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Support Pack | Grade 12

CAPS

Module 5 Units 1 – 2

Agricultural Sciences

Animal reproduction

This support pack for the **Animal reproduction** module in the **Agricultural Sciences Grade 12 CAPS curriculum** provides valuable revision activities. All activities have the answers provided. Learners can work through these individually at home or these could form the basis of a catch-up class or online lesson. You have permission to print or photocopy this document or distribute it electronically via email or WhatsApp.

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Module 5 – Animal reproduction

Unit 1 Male and female reproductive systems

Short questions

1. Various possible answers are provided for the following questions. Write only the correct letter (A–D) next to the question number.
 - 1.1 The hormone that is found in lucerne and clover pastures and leads to oestrus in pregnant animals is
 - A relaxin
 - B oxytocin
 - C oestrogen
 - D prolactin
 - 1.2 A long muscular tube extending from the bladder to the tip of the penis of the bull is called the
 - A sigmoid flexure
 - B epididymis
 - C urethra
 - D vas deferens
 - 1.3 The period of the oestrus cycle during which the hormone progesterone is secreted is
 - A di-oestrus
 - B pro-oestrus
 - C met-oestrus
 - D anoestrus
 - 1.4 The is the primary reproductive organ of a bull where the hormone testosterone is secreted.
 - A epididymis
 - B testes
 - C scrotum
 - D prostate
 - 1.5 The scrotum encloses the primary male reproductive organ that
 - A produces the carrier fluid for spermatozoa
 - B produces the spermatozoa and testosterone
 - C is the largest of the sex organs
 - D secretes all the sex hormones5 × 2 (10)
2. Supply ONE word/term for each of the following descriptions. Write only the word/term next to the question number.
 - 2.1 A structure that develops on the ovary after ovulation at the position of the burst follicle
 - 2.2 Removal of the testicles of a young male animal
 - 2.3 The condition where the testes of the bull remain behind in the abdominal cavity
 - 2.4 When a male animal is interested in a female animal but lacks the ability to serve and fertilise the female
 - 2.5 The process during which a spermatogonium develops into a spermatozoon 5 × 2 (10)

3. Match the description in column B with the hormone in column A.

Column A		Column B	
3.1	Oestrogen	A	Secreted by the corpus luteum in the ovary
3.2	Progesterone	B	Secreted by the testes
3.3	Follicle-stimulating hormone	C	Produced by the graafian follicle on the ovary
3.4	Testosterone	D	Secreted by the hypothalamus
3.5	Gonadotrophic releasing hormone (GnRH)	E	Secreted by the anterior pituitary gland in the brain

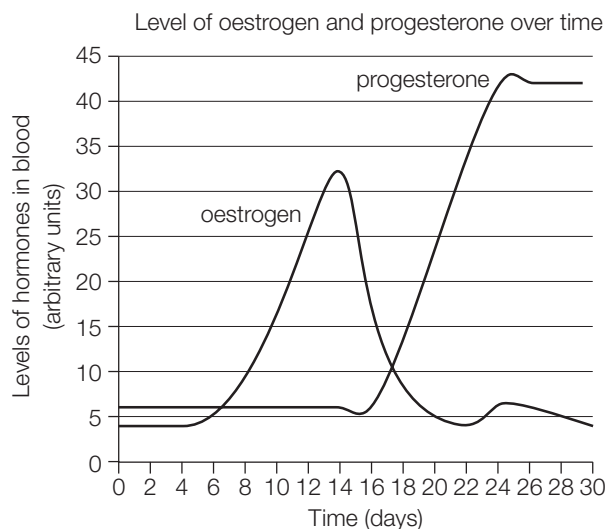
5 × 2 (10)

Longer questions

4. Bulls have to be fertile, which means that their semen must contain viable sperm, in order to fertilise cows.

Answer the following questions:

- 4.1 Name the process whereby viable male gametes are produced. (1)
 - 4.2 Name the organ where the process named in 4.1 takes place in the male animal. (1)
 - 4.3 Identify the phase in this process where mitotic cell division occurs. (1)
 - 4.4 During mitotic cell division the spermatogonium divides. Which structures are formed? (1)
 - 4.5 Briefly explain the role of meiosis in the development of sperm cells. (4)
 - 4.6 Name THREE congenital factors that may disturb the formation of sperm cells. (3)
5. The graph below shows the levels of two hormones in a cow that became pregnant.



