SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

JUNE 2017

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 10 pages.
SECTION A

QUESTION 1

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

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

1.3 1.3.1 Eructation/belching/burping ✓✓
    1.3.2 Farrowing pen ✓✓
    1.3.3 Lactation ✓✓
    1.3.4 Flushing/harvesting ✓✓
    1.3.5 Concentration ✓✓ (5 x 2) (10)

1.4 1.4.1 Finisher ✓
    1.4.2 Optimal/optimum ✓
    1.4.3 Oxytocin ✓
    1.4.4 Multiple ✓
    1.4.5 Implantation ✓ (5 x 1) (5)

TOTAL SECTION A: 45
SECTION B

QUESTION 2: ANIMAL NUTRITION

2.1 An alimentary canal of fowls

2.1.1 Identification of the letter of TWO parts representing accessory glands
- D ✔
- E ✔ (2)

2.1.2 Function of the parts
- B - Secretion of digestive juices/enzymes/chemical digestion ✔
- C - Grinding of the food/mechanical (physical) digestion ✔ (2)

2.1.3 Structural difference between the large intestines of fowls and cattle
- Fowls have caeca/two blind guts ✔
- Cattle have caecum/one blind gut ✔ (2)

2.2 Energy distribution

2.2.1 Identification
- A - Metabolic energy/ME ✔ (1)
- B - Faeces/manure ✔ (1)
- C - Energy loss through heat ✔ (1)

2.2.2 DE in full
- Digestible energy ✔ (1)

2.2.3 THREE important uses of net energy by farm animals
- Maintenance ✔
- Production ✔
- Growth ✔
- Reproduction ✔
- Fattening ✔
- Work ✔ (Any 3) (3)

2.3 Ration in sheep

2.3.1 Identification of the feed components
- (a) - Lucerne hay ✔
- (b) - Maize meal ✔
- (c) - Urea ✔ (3)

2.3.2 Calculation (in percentage) of the mineral content
- 5% + 2% ✔
- = 7 ✔% ✔ (3)

2.3.3 Reason for the inclusion of salt in licks
- To regulate/control the intake of licks ✔ (1)
2.4 The composition of feeds

2.4.1 Calculation of the nutritive ratio (NR) of feed A

NR = 1: % digestible non-nitrogen components

OR

NR = 1: \( \frac{TDN - DP}{DP} \)

\[= 1: \frac{80\% - 8\%}{8\%} \quad \text{OR} \quad 1: \frac{72\%}{8\%} \]

\[= 1:9 \]

(3)

2.4.2 Feed recommended for fattening

Feed A

(1)

2.4.3 Reason

Wide NR/1:9/contains more carbohydrates than proteins

(1)

2.4.4 Distinction between

Narrow NR

- NR is lower than 1:6/contains more proteins

Wide NR

- NR is greater or equal to 1:6/contains more carbohydrates and fats

(1)

2.5 Production of lucerne over a period of one year

2.5.1 Identification of the months with the lowest lucerne production

- June
- July

(2)

2.5.2 Reason for the answer in QUESTION 2.5.1

- Lowest quantity/50 kg DM/ha
- Winter/dry season in the summer rainfall areas
- Limited rain in the summer rainfall areas
- Not in the growing season

(Any 1)

(1)

2.5.3 TWO measures to address low production

- Storage of excess feed during the growing season
- Reduce livestock
- Provision of supplementary feeding

(Any 2)

(2)

2.5.4 Calculation of the production from August to December

\[200 + 300 + 400 + 600 + 1200 \quad \text{\checkmark}

= 2700 \text{ kg \checkmark}

\[= 2700 \times \frac{1 \text{ kg}}{1000 \text{ kg}} \]

= 2.7 tons

(3)

