



Australian and New Zealand College of Veterinary Scientists

Membership Examination

June 2015

Veterinary Radiology (Large Animal)

Paper 1

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

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

Section A: Answer **ALL TWO (2)** questions

Section B: Answer **ALL FOUR (4)** questions

Section C: Answer **ALL TEN (10)** questions

Section C is multiple choice which requires completion of **ten (10)** multiple choice questions located in the answer booklet you have been provided. *(Sample provided in this paper)*

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Section A: **TWO** essay-type questions each worth 30 markstotal 60 marks

Section B: **FOUR** short-answer questions each worth 10 markstotal 40 marks

Section C: **TEN** multiple choice questions each worth 2 markstotal 20 marks

Paper 1: Veterinary Radiology (Large Animal)

SECTION A

Answer both questions in Section A

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

- a) Define radiographic image contrast. (2 marks)
- b) List the features that contribute to radiographic image contrast. For **each** feature listed, indicate whether it occurs with film screen radiography (FSR), with digital radiography (DR), or both. (6 marks)
- c) For **three (3)** of the features listed in 1 b) briefly describe how the veterinarian may increase radiographic image contrast. (6 marks)
- d) Describe how a computed radiography (CR) system detects and produces a radiographic image. Your answer should include the following steps in the process: (16 marks)
 - i. image capture
 - ii. conversion to an electronic signal
 - iii. image processing and modification
 - iv. image display.

Continued over page

2. You have access to a portable ultrasound machine with a 12 MHz microconvex and a 5 MHz microconvex transducer. You wish to assess the relative cardiac chamber sizes and contractility of a 50 kg foal's heart. The machine only has an 'abdominal' preset.

Answer **all** parts of this question:

- a) List **two (2)** machine controls you need to change from the 'abdominal' preset to optimise the image for echocardiology. (2 marks)
- b) For **each** of the **two (2)** machine controls listed in 2 a) discuss how **each** control alters the image when changing from the 'abdominal' preset to echocardiology. (8 marks)
- c) State which one of the two available transducers would be most appropriate to assess this patient's heart. Briefly discuss the physical properties of sound that lead to the advantages and disadvantages of using your chosen transducer. (10 marks)
- d) List **four (4)** other machine controls that may be altered during the examination. Briefly describe how **each** of these controls optimises the image. (10 marks)

Section B over page

SECTION B

Answer all four (4) questions in Section B

1. Answer **both** parts of this question:
 - a) Describe the structure **and** purpose of a grid when making a radiographic exposure. (3 marks)
 - b) Describe the structure of **three (3)** different types of grids. For **each**, briefly discuss the clinical advantages **and** limitations of their use. (7 marks)

2. Answer **all** parts of this question:
 - a) List **four (4)** examples of personal protective equipment (PPE) used in veterinary radiography. (2 marks)
 - b) Discuss the meaning of the term 'half value layer', with respect to PPE in veterinary radiography. (2 marks)
 - c) Discuss the use and limitations of PPE during a radiographic examination. (6 marks)

3. Answer **all** parts of this question:
 - a) Define the stochastic **and** deterministic effects of radiation. Which of these effects is most important in a clinical veterinary radiology setting? (4 marks)
 - b) Define the ALARA principle. (1 mark)
 - c) Describe how the ALARA principle may be practically applied in a clinical setting. (5 marks)

Continued over page

4. Answer **all** parts of this question:
- a) Describe the cause of the reverberation artefact seen during ultrasound examination of the normal thorax. (3 marks)
 - b) Describe the cause of the edge shadowing artefact seen during ultrasound examination of the kidney. (3 marks)
 - c) List an example of the origin of the 'dirty' shadow artefact seen during abdominal ultrasound **and** state how this artefact is formed. (2 marks)
 - d) List an example of the origin of the 'clean' shadow artefact seen during abdominal ultrasound **and** state how this artefact is formed. (2 marks)

