

POSSIBLE ANSWERS FOR:**AGRICULTURAL SCIENCE SG****TIME: 3 hours****MARKS: 300****QUESTION 1**

- 1.1 D
- 1.2 A
- 1.3 A
- 1.4 C
- 1.5 B
- 1.6 C
- 1.7 C
- 1.8 D
- 1.9 A
- 1.10 C
- 1.11 D
- 1.12 B
- 1.13 C
- 1.14 B
- 1.15 A
- 1.16 B
- 1.17 A
- 1.18 A
- 1.19 B
- 1.20 B

2 x 20 = **[40]****QUESTION 2**

- 2.1
 - 2.1.1 Keratomalaise
 - 2.1.2 Clay
 - 2.1.3 Ovulation
 - 2.1.4 Villi
 - 2.1.5 Epididymis
 - 2.1.6 Neighbour pollination
 - 2.1.7 Progressive plant succession
 - 2.1.8 Soil surveys
 - 2.1.9 Tensiometer
 - 2.1.10 Open drains
 - 2.1.11 Over-capitalisation
 - 2.1.12 Labour
 - 2.1.13 Law of diminishing returns
 - 2.1.14 Light
 - 2.1.15 Peristalsis

1 x 15 = **[30]**

2.2	2.2.1	Abomasum	G		
	2.2.2	Glycogen	I		
	2.2.3	Bonsmara	K		
	2.2.4	Bulk density	A		
	2.2.5	Microspores	J		
	2.2.6	Dicotyledonous flower	C		
	2.2.7	Spray irrigation	D		
	2.2.8	Tensiometer	B		
	2.2.9	Sertoli cells	E		
	2.2.10	Organic matter	F	1 x 10 =	[10]
TOTAL FOR SECTION A:					[80]

**SECTION B
QUESTION 3**

3.1.1 LOSS OF WATER

- A. Transpiration
 - B. Surface evaporation
 - C. Run-off
 - D. Percolation
- (4)**

- 3.1.2**
- Use nitrogen fertilizers sparingly
 - Select cultivars with a low transpiration ratio
 - Choose cultivars with a short growing season
 - Eradicate weeds
 - Controlled irrigation
- (5)**

3.1.3 Capillarity **(1)**

3.1.4 Run-off **(1)**

3.1.5 DEVELOPMENT OF STRUCTURE

- Colloidal material
 - Alternating wetting and drying
 - Climate
 - Plant roots
 - Type of clay mineral present
- (5)**

3.1.6 Soil subject to continual changes, viz.

- Soil forming
 - Soil leaching
 - Soil erosion process
- (3)**

3.1.7 Soil profile: A vertical section through soil showing the different major horizons **(2)**

Soil horizon: A layer of soil, more or less parallel to the soil surface **(2)**

3.1.8 SOIL TEMPERATURE - FACTORS

- Soil depth
- Soil colour
- Vegetation
- Soil water content
- Seasonal changes
- Soil slope

(7)

3.1.9 EFFECTS OF BLACK BRAK

Osmosis is hindered.

- Toxic quantities of salt collect.
- Soil becomes structureless.
- Reduced microbial activity.
- Denitrification may take place.

(5)
[40]

QUESTION 4

4.1 4.1.1 ALIMENTARY CANAL OF CATTLE

- A. Oesophagus
- B. Rumen
- C. Omasum
- D. Reticulury
- E. Ileum
- F. Colon
- G. Anus
- H. Rectum
- I. Jejenum
- J. Duodenum
- K. Caecum

(10)

- 4.1.2
- A. Omasum C
 - B. Rumen reticulum B + D
 - C. Anus G
 - D. Duodenum (small intestine – ileum, jejunum)
 - E. Colon F

(5)

4.2 REQUIREMENTS FOR MICRO ORGANISMS

- Sufficient mineral nutrients
- Easily digestible carbohydrates
- Sufficient nitrogen

(6)

