in farm animals
3.6.1 Identification of the letters
(a) Mastitis ✓ (1)
(b) Virus ✓ (1)
(c) Dark/red urine ✓ (1)
(d) Wool sheep/Merino sheep ✓ (1)
(e) Protozoa ✓ (1)
3.6.2 **TWO roles of the state in the control of farm animal diseases**
- Public awareness/notify public ✓
- Conduct research ✓
- Import/export bans ✓
- Supplying veterinary services ✓
- Generate and implement legislation ✓
- Control movement of animals/movement permits ✓
- Setting of quarantine zones ✓

(Any 2) (2)

3.7 **Salt poisoning in livestock**

3.7.1 **TWO symptoms of salt poisoning**
- Increased thirst ✓
- Dry/red mucous membranes of the mouth ✓
- Hypersensitivity ✓
- Irritability ✓
- Excessive salivation ✓
- Increased urination/defecations ✓
- Constipation ✓
- Vomiting and regurgitation ✓
- Inflammation of the stomach ✓
- Abdominal pain and diarrhoea ✓
- Wobbling/staggering/circling/blindness/seizures/paralysis ✓
- Dragging the hind legs/knuckling of the fetlock ✓
- Aggressiveness ✓

(Any 2) (2)

3.7.2 **TWO ways of treating animals with salt poisoning**
- Immediate removal of the source ✓
- Treatment with hypertonic dextrose/isotonic saline solution ✓
- Provision of fresh/clean water ✓

(Any 2) (2)

[35]

**QUESTION 4: ANIMAL REPRODUCTION**

4.1 **Diagram of a sperm cell**

4.1.1 **Identification of Part A**
Nucleus ✓

(1)

4.1.2 **Letter of the part representing the acrosome**
B ✓

(1)

4.1.3 **Function of the Parts**
(a) **Part D** Provides energy to the sperm cell for movement ✓

(1)

(b) **Part E** Facilitates/propel movement of the sperm cell ✓

(1)
4.2 Male reproductive organs

4.2.1 Vas/ductus deferens/semenal tube ✓

4.2.2 Prostate gland ✓

4.2.3 Epididymis/vesicular gland/semenal vesicle ✓

4.3 Hormonal control during the oestrus cycle

4.3.1 Definition of oestrus cycle
Recurring periods of oestrus ✓ alternating with sexual rest ✓

4.3.2 Process at B
Ovulation ✓

4.3.3 Function of luteinising hormone
- Stimulates the rupturing of the Graafian follicles/causes ovulation ✓
- For maturation of oocytes ✓
- For the formation of corpus luteum ✓
- Facilitates the capturing of the ova/tightening the infundibulum ✓

(Any 1)

4.3.4 THREE signs of oestrus in cows
- Mounts other cows ✓
- Restlessness ✓
- Swelling of the vulva ✓
- Excessive mucus secretion from the vulva ✓
- Mucus membranes of the vagina appears red and moist ✓
- Scratches, manure and mud on the rear end ✓
- Cows sniffs/licks the genitalia of other cows ✓
- Tail/head/rump hair is fluffed up ✓
- Raised tail ✓
- Loss of appetite ✓
- Decrease in milk production ✓
- Allows Mating ✓

(Any 3)
4.4 Stages of the oestrus cycle

A bar graph on the duration (in days) of the different stages in the oestrus cycle in various female farm animals

Criteria/rubric/marketing guidelines
- Correct heading ✓
- X-axis: Correct calibrations and labelled (Various female farm animals) ✓
- Y-axis: Correct calibrations and labelled (Duration) ✓
- Correct unit (Days) ✓
- Bar graph ✓
- Accuracy ✓ (6)

4.5 Technique used by farmers

4.5.1 Identification of the technique
Artificial Insemination/AI ✓ (1)

4.5.2 TWO characteristics of good, quality semen
- Colour - whitish to yellowish/milky/opaque ✓
- Sticky ✓
- Less than 15% dead sperm cells/less mortality rate ✓
- 80% of sperm cells showing forward movement/mobility/motility/viability ✓
- Less than 20% deformation/normal morphology ✓
- Characteristic odour ✓
- Healthy/disease free semen ✓
- pH - 6.4 to 6.9/slightly acidic ✓
- Concentration - 1.1 to 4.5 billion sperm cells per ml ✓
- Volume - 4 to 8ml ✓ (Any 2) (2)
4.5.3 **Apparatus held by the hand**
A Pistolette/insemination gun ✓ (1)

4.5.4 **Best time for inseminating a cow**
The next morning ✓ (1)

4.5.5 **ONE negative effect of technique by inexperienced person**
- Injury of the reproductive tract of the cow ✓
- Unexpected low pregnancy result ✓ (Any 1) (1)

4.6 **Reproductive technique conducted in cows**

4.6.1 **Reproductive technique**
Embryo transplant/ET ✓ (1)

4.6.2 **Letters representing the FIRST TWO stages in sequence**
E ✓
C ✓ (2)

4.6.3 **TWO benefits of the technique to farmers**
- More progeny produced from best cows ✓
- More profit ✓
- Fast genetic improvement of the herd ✓
- Productive life of older cows is extended ✓
- Breeding animals with improved efficiency of production ✓
- Genes in a herd are conserved/prevent extinction of valuable animals ✓ (Any 2) (2)

4.7 **Stage of pregnancy**

4.7.1 **Term for a fertilised diploid cell**
Zygote ✓ (1)

4.7.2 **Cell containing 16 cells of the stage**
Morula ✓ (1)

4.7.3 **TWO non-infectious causes of termination of pregnancy**
- Injuries ✓
- Malnutrition/incorrect feeding ✓
- High dosage of drugs and hormones ✓
- Chemical poisoning/strong laxative/toxic feeds ✓
- Maltreatment/stress/trauma ✓
- Transportation ✓
- Vaccination ✓
- Embryo abnormalities/ovum/sperm defects ✓
- Genetic defects ✓
- Multiple foetus pregnancies ✓ (Any 2) (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

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