[35]
QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

3.1 Scenario on animal handling

3.1.1 THREE basic guidelines for vehicles transporting animals
- Suitable for the animals ✓
- Sufficient floor space ✓
- Sides must be strong ✓
- The back must be closed to avoid inhalation of exhaust fumes ✓
- Sides need to be high enough ✓
- Floors should not be slippery/bedding ✓
- No sharp edges to harm/injure animals ✓
- Protection against cold/hot conditions
- Well ventilated ✓
- Provide shade ✓
- Must be kept clean ✓

(Any 3) (3)

3.1.2 TWO important aspects for moving animals on a public road
- Red flag 200 m in front/behind ✓
- Move on the side of the road ✓
- Preferably in the morning ✓
- Move the animals slowly at their own pace ✓
- Always carry proper documentation/permit ✓

(Any 2) (2)

3.1.3 TWO guidelines when moving cows with calves
- Give cows time to pick up their calves before moving ✓
- Avoid chasing cows and calves with dogs ✓
- Beware of aggressive behaviour/avoid being too close ✓
- Move them slowly ✓
- Keep an obstruction between handler and the cows ✓

(Any 2) (2)

3.2 Facility used in an animal production system

3.2.1 Reason for handling farm animals in facility
A Administration of medication/observation/handling/management practices/procedure ✓

(1)

B Dipping ✓

(1)

3.2.2 TWO basic design features of the handling facility A
- Must be strong ✓
- Functional for the specific animal ✓
- Able to see other animals in front of them/no dead ends ✓
- Sufficient width according to the type of animal ✓
- Make provision to immobilise/sort animals ✓
- Animals should be able to see through ✓
- No sharp edges to harm/injure animals ✓

(Any 2) (2)
3.2.3 **THREE effects of incorrect handling of sheep**
- Damages the skin/wool/meat ✓
- Leads to injured and stressed animals ✓
- Rams can harm a handler ✓
- Ewes may reject their lambs ✓
- Sheep will get frightened ✓

(Any 2) (2)

3.3 **Graph on the visits to feed and water troughs.**

3.3.1 **Bar graph on the visits to the feed and water troughs at different temperatures**

![Bar graph on the visits to water and feed troughs at different temperatures](image)

**Criteria/rubric/markings guidelines**
- Correct heading ✓
- Y-axis - correctly calibrated and labelled (Number of visits) ✓
- X-axis - correctly calibrated and labelled (Temperature) ✓
- Correct unit (°C) ✓
- Bar graph ✓
- Accuracy ✓

(6)

3.3.2 **Indication of the trend**
The higher the temperature the more visits to the water troughs ✓
and the fewer the visits to the feed troughs ✓

OR
The lower the temperature the lesser visits to the water troughs ✓
and the more the visits to the feed troughs ✓

(2)

3.3.3 **Measure to reduce the impact of varying temperatures**
- Provision of shelter ✓
- Heating/cooling/air conditioners ✓

(Any 1) (1)
3.4 The life cycle of an internal parasite in farm animals

3.4.1 Classification according to the life cycle

Two host parasite ✓ (1)

3.4.2 Identification of the two hosts needed by the parasite

• Mites ✓
• Sheep ✓ (2)

3.4.3 THREE symptoms of parasite infestation

• Poor growth/production/dry rough hair/wool ✓
• Weight loss (weakness/listlessness) ✓
• Loss of appetite/anorexia/eating disorders ✓
• Pot/bloated belly ✓
• Diarrhoea ✓
• White segments in the faeces ✓
• Digestive disorders ✓ (Any 3) (3)

3.5 Management practices to control external parasites

3.5.1 Identification of the management practice

(a) Biological control ✓ (1)
(b) Immunization ✓ (1)
(c) Breeding ✓ (1)

3.5.2 THREE economic implications of these parasites

• Production losses ✓
• Death of animals ✓
• Skin/hides/teats/udders/ears are damaged ✓
• Financial/cost/time/labour implications of treatment ✓
• Loss of profit ✓ (Any 3) (3) [35]
QUESTION 4: ANIMAL REPRODUCTION

