



Australian and New Zealand College of Veterinary Scientists

Fellowship Examination

June 2015

Equine Medicine

Paper 1

Perusal time: **Twenty (20)** minutes

Time allowed: **Four (4)** hours after perusal

Answer **ALL EIGHT (8)** questions

All eight questions are of equal value

Question 4 a) requires completion of the table located in the answer booklet you have been provided.

Answer **EIGHT** questions each worth 30 markstotal 240 marks

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Paper 1: Equine Medicine

Answer all eight (8) questions

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

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

i. Define insulin resistance. *(2 marks)*

ii. List the tissues most commonly affected. *(3 marks)*

b) List the screening **and** the dynamic tests that can be used to evaluate insulin sensitivity in horses. Indicate on your list which tests can be performed in a clinical situation. *(8 marks)*

c) Discuss the current understanding of the relationship between obesity and insulin resistance in the adult horse. *(17 marks)*

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

a) Describe the epidemiology, clinical signs, and laboratory confirmation of disease caused by West Nile Virus in horses during the arboviral epidemic in horses in southeast Australia in 2011. *(20 marks)*

b) Briefly discuss the clinical syndromes of the **two (2)** other endemic arboviral diseases in Australian horses. *(10 marks)*

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

- a) Define the terms adaptive pain and maladaptive pain **and** provide an equine clinical example of **each** type of pain. (5 marks)
- b) Describe the pathophysiology of pain in regards to peripheral and central nervous system sensitisation and disinhibition. (20 marks)
- c) For **each** of the following drugs state the site of action within the nervous system (central or peripheral or both): (5 marks)
 - i. flunixin
 - ii. xylazine
 - iii. ketamine
 - iv. gabapentin
 - v. lignocaine.

4. Answer **all** parts of this question: (answer 4 a, in the answer booklet provided)

- a) Compare lactated Ringer's (Hartmann's solution) with 0.9% saline for initial intravenous fluid resuscitation in hypovolemic horses. Include approximate values for ions contained in **each** solution by completing the fluid composition table provided in the answer booklet. (10 marks)
- b) Briefly discuss the indications for **and** disadvantages of the following colloid fluids in horses:
 - i. fresh frozen plasma (7.5 marks)
 - ii. hydroxyethyl starch. (7.5 marks)
- c) List the clinical **and** laboratory parameters that may indicate systemic fluid overload in horses. (5 marks)

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5. Describe the requirements of a program designed to minimise nosocomial infections in a large Australasian equine referral veterinary hospital. (30 marks)
6. For **each** of the neurologic diseases in neonatal foals listed below, briefly describe the:
- aetiology
 - clinical signs
 - clinical and/or laboratory features that aid in differentiation from other neurologic diseases in neonatal foals.
- a) bacterial meningitis (7.5 marks)
- b) lavender foal syndrome (7.5 marks)
- c) kernicterus (7.5 marks)
- d) juvenile idiopathic epilepsy. (7.5 marks)
7. Compare and contrast the colonisation and infection of equine patients with *Clostridium perfringens* and *Clostridium difficile*. (30 marks)
8. With regard to oedema in horses:
- a) Define the term 'oedema'. (3 marks)
- b) Describe the mechanisms of oedema formation, giving a clinical example for **each**. (12 marks)
- c) Briefly describe the diagnostic tests that may be used to determine the cause of oedema in a horse. Include in your answer the interpretation of the results of these diagnostic tests. (15 marks)

End of paper



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Paper 2

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Time allowed: **Four (4)** hours after perusal

Answer **ALL EIGHT (8)** questions

All eight questions are of equal value.