- 5.1 Identify the times when the levels of oestrogen and progesterone are equal. (2)
- 5.2 Indicate the level of oestrogen in the blood on day 14. (1)
- 5.3 Supply evidence from the graph that suggests that an ovum was fertilised. (2)
- 5.4 What would happen to the corpus luteum if this cow was not pregnant? (1)
- 5.5 During which stage of oestrus does the progesterone level begin to increase? (1)

Unit 2 Synchronisation of oestrus and mating

Short questions

1. Various possible answers are provided for the following questions. Write only the correct letter (A–D) next to the question number.
- 1.1 The condition that refers to successful mating without fertilisation taking place is called
 - A impotence
 - B infertility
 - C oestrus
 - D anoestrus

1.2 Which ONE of the following does not fit in the process of natural mating?

- A erection
- B ejaculation
- C insemination
- D copulation

1.3 A has both male and female reproductive organs.

- A hermaphrodite
- B freemartin
- C nymphomaniac
- D repeat breeder

1.4 A cow that is temporarily unable to produce viable ova and produce a calf is

- A sterile
- B fertile
- C hermaphroditic
- D infertile

1.5 Which ONE of the following is not an infectious cause of infertility in cows?

- A bacteria
- B viruses
- C nutrition
- D protozoa

5 × 2 (10)

2. Supply ONE word/term for each of the following descriptions. Write only the word/term next to the question number.

2.1 A procedure that is performed to bring all the cows into oestrus at approximately the same time, especially when artificial insemination is used

2.2 When a cow is totally unable to conceive and produce offspring although she may come into oestrus and mate

2.3 'White Heifer Disease' is caused by the fact that this membrane does not rupture during the first copulation.

2.4 A condition that causes the vagina to protrude from the vulva, resulting in sterility of the cow

2.5 The oestrus stage during which a mature cow may be infertile due to the absence of oestrus signs caused by a shortage of FSH and the corpus luteum not degenerating

5 × 2 (10)

3. Match the description in column B with the correct word/term in column A.

Column A		Column B	
3.1	Hypoplasia	A	Defective ovulation
3.2	Nymphomania	B	Cause of physical infertility
3.3	Repeat breeder syndrome	C	Infertile female twin
3.4	Heat stress	D	Failure to conceive after several servings
3.5	Freemartinism	E	Congenital defect in a cow

5 × 2 (10)

Longer questions

4. Answer the following questions with relation to synchronisation and mating.

4.1 Give FIVE reasons why many farmers/breeders use 'synchronisation of oestrus'. (5)

4.2 Name FIVE important factors to take into account when synchronising cows. (5)

4.3 Name THREE hormones used to synchronise oestrus and the methods used to administer each. (6)

4.4 Name THREE advantages of synchronisation of oestrus. (3)

4.5 Briefly explain what is meant by 'natural mating'. (2)

4.6 Name the male and female reproductive organs important for natural mating to take place. (2)

4.7 What does the ejaculate consist of? (1)

- 4.8 Name FIVE important characteristics of the ejaculate. (5)
- 4.9 Name FIVE factors that may negatively affect the ejaculate of a bull and therefore influence successful fertilisation. (5)
- 4.10 Briefly explain the reaction of a bull when detecting a cow in oestrus. (7)

Memorandum

Unit 1

Short questions

- 1.1 C 1.2 C 1.3 A 1.4 B 1.5 B (10)
- 2.1 Corpus luteum 2.2 Castration 2.3 Cryptorchidism
- 2.4 Impotence 2.5 Spermatogenesis (10)
- 3.1 C 3.2 A 3.3 E 3.4 B 3.5 D (10)

