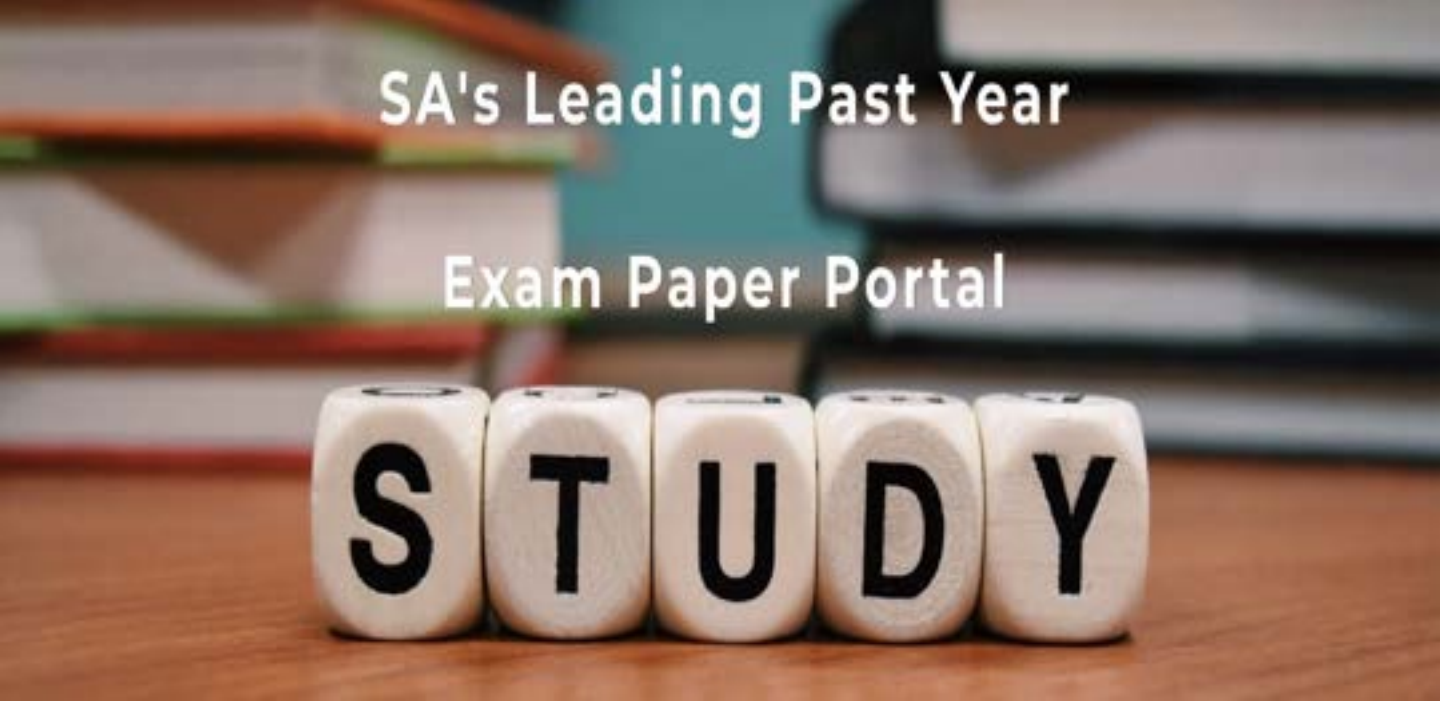

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SENIOR CERTIFICATE EXAMINATIONS

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: $\frac{\%\text{ digestible non-nitrogen components}}{\%\text{ digestible crude protein}}$ ✓

OR

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

= 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 ✓ (1)

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 ✓

= $\frac{2\,700\text{ kg}}{1\,000}$ ✓

= 2,7 tons ✓ (3)

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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

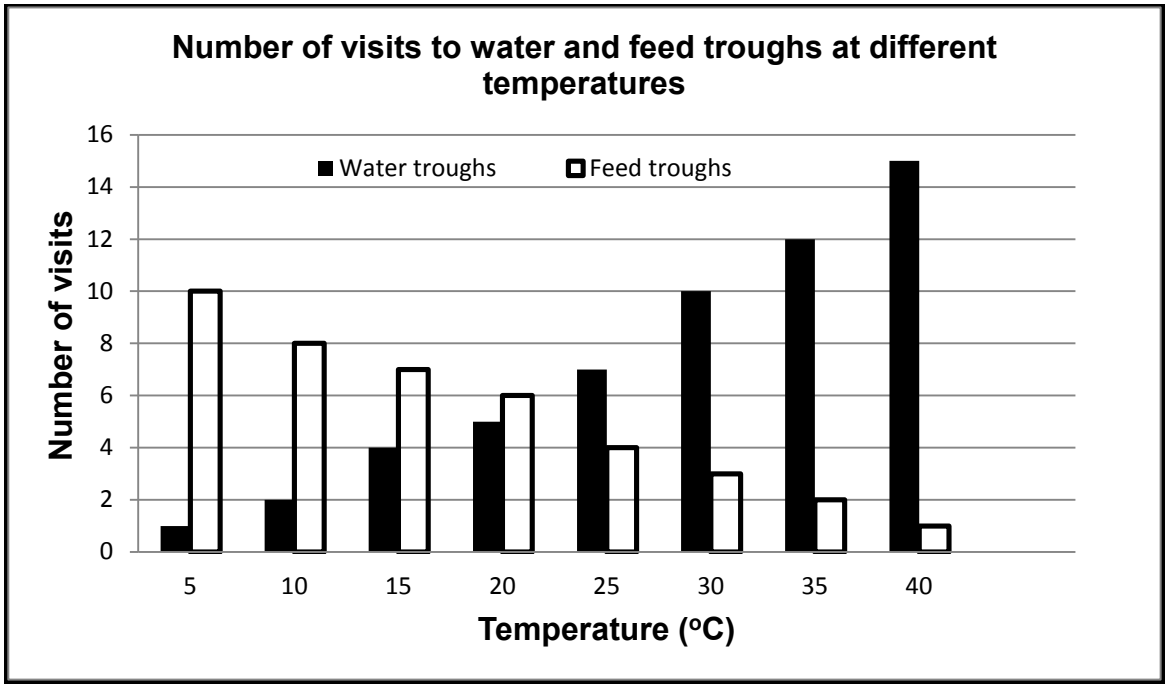
- Must be strong ✓
- Functional for the specific animal ✓
- Able to see other animals in front of them/no dead ends ✓
- Sufficient width according to the type of animal ✓
- Make provision to immobilise/sort animals ✓
- Animals should be able to see through ✓
- No sharp edges to harm/injure animals ✓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



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 ✓ (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)

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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 ✓ (1)
(b) Nitrogen flask/tank ✓ (1)
(c) Semen straw ✓ (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 ✓ (1)
B Embryo ✓ (1)

4.4.2 The structure/organ in the reproduction canal

(a) Uterus ✓ (1)
(b) Fallopian tube/oviduct ✓ (1)
(c) Ovary ✓ (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)

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TOTAL SECTION B: 105
GRAND TOTAL: 150