4.3 BILE FUNCTIONS

- Neutralises chime
- Creates alkaline medium which activates lipase
- Aids in break up of fat drops in the alimentary canal
- Enhances peristalsis
- Improve absorption of fat, fatty acids and glycerol
- Purifies small intestine
- Aids in absorption of fat-soluble vitamins A, D, E and K
- Counteracts putrefaction in alimentary canal (antiseptic)

(8)

4.4 VITAMIN A – DEFICIENCIES

- Night blindness Weakened adaptation to darkness
- Keratomalaise Deformation and ulceration of the cornea of the eye
- Lowered resistance to bacterial infections
- Deformed, weak or dead young
- Weakened muscular co-ordination, paralysis
- Lowered fertility, infertility
- Degeneration of nervous system
- Retardation in the normal growth
- Loss of appetite (anorexia)

(9)

4.5 FACTORS DETERMINING DIGESTIBILITY OF FEEDS

- Composition of the feed
- Ration composition
- Preparation of feed
- Type of animal
- Quantity of feed taken in
- Age of the plant
- Individuality

(7)
[45]

QUESTION 5

5.1 REPRODUCTIVE ORGANS OF A BULL

- 5.1.1
- A. Vesicular glands
 - B. Rectum
 - C. Anus
 - D. Cowpers gland
 - E. Bladder
 - F. Retractor penis muscle
 - G. Vas deferens
 - H. Penis
 - I. Cremaster muscle
 - J. Caput epididymis
 - K. Scrotum
 - L. Glans penis
 - M. Sheath

(13)

- 5.1.2
- A. Testis
 - B. Penis / Urethra
 - C. Scrotum
 - D. Vas deferens/seminal tube/epididymus

(4)

5.2 LACK OF LIBIDO (CAUSES)

- Sexual immaturity
- Lack of experience
- Malnutrition
- Psychological factors
- Disease (6)
- Over-exertion

5.3 CHARACTERISTICS OF OESTRUS IN COWS

- Restlessness
- Cow isolates herself
- Swelling of vulva, soft and enlarged
- Moist and red mucous membrane
- Abrasions, manure, mud on rear, other cows mount her
- Excessive mucous secretion
- Sudden decrease in milk production and food intake (six only) (6)

5.4 INFERTILITY IN COWS

- Pathological infertility
- Anatomical defects
- Physiological or functional infertility
- Climate
- Malnutrition
- Psychological factors
- Management (7)

5.5 ARTIFICIAL INSEMINATION – ADVANTAGES

- Most efficient preventative measure against disease (transmitted during mating)
- Decrease occurrence of other diseases of sexual organs
- Rapid method of improving quality of a herd
- Most economical breeding method
- Variety of bulls may be used
- Very handy and accurate way of doing progeny testing aimed at evaluating breeding value of bull
- Increases commercial value of a herd
- Better calving percentage achieved
- Use of overseas bulls made without importing them
- Seed of exceptional bulls frozen and used even after their death. (only six) (6)

5.6 CROSS-BREEDING – DISADVANTAGES

- Animals unsuitable for breeding purpose
- Animals cannot be randomly cross-bred
- Expensive – Since breeds must be kept for this purpose only. (3)

[45]

QUESTION 6**6.1.1 DICOTYLEDONOUS FLOWER**

- A. Stigma
- B. Anther
- C. Style
- D. Filament
- E. Petule/petal/corolla
- F. Ovary
- G. Locule
- H. Ovule
- I. Sepals
- J. Septum
- K. Receptacle
- L. Pedicle

(12)

6.1.2 FUNCTIONS

- A Receives ripe pollen and pollen germinates on it.
- C Carries stigma in a favourable position for pollination and connects it to ovary
- E Attracts insects for pollination

(3)

6.2 POLLINATION

6.3.1 SELF-POLLINATION – Transportation of ripe pollen from anthers of one flower to the ripe receptive stigma of another flower of same plant

6.3.2 ARTIFICIAL CROSS-POLLINATION – Cross-pollination done on selected parent plants to breed new cultivars by man.

(2)

