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 ✓
- B - Faeces/manure ✓
- C - Energy loss through heat ✓  

(1)

(1)

(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 ✓
% digestible crude protein

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

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

\[= 1:9 \] ✓

(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
\[200 + 300 + 400 + 600 + 1 200 \]
\[= 2 700 \text{ kg} \] ✓
\[= 2,7 \text{ tons} \] ✓

(3)
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
- 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

Criteria/rubric/marking 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 ✓

3.4.2 Identification of the two hosts needed by the parasite
- Mites ✓
- Sheep ✓

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 ✓
(b) Immunization ✓
(c) Breeding ✓

(1) (1) (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)
QUESTION 4: ANIMAL REPRODUCTION

4.1 The reproductive tract of the bull

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

4.1.2 ONE function of part G
Secretes the seminal fluid ✓

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 ✓

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

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

4.2 Infertility in bulls

4.2.1 A term for identified condition
Infertility/sterility ✓

4.2.2 THREE causes of infertility
- Diseases ✓
- Infections ✓
- Congenital defects ✓
- Malnutrition ✓
- Old age/senility ✓
- High environmental temperatures ✓

4.2.3 THREE characteristics of a good quality semen
- Mobility/live sperm cells ✓
- Concentration of sperm cells ✓
- Less than 20%/few abnormalities/defects ✓
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 ✓ (1)
(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