



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2021

Animal Reproduction

Paper 1

Perusal time: **Fifteen (15)** minutes

Time allowed: **Two (2)** hours after perusal

Answer **ALL FOUR (4)** questions

Answer **FOUR** questions, each worth 30 markstotal 120 marks

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Paper 1: Animal Reproduction

Answer all four (4) questions

1. Answer **both** parts of this question:

a) The hypothalamic-pituitary-gonadal axis controls reproduction through an intricate interplay between various hormones. Provide a flow diagram of this process as it pertains to the male, indicating the source, site of action (use an arrow in the direction from source to site of action) and effect (inhibition [-] versus stimulation [+]) of each of the following hormones: (15 marks)

- Gonadotrophin-releasing hormone (GnRH)
- Luteinising hormone (LH)
- Follicle-stimulating hormone (FSH)
- Testosterone
- Inhibin.

b) Answer both of the following questions related to sperm production:

- i. Define the term spermatogenesis and describe the phases of this process. (10 marks)
- ii. Explain the cycle of the seminiferous epithelium, indicating how this process relates to spermatogenesis and providing an indication of the time required in a representative species. (5 marks)

2. Answer **both** parts of this question:

a) Describe the process of testicular descent in domestic mammals. In your answer, include a labelled diagram to illustrate the formation of the vaginal cavity and show how this cavity relates to the peritoneal cavity. (20 marks)

b) Name **two (2)** hormones that could be utilised to further investigate the sterilisation status of an adult male cat with no testes evident within the scrotum. For each of the identified hormones, briefly discuss where the hormone is produced and its function(s) in both males and females. (10 marks)

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3. Puberty is a critical stage of development in breeding female livestock.

Answer **all** parts of this question:

- a) Briefly discuss the impact of age at puberty in beef heifers on their life-time productivity. In your answer, consider production systems with a restricted, versus year-round, breeding season. *(10 marks)*
 - b) Compare the endocrine events that lead to the onset of puberty in ruminant males and females. *(10 marks)*
 - c) List factors that influence the onset of puberty in female cattle, sheep and pigs. *(10 marks)*
4. Maternal recognition of pregnancy is critical to the maintenance of pregnancy in most domestic species.

Answer **both** parts of this question:

- a) Discuss maternal recognition of pregnancy, with specific reference to each of the following species: cow, ewe, sow and mare. *(20 marks)*
- b) Compare and contrast dioestrus in the pregnant, versus non-pregnant bitch, with reference to maternal recognition of pregnancy in this species. *(10 marks)*

End of paper



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Paper 2

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Answer **ALL FOUR (4)** questions

Answer **FOUR** questions, each worth 30 markstotal 120 marks

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Paper 2: Animal Reproduction

Answer all four (4) questions

1. You are called to a property to perform a pregnancy diagnosis on a four-year-old mare. On rectal palpation of the mare you detect a distinct bulge at the base of the right uterine horn. Transrectal ultrasonography of this area reveals two embryonic vesicles in close apposition and of similar size. You estimate that both conceptuses are of approximately 24 days' gestation, based on their positioning within the yolk and allantoic sacs and the presence of foetal heartbeats.

Answer **all** parts of this question:

- a) Explain the risks of twinning in mares. *(5 marks)*

- b) Outline options for the management of this case, highlighting the strengths and weaknesses of each suggestion. *(15 marks)*

While at the property, the client asks you to examine a Kelpie bitch that was bred four weeks ago. You perform an abdominal ultrasound on the bitch and find that she is pregnant, but you detect only one foetus.

- c) A singleton pregnancy could be considered a failed breeding attempt in this species. Outline the factors that may have contributed to this outcome. *(7 marks)*

- d) Identify and briefly discuss the risks associated with singleton pregnancies in the bitch. *(3 marks)*

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2. You are called to a Charolais beef cattle stud to attend to a six-year-old cow that was found, this morning, standing in the corner of the paddock with two hooves protruding from her vulva. On vaginal examination you determine that the protruding hooves are the forelimbs of a single, full-term, dead foetus. The dorsum of the foetus is orientated towards the cow's sacrum. You note that the head of the foetus is deviated laterally and is facing towards the foetus's right lateral thorax.

Answer **all** parts of this question:

- a) Describe the presentation, position and posture of the foetus in the case described. *(3 marks)*
- b) Describe and justify a rational approach to resolving this cow's dystocia, including after-care of the dam. *(17 marks)*
- c) Briefly discuss the use of oxytocin in the management of cases of dystocia in cattle and dogs. *(10 marks)*

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3. You provide a veterinary service to a fine-wool merino sheep stud. The owner has recently purchased three new rams and wishes to use them in an artificial insemination (AI) programme in four weeks' time. You recommend conducting a breeding soundness examination on each ram. You use electroejaculation to collect a sample of semen from each ram. The findings of your examinations are summarised in the table below.

ID	Body condition score ^a	General physical examination	Scrotum and scrotal contents	Prepuce and penis	% progressively motile sperm	% morphologically normal sperm
Ram 1	4.5	normal	normal	normal	70%	70%
Ram 2	3.0	abnormal ^b	normal	normal	60%	45%
Ram 3	3.5	normal	normal	abnormal ^c	90%	80%

^ausing the 1-5 scoring system, where 1= very thin and 5 = fat

^blame right hind – examination reveals a toe abscess

^cthere is a crusty scabbing and greyish colour exudate around the preputial orifice. When the scabs are removed, the underlying tissue is excoriated with some superficial haemorrhage.

Answer **all** parts of this question:

- Review the findings for each ram and provide your judgement as to whether (or not) each ram is suitable to be used for breeding. Identify the ram(s) you recommend should be used in the planned AI programme and provide justifications for your recommendations. (8 marks)
- For ram(s) that should not be used in the planned AI programme, briefly outline any treatments or changes in management that the owner should implement. (8 marks)

You return to the stud to conduct pregnancy diagnoses on a mob of 200 ewes, six weeks after they were artificially inseminated with frozen semen. The ewes were treated to synchronise oestrus and were laparoscopically inseminated 60 hours after the removal of progestogen-impregnated sponges. The pregnancy rate is 40%.

- Describe in detail an appropriate investigation into the possible causes of this lower-than-expected pregnancy rate. (14 marks)

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4. Answer **both** parts of this question:

- a) One of your clients has an eight-year-old breeding dog (male). Over the last six months the dog has been mated to four bitches and none of them have become pregnant. The owner says that he has noticed that the dog is drinking more than usual and has lost weight.

Answer **both** parts of this sub-question:

- i. Based on the above, briefly discuss **two (2)** likely causes of this dog's failure to impregnate the females mated to him. *(5 marks)*
- ii. Describe the appropriate investigation of this breeding problem. *(10 marks)*

- b) You are called to examine a Warmblood stallion that is currently being used to breed 30 mares. The manager of the stud is quite concerned because the stallion was kicked by a mare during a covering yesterday and now appears to have a swollen scrotum.

Answer **both** parts of this sub-question:

- i. Describe in detail the evaluation of this case. *(10 marks)*
- ii. Based on the information provided by the manager, outline a rational initial treatment plan for this stallion. *(5 marks)*

End of paper