6.3.3 AGENTS

- Wind – Wind-pollinated flowers produce light dry, pollen which can be blown away by wind.
- Water – Water can transport pollen in the case of water plants
- Animals – Insects and birds can carry pollen from one plant to another

(6)

6.3 CALCULATION

3:1:5 (26)

3+1+5 = 9

$$N \frac{3}{9} \times \frac{26}{1} = 8.6\%$$

$$P \frac{1}{9} \times \frac{26}{1} = 2.9\%$$

$$K \frac{5}{9} \times \frac{26}{1} = 14.4\%$$

$$8.61\% + 2.9 + 14.4 = 26$$

(7)

6.4 BLACK BRAK

6.4.1 Prevention

- Sodium - rich soils must be carefully irrigated.
- Canals etc. must be lined with cement.
- Water for irrigation must be of good quality. (3)

6.4.2 Reclamation

- Physical and chemical observations to determine symptoms
- Remove all causes of brak
- Improve soil drainage
- Apply Gypsum
- Apply heavy flood irrigation – leach soluble salts
- Plant brak-resistant crops (5)

6.5 WATER - FUNCTIONS

- Solvent and transport medium
 - Medium for chemical reactions
 - Regulation of temperature
 - Gives form to the body/mechanical rigidity/turgor
 - Serves as a lubricant
 - Protects the nervous system
 - Cools the body
 - Important solvent in which chemical reactions occur. (5)
- [45]

QUESTION 7

7.1 VELD TYPES

- Savannah
- Scrub
- Forests
- Grassland
- Semi-desert (5)

7.2 SOIL SURVEY

- Taking aerial photographs
- Visit the area – veld reconnaissance
- Second study of aerial photographs
- Preliminary mapping/charting
- Soil classification of clearly indicated profile test holes
- Description of soil horizons according to test holes
- Interpretation of all acquired information (6)

7.3 CROP ROTATION-ADVANTAGES

7.3.1 ADVANTAGES

- Combats insect pests and diseases
- Maintains high organic fraction of soil
- Prevent one-sided utilisation of nutrients
- Maintains soil fertility
- Decreases slack period in farm activities
- Risk of crop failure distributed
- Farm more economically viable
- More economical use of labour and machinery (6)

7.3.2 CONDITIONS UNDER WHICH IT IS NOT VIABLE

- Soil suitable for a limited number of crops
- Climate suitable for a small number of one crop
- High producer prices may result in farmer planting only one crop – mono culture (3)

7.4 MICRO-IRRIGATION

7.4.1 ADVANTAGES

- Water is applied directly to crops
- Easy weed and pest control
- Lower running costs
- Saves labour
- Better growth of plants
- Can be used on soils with low or high infiltration rates
- Minimized water losses
- No problems on steep slopes
- less energy needed to distribute water (any four) (4)

7.4.2 DISADVANTAGES

- In sandy soil, danger of horizontal distribution of water
- Salts may accumulate around the root zone
- Blockage of emitters occurs
- Uneven moisture distribution on coarse soil
- Special cultivation practices
- Limited root growth (any three) (3)

7.5 REASONS FOR SOIL EROSION

- Injudicious cultivation
- Veld fires
- Overgrazing
- Marginal, erodable soils
- Rainfall is intensive, thunderstorms
- Nature of surface area – slope (6)

7.6 FACTORS DETERMINING SUPPLY

- Weather
- Profit margin of the product
- Stability of the product
- Period of production
- Increasability of supply of products (any four) (4)

7.7 FREE MARKETING – DEFINITION

- A form of marketing whereby a producer sells when and where he pleases at the highest possible price. (2)

ADVANTAGES

- 7.7.1
- Products usually sold for cash.
 - Producer receives payments on the spot.
 - Middlemen are eliminated.
 - Producers encouraged to deliver good quality products.
 - Entrepreneur can show initiative and drive.
 - Stimulates producer to work harder (6)

[45]

TOTAL FOR SECTION B: [220]

TOTAL: 300