NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2020

EQUINE STUDIES

Time: 3 hours 200 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 9 pages. Please check that your question paper is complete.
2. Read the questions carefully.
3. Answer **all** the questions.
4. All answers must be written in the Answer Book provided.
5. Please number your answers exactly as the questions are numbered.
6. It is recommended that you spend approximately one hour on each section.
7. It is in your own interest to write legibly and to present your work neatly.

SECTION A

QUESTION 1

1.1 Match the appropriate remedy in column B to the respiratory condition in column A. Write only the letter and number of your answer, e.g. F 9.

Column A	Column B
A. Laryngeal hemiplegia	1. Tongue tie
B. Dorsal displacement of the soft palate	2. Tie-back operation
C. Recurrent airway disease	3. Furosemide/diuretic
D. Exercise-induced pulmonary haemorrhage	4. Nebulising with medication and implementing good management practices
	5. Neuromuscular pedicle graft

(4)

1.2 Choose TWO of the respiratory conditions in Question 1.1.

1.2.1 For each respiratory condition, describe the signs/symptoms you might see. (4)

1.2.2 Describe what the "good management practices" are that should be implemented for any respiratory condition. Refer to column B, item 4. (4)

1.3 Which one remedy given in column B above, is illegal in racing? (1)

1.4 How would you recognise a horse in respiratory distress? (6)

1.5 List, in order, the anatomical structures that air would pass through during inspiration in the horse. (10)

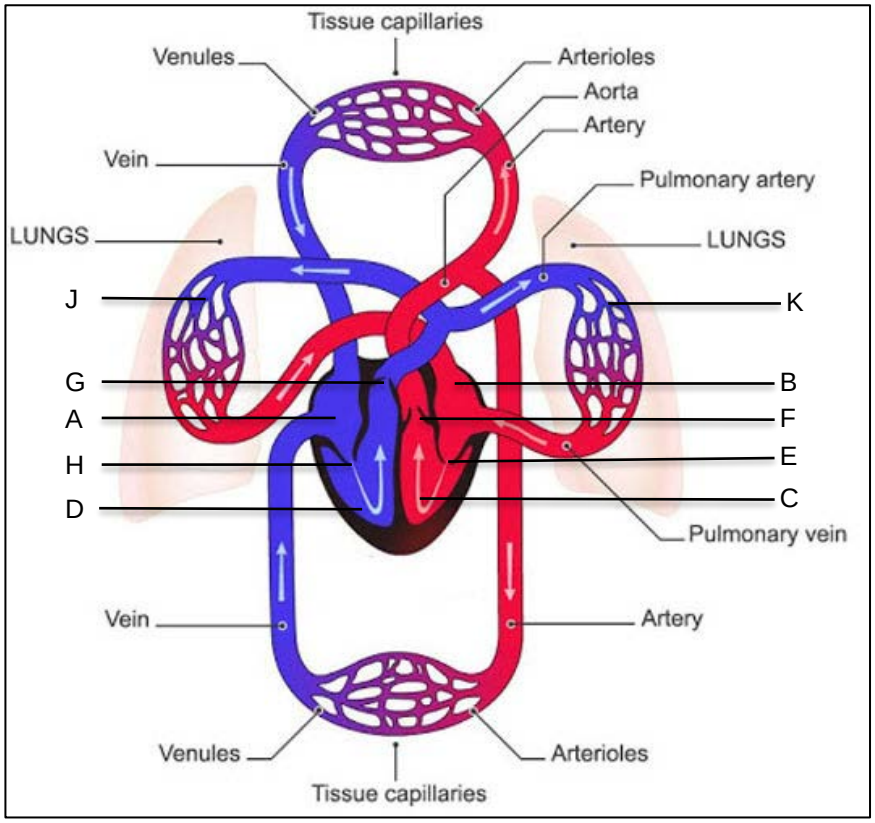
1.6 Name one other condition, other than EIPH, that could cause epistaxis. (1)

1.7 Provide some isolation protocols for a horse with a respiratory condition. (5)

[35]

QUESTION 2

Study the diagram below and answer the questions that follow.



