AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

MEMBERSHIP GUIDELINES

Animal Reproduction

INTRODUCTION

These Membership Guidelines should be read in conjunction with the *Membership Candidate Handbook.*

ELIGIBILITY

Refer to the *Membership Candidate Handbook.*
Section 2. page 4.

OBJECTIVES

Refer to the *Membership Candidate Handbook.*
Section 1. page 4.

Membership Definition
1.1. The award of Membership of the College is conferred upon a veterinarian who is eligible to sit and successfully passes an examination in a given Membership subject.
1.2 Membership of the College should signify the following:
"Membership of the College is an official recognition of a veterinary surgeon's knowledge and experience in the designated field of veterinary reproduction science. Membership is an indication to the profession and the general public of an advanced practitioner, representing a middle-tier of knowledge, competence and experience in a specific area of veterinary practice. Membership is not a specialist qualification. Membership requires examination with members signified by post-nominals MANZCVS."

LEARNING OUTCOMES

1. The candidate will have a **sound[1] knowledge** of the comparative reproduction in domestic mammalian species. Domestic animal species is defined as: horse, cow, sheep, pig, goat, dog, cat and camelid.

   Specific outcomes around this **sound knowledge** are that the candidate will be able to:

   1.1 Describe with **sound knowledge**, the normal reproductive anatomy of males and females of the above domestic species, internal and external reproductive organs, gross and histological features of the normal organs.

   1.2 Explain with **sound knowledge,** the general embryonic development of the reproductive system in male and female mammals, considering the influence of the main genes that drive sexual differentiation, and the development of gonads, duct system and external genitalia.

   1.3 Describe with **sound knowledge,** the origin, structure, target tissues and mode of action for the hormones from the hypothalamus, pituitary, gonads and reproductive tissues that act to coordinate and stimulate reproduction in males and females of the listed domestic species.

   1.4 Explain with **sound knowledge,** the events leading to and the consequences of puberty.

   1.5 Explain with **sound knowledge,** the normal female reproductive cycle including behavioural, endocrinological and structural changes during the cycle, detailing individual ovarian cycles, and the annual reproductive events in female domestic animals, such as seasonality, for all species listed above.

   1.6 Explain with **sound knowledge,** cycle length and stages, oestrus display, time of ovulation, and the most appropriate time of breeding or insemination to optimise pregnancy.

   1.7 Describe with **sound knowledge,** the processes of male reproduction. These include: the cycles and stages of spermatogenesis,and the processes of sperm maturation testis to fertilisation.

   1.8 Explain with **basic knowledge**, the principles of arousal, erection, emission and ejaculation.

   1.9 Describe with **sound knowledge,** the uterine responses and the process of successful fertilisation, early embryonic development, and maternal recognition of pregnancy.

   1.10 Describe with **sound knowledge,** the embryonic development from fertilisation through to the formation of a functional placenta.

   1.11 List the different types of placentation in domestic species, and with a **basic knowledge** describe the implications of these variations.

[1] **Knowledge levels:**
Sound knowledge — candidate must know all of the principles of the topic including some of the finer detail, and be able to identify areas where opinions may diverge. A middle level of knowledge.
Basic knowledge — candidate must know the main points of the topic and the major literature

1.12 Describe with **sound knowledge,** the hormonal events during normal pregnancy; including maintenance of pregnancy until parturition.

1.13 Explain with **sound knowledge,** the techniques for diagnosis of pregnancy, and the time during gestation when the different techniques are useful for each species.

1.14 Explain with basic knowledge, the processes and hormonal events leading to the initiation and progression of normal parturition.

1.15 Describe with **sound knowledge,** the anatomical position, presentation and posture of a fetus during parturition and/or dystocia.

1.16 List the common diseases of the reproductive system of male and female animals describing with **sound knowledge,** the aetiopathogenesis of those diseases, including **basic knowledge** of disorders of sexual development, endocrinological disorders, degenerative changes.

1.17 List and explain with **sound knowledge**, the general causes of embryonic loss and abortion, including specific diseases, toxins and abnormalities which result in loss of pregnancy in domestic animals. (Ensure that the difference between embryonic and fetal loss can be clearly explained.)