4.1 The reproductive tract of the bull

4.1.1 Identification of parts
A Seminal vesicle/vesicular gland ✓ (1)
B Prostate gland ✓ (1)

4.1.2 ONE function of part G
Secretes the seminal fluid ✓ (1)

4.1.3 The role of the hormone secreted in part E
• Responsible for the development of the secondary male characteristics ✓
• Normal mating behaviour/enhance sexual behaviour/libido ✓
• Production/transportation of spermatozoa ✓
• Maintenance of optimal conditions for spermatogenesis ✓
• Maintenance of the male duct system ✓ (Any 1) (1)

4.1.4 Reason for part F located outside the body of the bull
Regulate the temperature of the testis for spermatogenesis ✓ (1)

4.1.5 The process used to remove part E in young calves
Castration ✓ (1)

4.2 Infertility in bulls

4.2.1 A term for identified condition
Infertility/sterility ✓ (1)

4.2.2 THREE causes of infertility
• Diseases ✓
• Infections ✓
• Congenital defects ✓
• Malnutrition ✓
• Old age/senility ✓
• High environmental temperatures ✓ (Any 3) (3)

4.2.3 THREE characteristics of a good quality semen
• Mobility/live sperm cells ✓
• Concentration of sperm cells ✓
• Less than 20%/few abnormalities/defects ✓ (3)
4.3 Scenario on artificial insemination

4.3.1 Method of detecting the presence of the diseases in semen
- Microscopic examination ✓
- Macroscopic/physical examination ✓

(Any 1) (1)

4.3.2 TWO requirements for successful artificial insemination
- Use only good quality/live/viable/healthy/clean semen ✓
- Correct technique ✓
- Operator with experience/expert knowledge/skill ✓
- Correct timing/cows needs to be in oestrus ✓
- Clean/sterile equipment ✓

(Any 2) (2)

4.3.3 Equipment used for artificial insemination
(a) Electro-ejaculator/electrical stimulation probe ✓
(b) Nitrogen flask/tank ✓
(c) Semen straw ✓

(1) (1) (1)

4.3.4 TWO disadvantages of artificial insemination
- Spread of diseases if semen is not tested ✓
- Inexperience/unskilled operator may cause damage to the animal ✓
- Decreased genetic variation ✓
- Some heifers are difficult to inseminate successfully ✓
- May not give the desirable results ✓
- Higher management demands ✓
- Undesirable traits/congenital defects may be transferred to more offspring ✓
- Labour intensive ✓
- Time consuming ✓
- Expensive procedure ✓

(Any 2) (2)

4.4 The reproduction process

4.4.1 Identification of parts
A Ovum/female reproductive cell/gamete/egg cell ✓
B Embryo ✓

(1) (1)

4.4.2 The structure/organ in the reproduction canal
(a) Uterus ✓
(b) Fallopian tube/oviduct ✓
(c) Ovary ✓

(1) (1) (1)
4.4.3 Termination of pregnancy
(a) Abortion/miscarriage ✓
(b) One cause of abortion
• Malnutrition ✓
• Injuries ✓
• Hormonal disturbances/stress conditions ✓
• Toxins/poisonous substances/laxatives/clovers high in oestrogen/immunization of pregnant animals ✓
• Diseases ✓
• Multiple births ✓
(Any 1) (1)

4.5 Embryo transplant (ET)

4.5.1 Type of cow
Donor/superior cow ✓ (1)

4.5.2 Motivation
Embryos are flushed from the uterus ✓ (1)

4.5.3 The concept recipient cow
An inferior/surrogate cow that receives an embryo, mothers and gives birth ✓ to a superior calf ✓ (2)

4.5.4 TWO disadvantages of embryo transplant
• Conception rate is low ✓
• Expensive procedure/no guarantees for success ✓
• Very scientific/complex procedure ✓
• Expert knowledge/skills required/veterinarian ✓
• Time consuming/labour intensive ✓
• Diseases can be transmitted ✓
• Abortions may occur ✓
(Any 2) (2)

4.5.5 The main reason for embryo transplant
To produce more genetically superior offspring from genetically superior parents ✓ (1)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150