[Source: <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/PH/PH709_Heart/PH709_Heart2.html>]

2.1 Provide a heading for the diagram above. (3)

2.2 Provide labels for parts A to H. (8)

2.3 Explain diastolic and systolic pressures in the heart. (4)

2.4 What is a horse's normal heart rate? (2)

2.5 Describe what a heart murmur is and why it is often a career-limiting condition. (4)

2.6 Name the process occurring at J and K. (1)

2.7 The lymphatic system is closely associated with the circulatory system. Describe the anatomy and function of the lymphatic system. (7)

2.8 Explain the difference between stocking up and lymphangitis. (6)

[35]

70 marks

SECTION B

QUESTION 3

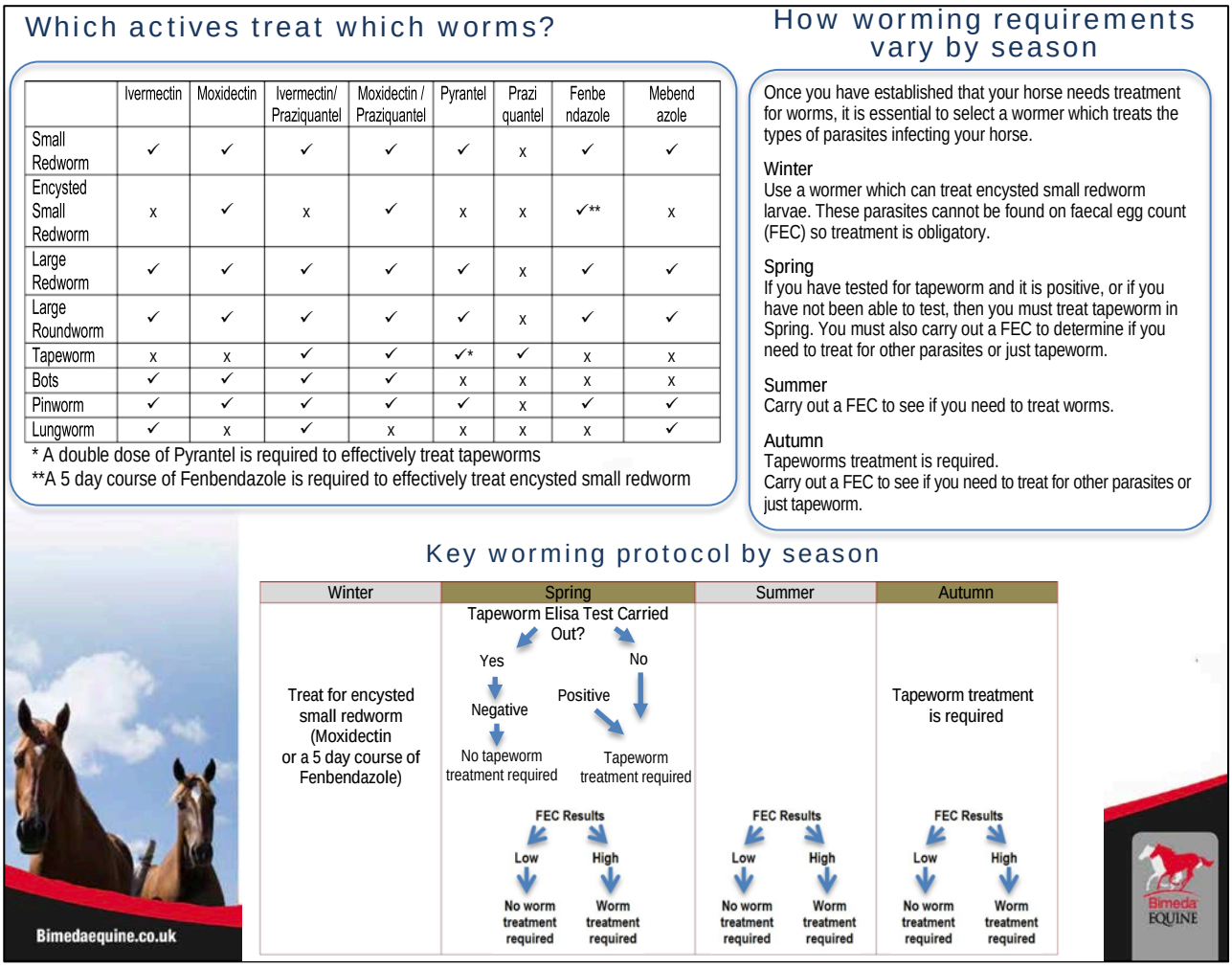
Worm resistance is an issue with Cyathostomes and *Parascaris* species. This must be considered when making treatment decisions. Faecal egg count reduction test (FECRT) is performed to determine worm resistance. FECRT is done 14 days after treatment with an anthelmintic. Faecal egg count is measured in eggs per gram.