Longer questions

- 4.1 Spermatogenesis (1)
- 4.2 Testes (1)
- 4.3 Spermatocytogenesis (1)
- 4.4 Primary spermatocytes (1)
- 4.5 Role of meiosis:
- Number of chromosomes in the reproductive cells are halved – diploid (2n) parent cell divides to produce haploid (n) daughter cells.
 - Meiosis I – primary spermatocyte forms two secondary spermatocytes.
 - Meiosis II – secondary spermatocyte forms spermatids.
 - Genetic information is transported to the reproduction cells (outflanking) (4)
- 4.6 Congenital factors that may disturb formation of sperm cells:
- Hypoplasia
 - Cryptorchidism
 - Sperm defects (3)
- 5.1 Day 7 and day 17 (2)
- 5.2 Approximately 33 units (1)
- 5.3 Evidence of fertilisation of ovum:
- Progesterone level increases sharply.
 - Oestrogen level decreases sharply. (2)
- 5.4 The corpus luteum will degenerate/burst/be resorbed/be broken down. (1)
- 5.5 Met-oestrus (1)

Unit 2

Short questions

- 1.1 B 1.2 C 1.3 A 1.4 D 1.5 C (10)
- 2.1 Synchronisation of oestrus 2.2 Sterility 2.3 Hymen
- 2.4 Prolapse (of vagina) 2.5 Anoestrus (10)
- 3.1 E 3.2 A 3.3 D 3.4 B 3.5 C (10)

Longer questions

- 4.1 Reasons for using synchronisation of oestrus (any five):
- Increasing the number of offspring
 - Improving the genetics of the herd
 - Selecting the best calving time
 - Increased milk and meat production at the most economic times
 - Having lactating cows throughout the year
 - Increased income for the farmer/breeder (5)

- 4.2 Important factors to take into account when synchronising oestrus (any five):
- Good management
 - Adequate facilities
 - Understanding the oestrus cycle
 - Accurate heat detection
 - Proper nutrition
 - Good herd health
- (5)
- 4.3 Hormones to synchronise oestrus (any three):
- Prostaglandin – injection
 - Synthetic progesterone (progestin) – ear implant or intramuscular injection
 - Oestradiol (oestrogen compound) – intramuscular injection
 - Gonadotropin-releasing hormone (GnRH) – injection
 - MGA (melengestrol acetate) – mixed with feed
 - CIDR – vaginal insert
- (6)
- 4.4 Advantages of synchronisation of oestrus (any three):
- Possible to schedule breeding for a shorter calving season
 - More uniform calves at weaning age
 - Improved genetics using superior bulls or semen from superior bulls
 - Good herd management – decreases costs, labour and time of oestrus detection
 - Improved reproductive performance
 - Beneficial for artificial insemination and embryo transfer
 - Castration and branding can be done at the same time
- (3)
- 4.5 In natural mating copulation of the male and female animal takes place for a cow to become pregnant. (2)
- 4.6 Male reproductive organ: penis; female reproductive organ: vagina (2)
- 4.7 Semen containing sperm/male gametes/male reproductive cells/spermatozoa (1)
- 4.8 Characteristics of ejaculate (any five):
- High-quality sperm/spermatozoa/male gametes/male reproductive cells
 - Sperm with normal morphology
 - Motile sperm
 - Sperm must transfer genetic material
 - Volume of sperm
 - Sperm concentration
 - Total spermatozoa per ejaculate
 - Proportion of live spermatozoa
- (5)
- 4.9 Factors negatively affecting the ejaculate of a bull:
- Scrotal circumference
 - Age
 - Stress levels
 - Testosterone levels
 - Body weight
- (5)
- 4.10 Reaction of bull when detecting a cow in oestrus:
- Follows her closely
 - Licking and smelling her external genitalia
 - Sampling the odour and taste of her urine
 - Paws the ground and snorts
 - Rests his chin on the cow's rump
 - Guards the receptive cow to prevent mating with other males
 - Flehmen response/curling the upper lip and stretching out the head
- (7)