1.18 Describe with **sound knowledge** gross examination of fetal membranes, and the pathological processes that may affect the placenta of domestic species

2. In the application of this sound knowledge the candidate will be able to::

2.1 Describe with **sound knowledge**, the processes for breeding soundness examination of male and female domestic animals, including consideration of the examination of individuals and groups (e.g. herd and flock level), specific reproductive examination of individuals, and collection and processing of appropriate samples for laboratory investigation. Describe the use of pregnancy diagnosis techniques to effectively manage the breeding and monitoring of domestic animals.

2.2 Interpret with **sound knowledge**, findings from breeding soundness examinations of male and female domestic animals, with reference to the normal parameters and findings in the species listed above, including semen evaluation.

2.3 Examine, and interpret findings with **sound knowledge**, from, a male or female animal with reproductive dysfunction, generating differential diagnoses; explain the processes of differentiation of those possibilities; suggest management and treatment options.

2.4 Explain with **sound knowledge**, the processes for investigating loss of pregnancy and/or abortion with specific reference to the main causes in the above listed domestic species.

2.5 Explain with **sound knowledge**, the use of drugs and management to exert control over reproduction in the female domestic species, such as induction of oestrus, synchronisation of oestrus, manipulation and timing of ovulation, contraception, induction of pregnancy termination, and induction of parturition.

2.6 Evaluate with **sound knowledge**, reproductive performance of individuals and groups of animals by analyzing records and gathering history of management and reproductive practices.

2.7 Dystocia:

2.7.1 Describe with **sound knowledge**, the principles of diagnosing and managing dystocia. (NB it is important to be able to describe fetal alignment for both eutocia and dystocia.)

2.7.2 Identify and provide valid management options for common causes of dystocia.

2.7.3 Identify commonly used obstetrical equipment and explain their uses.

2.8 Diagnostic imaging:

2.8.1 **Explain with basic knowledge** the principles, and very basic physics, of ultrasonography

2.8.2 Describe with **basic knowledge** the use of ultrasonography in evaluating the ovaries and uterus, and for monitoring pregnancy viability in the listed species.

2.9 Describe with **sound knowledge**, the processes of artificial insemination with fresh, chilled and frozen semen (including sexed semen) as appropriate and commonly used for each domestic species. Include in this description information about equipment used for the procedure, technique for insemination, handling of the semen, and timing of insemination.

2.10 Explain with **basic knowledge**, the welfare aspects associated with various insemination techniques appropriate to domestic animal species.

2.11 Describe with **basic knowledge**, how to collect then process semen for fresh or chilled insemination. In general terms explain the processes required for freezing of semen and the use of frozen semen.

2.12 Explain with **basic knowledge**, the welfare aspects associated with various methods for collection of semen appropriate to domestic animal species.

3. The candidate will have a **basic**[1] knowledge of the following in the listed domestic species:

3.1. Reproductive technology: The candidate will be able to:

3.1.1. Describe with **basic knowledge,** the general processes for embryo transfer, including collection of in vivo generated embryos, cryopreservation and transfer to suitably prepared recipients.

3.1.2. Describe with **basic knowledge**, the general processes for the collection of oocytes for in vitro fertilisation.

3.2. Describe with **basic knowledge**, development of the mammary gland and the physiology of lactogenesis.

3.3. Describe with **basic knowledge**, techniques for common surgeries involving the reproductive system, including caesarean, ovariectomy/ovariohysterectomy, castration, Caslicks' procedure (vulvoplasty).

3.4. Describe with **basic knowledge**, the principles and common techniques for neonatal resuscitation and monitoring.

3.5. Discuss with **basic knowledge**, the rationale for desexing both sexes of the domestic species.

EXAMINATIONS

For information on both the standard and the format of the Written and Oral examinations, candidates are referred to the *Membership Candidates Handbook.*

The Membership examination has **two separate components**:

1. **Written Examination** *(Component 1)*
   Written Paper 1 (two hours): Principles of the Subject
   Written Paper 2 (two hours): Applied Aspects of the Subject

2. **Oral (Examination** *(Component 2)*
   Oral (one hour)

The written examination will be comprised of two separate two-hour written papers taken on the same day. There will be an additional 15 minutes perusal time for each paper. In each paper you are provided with four (4) questions to answer, worth 30 marks each, giving a total of 120 marks per paper. There is no choice of questions. Questions may be long essay type, a series of shorter answer sub-questions, or multiple-choice questions. Marks allocated to each question and to each subsection of questions will be clearly indicated on the written paper.