Answer **EIGHT** questions each worth 30 markstotal 240 marks

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Paper 2: Equine Medicine

Answer all eight (8) questions

1. For the pharmacological agents listed below, briefly describe:
 - the mechanism of action
 - adverse effects
 - management of the adverse effects
 - a) fluphenazine deconoate (10 marks)
 - b) phenylephrine (10 marks)
 - c) quinidine sulphate. (10 marks)

2. Discuss the recommended nutritional management of **each** of the following clinical cases:
 - a) a miniature pony with hyperlipaemia (10 marks)
 - b) a pregnant Thoroughbred mare following small intestinal resection and anastomosis (10 marks)
 - c) a 13-year-old eventing horse with right dorsal colitis. (10 marks)

Continued over page

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

a) Briefly describe the clinical signs **and** treatment of the following toxicoses in the horse:

i. oleander (7 marks)

ii. ivermectin (6 marks)

iii. maple (*Acer pseudoplatanus*) **or** box elder (*Acer negundo*) toxicoses. (7 marks)

b) Briefly describe the proposed pathogenesis and the clinical signs of the following paraneoplastic syndromes in the horse:

i. hypercalcemia (5 marks)

ii. hypertrophic osteopathy. (5 marks)

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

a) Describe the diagnostic investigation of a horse with vertical headshaking. Assume access to a well-equipped facility, with advanced diagnostic imaging. Include in your answer historical, physical exam and diagnostic test findings that would support involvement of the trigeminal nerve. (10 marks)

b) Describe the proposed mechanism of trigeminal nerve pathology as a cause of head shaking in horses. (10 marks)

c) Describe the management of a horse diagnosed with trigeminal neuritis. (10 marks)

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5. A three-month-old Thoroughbred foal in good body condition presents for acute onset of lethargy, inappetence, and effusion of multiple synovial structures. Pertinent findings on clinical examination include dull mentation, heart rate of 68 beats per minute, respiratory rate 70 breaths per minute, rectal temperature of 39.2°C and marked, bilateral effusion of the tibiotarsal joints, stifle and radiocarpal joints. The foal shows no evidence of lameness. The foal originates from a Thoroughbred breeding farm endemically affected by *Rhodococcus equi*. Haematology and synovial fluid evaluation (tibiotarsal joint) yield the following results:

Haematology

Parameter	Units	Patient value	Reference Range
Red blood cell count	$\times 10^{12}/L$	10.23	9.2–12.0
Haemoglobin	g/L	145	117–153
Haematocrit	L/L	0.40	0.32–0.42
MCV	fL	46.0	47.0–58.5
MCH	pg	17.1	12.3–19.7
MCHC	g/L	380	340–400
White blood cell count	$\times 10^9/L$	22.2	6.7–16.8
Neutrophils	$\times 10^9/L$	16.0	3.9–10.3
Lymphocytes	$\times 10^9/L$	5.6	2.9–7.1
Monocytes	$\times 10^9/L$	0.6	0.0–0.8
Eosinophils	$\times 10^9/L$	0.0	0.0–0.53
Basophils	$\times 10^9/L$	0.0	0.0–0.07
Platelets	$\times 10^9/L$	525	100–350
Fibrinogen	g/L	6.2	2–4

Synovial fluid analysis

Parameter	Units	Patient value	Reference Range
Gross visual inspection:	volume	high	low
	viscosity	low	high
	colour	yellow, translucent	pale yellow, clear
White blood cell count	cells/ μL	2,500	<500–1000
Total protein	g/L	30	<25
Cytology		4% (non-degenerate) neutrophils, no bacteria	<10% neutrophils

Question 5 continued over page

Answer **all** parts of question 5:

- a) Interpret the clinical examination findings and laboratory results. Include in your answer the major differential diagnoses in this case. (10 marks)
- b) List the further diagnostic tests you would perform in this case. Include in your answer justification for performing **each** test. (10 marks)
- c) Briefly discuss the advantages **and** disadvantages of routine antimicrobial treatment of foals on endemically affected farms that have subclinical *Rhodococcus equi* infection based on screening tests. (10 marks)

6. A seven-year-old Quarter horse gelding presents for evaluation of depression and anorexia. The gelding had reportedly also lost weight over the past month. The horse has no history of diarrhoea, and urination has been normal.

Pertinent findings from physical examination include dull mentation, body weight of 420 kg, a body condition score of 2 out of 5, dull hair coat, and cardiovascular examination findings consistent with mild (6%) dehydration. Respiratory rate is 26 breaths per minute. Rectal temperature and heart rate are normal.