Section C continued in provided answer booklet

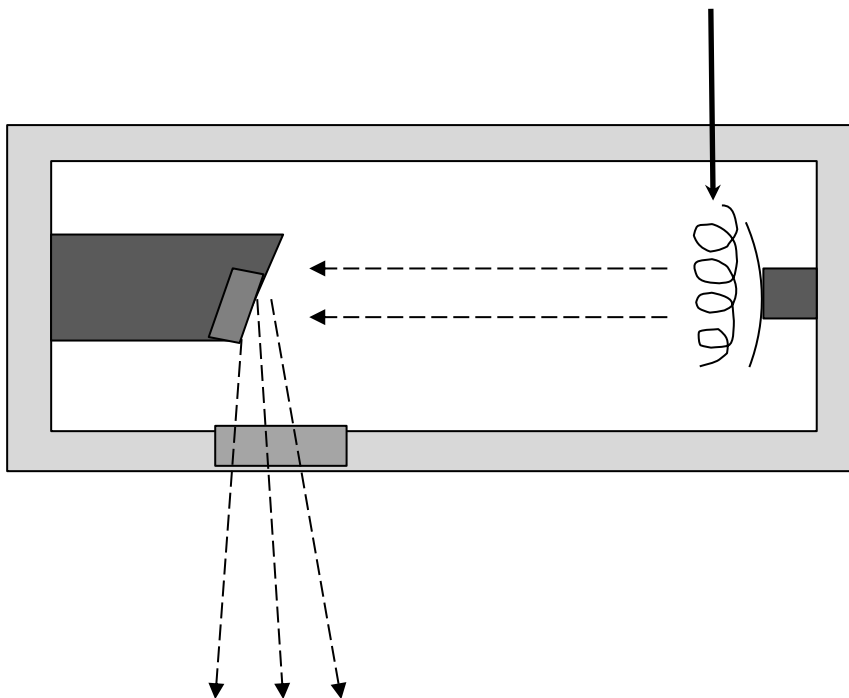
Paper 1: Veterinary Radiology (Large Animal)

Section C: Answer all ten (10) multiple choice questions in this section on printed pages 6 to 9 in this answer booklet.

Answer all ten (10) questions on the examination paper. This section is worth 20 marks. Each question is worth two (2) marks. Circle the letter corresponding to your chosen answer.

(10 multiple choice questions will be part of this examination located in a separate answer booklet that will be provided. Two examples for each paper have been made available.)

1. In the diagram below, which of the following options is the correct name for the component of an x-ray tube indicated by the solid arrow? (2 marks)



- a) tungsten target
- b) anode
- c) tube port
- d) cathode filament

2. Which of the following actions can a radiographer take to reduce the amount of scatter radiation produced by a patient? (2 marks)
- a) collimate the beam
 - b) reduce mAs
 - c) use a grid
 - d) increase kVp

End of paper



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Paper 2

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Section A: Answer **ALL TWO (2)** questions

Section B: Answer **ALL FOUR (4)** questions

Section C: Answer **ALL TEN (10)** questions

Section C is multiple choice which requires completion of **ten (10)** multiple choice questions located in the answer booklet you have been provided. *(Sample provided in this paper)*

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Section A: **TWO** essay-type questions each worth 30 markstotal 60 marks

Section B: **FOUR** short-answer questions each worth 10 markstotal 40 marks

Section C: **TEN** multiple choice questions each worth 2 markstotal 20 marks

Paper 2: Veterinary Radiology (Large Animal)

SECTION A

Answer both questions in Section A

1. You are presented with a 15-year-old Quarter horse gelding who is 'toe touching' lame in the left hindlimb and has swelling over the plantar aspect of the hock.

Answer **all** parts of this question:

- a) Describe the technique for acquiring radiographic projections to evaluate the hock, including the sustentaculum tali. *(10 marks)*
- b) List the soft tissue and synovial structures that should be evaluated on an ultrasound examination of the plantar aspect of the hock. *(8 marks)*

The diagnosis for the horse described above is osteoarthritis of the distal hock joints and osteomyelitis of the sustentaculum tali.

- c) Describe the changes you might expect to see on the hock radiographs of this horse. *(12 marks)*
2. You are presented with a 14-day-old foal that is non weight bearing lame in its right hindlimb. The foal is febrile with an elevated fibrinogen on its peripheral blood sample. There is stifle joint effusion and the umbilicus is moist.