Written Paper 1:
This paper is designed to test the candidate's knowledge of the principles of animal reproduction as described in the Learning Outcomes using essay-style, short answer, multiple choice, and note-point formats. Answers may cite specific examples where general principles apply, but should primarily address the theoretical basis underlying each example.

Written Paper 2:
This paper is designed to (a) test the candidate's ability to apply the principles of animal reproduction to particular cases/problems or tasks and (b) test the candidate's familiarity with the current practices and issues that arise from activities within the discipline of animal reproduction in Australia and New Zealand. This paper assesses knowledge of applied reproduction, using essay style, short answer and multiple choice questions.

Oral Examination:
This examination requires the candidate to demonstrate achievement of the above mentioned Learning Outcomes. Discussion will be predominantly based on case material. The duration of this examination is approximately one (1) hour. Clinical and clinicopathologic images, laboratory test results, radiographs and basic ultrasound images are likely to be used during this examination. Six (6) cases are presented with supporting questions asked verbally in a face-to-face setting. The oral examination has a total of 60 marks with each case allocated 10 marks.

RECOMMENDED READING MATERIAL

The candidate is expected to read widely within the discipline, paying particular attention to areas not part of their normal work experiences. This list of books and journals is intended to guide the candidate to some references and other source material. Candidates also should be guided by their mentors. *The list is not comprehensive and is not intended as an indicator of the content of the examination.*

TEXTBOOKS[2]

Recommended Text books:

Senger, PL 2012, *Pathways to pregnancy and parturition*, 3rd edn, Current Conceptions, Redmond, Or. www.currentconceptions.com

Noakes, David E., Parkinson, Timothy J., & England, Gary C. W. (2019). *Veterinary reproduction and obstetrics* (Tenth edition. ed.). Edinburgh, Scotland: Elsevier.

Additional references:

Hopper, Richard M. (2021). *Bovine reproduction* (Second edition. ed.). Hoboken, New Jersey: Wiley.

Youngquist RS & Threlfall WR editor. *Current Therapy in Large Animal Theriogenology.* 2nd revised edn. Saunders, Elsevier, 2007 Also as an e book

Johnston SD, Root Kustritz MV & Olson PNS. *Canine and Feline Theriogenology*. W.B Saunders, Harcourt Health Sciences Company, 2001.

McKinnon AO, Squires EL, Vaala WE & Varner DD, editors. *Equine Reproduction.* 2nd Edn. Wiley-Blackwell, 2011. Also as an e book.

[2] **Definitions of Textbooks**
Recommended textbook – candidates should own or have ready access to a copy of the book and have a sound knowledge of the contents.
Additional references – candidates should have access to the book and have a basic knowledge of the contents.

Other texts providing useful sections:

Australian Veterinary Association Special Interest Group Publications:
Beggs,D.S. (Ed) 2013.Pregnancy Diagnosis in Cattle (3rd Ed). Australian Association of Cattle Veterinarians, Eight Mile Plains, Qld
Beggs, DS (ed.) 2013 *Veterinary bull breeding soundness evaluation,* Australian Association of Cattle Veterinarians, Eight Mile Plains, Qld

Web Resources:
www.ivis.org
Access to a wide variety of books, journals and proceedings.
Library of reproduction images: lorimainsection.blogspot.ca
https://visgar.vetmed.ufl.edu/http://www.animalandrology.org/ - Association for Applied Animal Andrology
http://www.therio.org/ - Society for Theriogenology
International Embryo Transfer Society: http://www.iets.org/
Society for the Study of Reproduction: http://www.ssr.org/
The InCalf Project: www.incalf.com.au
LSU – theriogenology course VETMED 5361
www.lsu.edu
https://www.vin.com/vin/

FURTHER INFORMATION

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