A diagnosis of renal tubular acidosis (RTA) is suspected based on the following diagnostic test results:

Question 6 continued over page

Haematology – no abnormal findings

Serum biochemistry

Parameter	Units	Patient value	Reference Range
Sodium	mmol/L	132	130–151
Potassium	mmol/L	3.0	2.6–5.2
Chloride	mmol/L	116	97–109
Calcium	mmol/L	2.98	2.78–3.30
Phosphate	mmol/L	1.1	0.9–2.1
Magnesium	mmol/L	0.7	0.6–1.1
Triglyceride	mmol/L	1.48	<0.80
Glucose	mmol/L	4.2	3.5–7.1
Urea	mmol/L	5.8	3.3–5.8
Creatinine	µmol/L	138	62–140
Total bilirubin	µmol/L	44	<25
Alkaline phosphatase	U/L	130	<280
Aspartate aminotransferase	U/L	185	<240
Gamma glutamyltransferase	U/L	18	<40
Creatine kinase	U/L	112	<150
Total protein	g/L	72	60–78
Albumin	g/L	32	26–35
Globulin	g/L	40	30–55

Venous blood gas analysis

Parameter	Units	Patient value	Reference Range
pH		7.08	7.35–7.45
PvCO ₂	mmHg	2.8	38–49
HCO ₃ ⁻	mmol/L	6.8	28–32
Base excess	mmol/L	-21.2	-3–4
Lactate	mmol/L	1.2	<2
Haematocrit	L/L	0.37	0.30–0.50
Anion gap		12.8	0–13

Question 6 continued over page

Urinalysis

Parameter	Result
Source	catheter
Colour	yellow
Specific gravity	1.035
pH	8.0
Protein	0
Blood	negative
Leukocytes	negative
Epithelial cells	negative
Hyaline casts	negative
Granular casts	negative
Crystals	few CaCO ₃

Answer **all** parts of question 6:

- a) Interpret the clinical findings and diagnostic test results. Explain how they support the suspected diagnosis of renal tubular acidosis. *(10 marks)*
- b) Answer **both** parts of this sub-question:
 - i. Calculate the total body HCO₃⁻ deficit. *(3 marks)*
 - ii. Outline a treatment and monitoring plan for the first 24 hours. *(12 marks)*
- c) Briefly discuss the prognosis for this horse. *(5 marks)*

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7. With regard to urinary incontinence in the horse:
- a) Describe the clinical signs of urinary incontinence. (2 marks)
 - b) List the neurogenic and non-neurogenic causes of urinary incontinence. (8 marks)
 - c) List the diagnostic tests indicated in a complete evaluation of an adult horse with urinary incontinence. Include in your answer justification for **each** diagnostic test selected. (10 marks)
 - d) Describe the management of urinary incontinence associated with sabulous urolithiasis. (10 marks)
8. An adult Quarter horse presents with acute respiratory distress characterised by markedly increased inspiratory and expiratory effort, head and neck extension, nostril flare, tachycardia, tachypnoea, dark reddish-blue, congested mucous membranes, and an anxious expression. Rectal temperature is 38.8°C. Thoracic auscultation reveals an increase in breath sound intensity over the entire lung fields bilaterally. The owner reports the horse to have had a cough, exercise intolerance, and weight loss over the past month. There were no abnormal findings on videoendoscopy of the upper respiratory tract.

Answer **all** parts of this question:

- a) Describe the diagnostic tests and results that would provide a diagnosis of the following conditions:
 - i. recurrent airway obstruction (RAO) (8 marks)
 - ii. equine multinodular pulmonary fibrosis (EMPF). (8 marks)
- b) Briefly discuss the principles of management of interstitial pneumonia in horses. Use equine multinodular pulmonary fibrosis (EMPF) as a clinical example. (10 marks)
- c) List the criteria used to define acute respiratory distress syndrome (ARDS) in equine patients. (4 marks)

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