



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2016

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. A client owns two Quarter horse mares, and both were mated to the same fertile stallion. After their first mating in late September neither mare became pregnant. After the second mating both mares were determined to be pregnant 12 days after ovulation. When rechecked for pregnancy at day 24 after ovulation, mare one was no longer pregnant whereas mare two remained pregnant.

Answer **all** parts of this question:

- a) List the methods available for pregnancy diagnosis for mares from day 12 through to day 120, and indicate the optimum time for **each** technique. (10 marks)
- b) In early September, mare one had an endometrial biopsy which revealed moderate inflammatory cell infiltration in the endometrium and moderate fibrosis (biopsy grade IIB). Describe the histology of the normal and inflamed endometrium using text and a diagram. Outline how endometrial function is altered by the pathology noted in the biopsy and explain how this may result in pregnancy failure. (10 marks)
- c) The processes involved in the initiation of parturition are best known in ewes. Using ewes as a model animal, explain how parturition is initiated, and describe physiological and anatomical events in the dam that culminate in the delivery of a neonate. You may use appropriate diagrams or flow charts in your answer. (10 marks)
2. You visit an Australian Thoroughbred horse breeding farm in July to discuss management of their stallions and mares during the breeding season.

Answer **all** parts of this question:

- a) Discuss the hormonal changes that occur in mares during the between winter anoestrous and the start of regular oestrous cycles in spring. Highlight the management or hormonal interventions available for use by the stud to reduce the impact of seasonality on reproductive management. (10 marks)
- b) Describe the process of spermatogenesis in a mature male and illustrate this process with a labelled diagram. (10 marks)
- c) Draw a diagram to illustrate the structures involved in the regulation of testicular temperature in males. Discuss how regulation is achieved and the impact of high temperatures on spermatogenesis. (10 marks)

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3. The owner of a small peri-urban farm has a Quarter horse mare and a Jersey cow. Both are late pregnant. You are asked to arrange for them to be bred as soon as possible after they give birth.

Answer **all** parts of this question:

- a) Compare and contrast the structure and function of equine and bovine placentas. (10 marks)
- b) Using your knowledge of placentation and regulation of ovulation, explain why mares usually conceive sooner after birth than cows. (10 marks)
- c) Outline similarities and differences in the process and timing of 'pregnancy recognition' in mares and cows. (10 marks)

4. A client presents her female three-year-old Standard schnauzer to you for help with breeding management.

Answer **all** parts of this question:

- a) Describe the hormonal profile in bitches, during a complete estrous cycle (including anestrus), and relate this to ovarian activity. Illustrate with a diagram. (10 marks)
- b) After copulation in domestic animals, spermatozoa encounter anatomical structures and local environments that both enhance and reduce survival of spermatozoa. Describe the structures and environments encountered by spermatozoa during transit from the site of ejaculation through to the site of fertilization using examples from any domestic species. (10 marks)
- c) Outline the fertilisation process, and discuss the optimum timing of insemination in relation to the timing of ovulation, in the bitch compared to the mare. (10 marks)

End of paper



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Paper 2

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Answer **ALL FOUR (4)** questions

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Paper 2: Animal Reproduction

Answer all four (4) questions

1. A beef cattle farmer near Tamworth, NSW has 4 Angus bulls to join to his 150 cows. The bulls were semen tested one week prior to the start of mating in January. The results are below.

Bull ID	Weight (kgs)	BCS (1 to 5)	General physical exam	Internal (rectal) exam	External genitalia exam	Scrotal circumference (cm)	% progressively motile sperm	% normal sperm
1	820	3.5	normal	normal	normal	40.0	40	80
2	742	2.5	normal	normal	normal	35.0	80	58
3*	976	3	normal	abnormal	normal	41.0	10	26
4**	554	3	abnormal	normal	normal	38.0	35	44

*bull 3 – seminal vesicles enlarged, nodular with a firm texture

**bull 4 – large abscess over left thorax

Answer **all** parts of this question:

- Describe the optimal methods for semen collection and examination for these four bulls and explain how less than optimal conditions for semen collection and semen analysis can affect semen parameters. (10 marks)
- Using the data above make an assessment of the future fertility for **each** bull and include any recommendations to the owner for the use and management of the bulls (including vaccinations). (10 marks)
- List and discuss the common defects or acquired abnormalities that occur in the penis and prepuce of bulls (*Bos indicus* and *Bos taurus* origin). (10 marks)

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2. You have conducted pregnancy diagnosis on a group of 100 beef heifers six weeks after the bulls were removed. The heifers were mated for nine weeks. The overall pregnancy rate is lower than expected, and because the farmer has recently bought in some heifers from a local stud you suspect that bovine viral diarrhoea virus (BVDV) infection may be contributing to the reduced reproductive performance.

Answer **all** parts of this question:

- a) Give differential diagnoses for this general scenario then outline your plan to collect samples and further data to pursue your tentative diagnosis of BVDV. (10 marks)
- b) Subsequently you receive a laboratory report confirming heifers in this herd are positive for BVDV and eight have an AGID reaction of three (AGID score of 1, 2, 3 or 3+ is considered positive). Describe the options for managing BVDV in beef herds and nominate what you consider to be the most appropriate plan for this herd. (10 marks)
- c) At a later visit on a Friday you are called to synchronize oestrus in ten Charolais cows. The owner requests that the cows be bred by timed artificial insemination (AI) using frozen semen. Explain an effective management protocol to comply with the owner's request. (10 marks)

3. You have been called to a 600 kg Warmblood mare a few hours after she gave birth to a small, weak 35 kg foal. The foal was born at 331 days of gestation. The owners had observed a vulval discharge from day 310 of gestation but no contact was made with their veterinarian and thus no treatment was initiated prior to birth. The owners show you the fetal membranes; which after cleaning are determined to weight 6 kg (you have accurate scales) with gross signs of placentitis visible to you.

Answer **all** parts of this question:

- a) Describe the procedures that, if undertaken during gestation, would have assisted in making an early diagnosis of placentitis and assessment of fetal viability. (10 marks)
- b) Discuss options for management and treatment for mares diagnosed with late gestation placentitis (eg from day 300 of gestation). Nominate the protocol you would select that would most likely enhance fetal viability. (10 marks)
- c) The owner wishes to breed the mare on her foal heat to an expensive stallion using cooled shipped semen. Describe the most appropriate protocol to follow in determining suitability to breed on the foal heat, any treatments that are indicated, and outline the protocol for the timing and procedures for insemination. (10 marks)

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4. You are managing the insemination and pregnancy of a four-year-old Labrador bitch, owned by a midwife. The Labrador is to be inseminated with frozen semen.

Answer **all** parts of this question:

- a) Describe an appropriate protocol for the optimal timing and inseminating of bitches where frozen semen is to be used for insemination. Your goal is to maximise the number of puppies per litter. *(12 marks)*
- b) During discussions the owner mentions that one of her other bitches (five-years-old, not desexed) has a purulent vulval discharge. On further questioning you establish that she has been off colour for a week or so. You suspect she has a pyometra. Explain the risk factors for pyometra and discuss options for treatment. *(10 marks)*
- c) The owner also has a four-year-old Poodle which was observed to mate with the neighbour's cattle dog. The owner is distressed about this unplanned mating and immediately (an hour later) calls you for advice. Outline the options **and** provide the most appropriate advice for management of this Poodle. *(8 marks)*

End of paper