Answer **both** parts of this question:

- a) Describe your approach to imaging the stifle and umbilicus in this patient. *(15 marks)*
- b) Describe the abnormalities you expect to find during your imaging examination of the stifle and umbilicus of this patient. *(15 marks)*

Section B over page

SECTION B

Answer all four (4) questions in Section B

1. Briefly describe the radiographic features seen in the following conditions:
 - a) Tooth root infection of the left maxillary premolar 4 in a 20-year-old horse. *(6 marks)*
 - b) Septic arthritis of the left fore proximal interphalangeal joint of the third digit of a four-year-old Holstein cow. *(4 marks)*
2. Describe your investigation of suspected generalised megaesophagus in a one-year-old male alpaca. *(10 marks)*
3. A two-year-old Thoroughbred has suspected osteochondrosis of the sagittal ridge of the third metacarpus.

Answer **both** parts of this question:

- a) Describe the technique for obtaining the **one (1)** radiographic projection that would best demonstrate this lesion. *(5 marks)*
 - b) List the expected radiographic findings. *(5 marks)*
4. Answer **both** parts of this question:
 - a) List the radiographic projections required for evaluation of the navicular bone. *(3 marks)*
 - b) Describe the radiographic findings that may be seen in an eight-year-old Quarter horse mare with navicular disease. *(7 marks)*

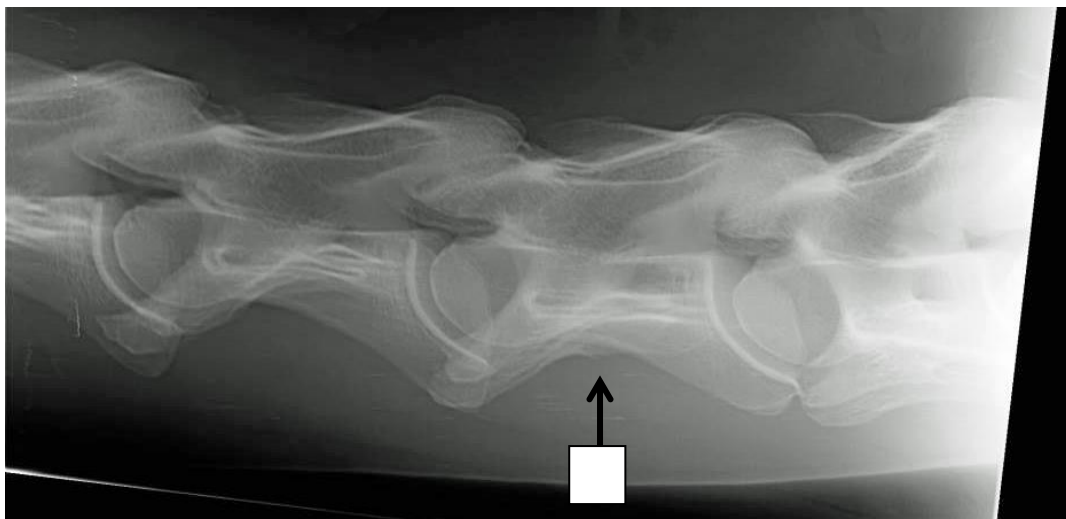
Section C continued in provided answer booklet

Paper 2: Veterinary Radiology (Large Animal)

Section C: Answer all ten (10) multiple choice questions in this section on printed pages 4 to 7 in this answer booklet.

Answer all ten (10) questions on the examination paper. This section is worth 20 marks. Each question is worth two (2) marks. Circle the letter corresponding to your chosen answer.

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1. On the radiograph provided above the cervical vertebra labelled (x) is: (2 marks)
 - a) C4
 - b) C5
 - c) C6
 - d) C7

2. Which surface of the equine carpus will be projected in an unobstructed manner ('free projected') in a dorsolateral-palmaromedial radiograph? (2 marks)
 - a) Dorsomedial
 - b) Dorsolateral
 - c) Lateral
 - d) Dorsal

End of paper