Study the table and the flyer below and answer the questions that follow.

Table 1

HORSE	FAECAL EGG COUNT before treatment	DEWORMING PRODUCT used	FAECAL EGG COUNT 14 days after treatment
1	1500	Moxidectin	1400
2	250	Ivermectin	50
3	500	Ivermectin	300
4	50	Not treated	75
5	150	Not treated	100
6	1750	Moxidectin	100
7	0	Not treated	50

Flyer 1



[Source: <www.bimedaequine.co.uk>]

Use Table 1 to answer questions 3.1 – 3.6.

3.1 Which horses' worms show resistance to dewormers? Explain your choice(s). (3)

3.2 Give three reasons, other than resistance to dewormers, that could have given the results you deemed to be representative of resistance in Question 3.1. (3)

3.3 Which horses were potentially kept in the same field? Justify your answer. (5)

3.4 Why were some horses not treated? (2)

3.5 Explain the data for horse 7. (4)

3.6 During winter, small redworms (Cyathostomes) are encysted in the gut lining. Why can these parasites not be found on faecal egg count? (3)

Use Flyer 1 to answer Questions 3.7 and 3.8.

3.7 Which dewormer would you use to treat these encysted worms in winter? Justify your choice. (2)

3.8 In autumn, if your FEC results were low, which dewormer would you give your horse? Justify your answer. (3)

3.9 It is often said that horses should be stabled for 24 to 48 hours after deworming. Give two pros and two cons of this enforced box rest. (4)

3.10 Explain the need for record keeping with regard to your yard's worming protocol. (5)

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QUESTION 4

Equine metabolic syndrome (EMS) is a widely recognised collection of risk factors for laminitis. The most important of these risk factors is insulin dysregulation (ID). Clinicians and horse owners must recognise the presence of these risk factors so that they can be targeted and controlled to reduce the risk of laminitis attacks. Diagnosis of EMS is based partly on the horse's history and clinical exam findings, and partly on laboratory testing. EMS is controlled mainly by dietary strategies and exercise programs that aim to improve insulin regulation and decrease obesity where present. In some cases, drugs might be useful. Management of an EMS case is a long-term strategy requiring diligence and discipline by the horse's carer and support and guidance from their veterinarians. Laminitis associated with ID can also arise in association with glucocorticoid administration and Pituitary pars intermedia dysfunction (PPID).

[Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6430910/>]

4.1 What is the name of the body condition scoring system in horses that would define a Body Condition Score of 9 as obese? (1)

4.2 Describe laminitis in detail. (4)

4.3 Explain feeding protocols for horses prone to laminitis. (6)

4.4 Give feeding and exercise advice to an owner with an obese horse. (7)

4.5 Describe the exocrine and endocrine functions of the pancreas. (10)

4.6 Give the common name for PPID. (1)

4.7 How would you visually recognise a horse with PPID? (4)

[33]

QUESTION 5

You have a top Arabian endurance mare that is stabled in Kwa-Zulu Natal. She has qualified to go to a competition in Dubai in April next year with the potential to be purchased as a breeding mare after the race.

5.1 What potential problem could there be in having to export the mare during the months December till March? (3)

5.2 List the documents you would need before moving your horse for export into the African Horse Sickness (AHS) free zone. (3)

5.3 Being a competitive horse, your Arabian mare is at risk of experiencing exertional rhabdomyolysis.

5.3.1 Explain how you would limit the risk of this condition in the horse. (2)

5.3.2 What signs would you see if your horse did get exertional rhabdomyolysis? (2)

5.4 Explain the specific dietary needs, ratios and supplements that would be beneficial to a competitive endurance horse. (10)

5.5 If your mare was purchased for breeding purposes, explain how the move from the southern to the northern hemisphere would affect her breeding cycle. (4)

5.6 Your mare is now seven years old. Give five defining features of a seven-year-old's teeth. (5)

5.7 A balanced foot is essential to minimise injury during strenuous work. Describe a well-balanced foot. (4)

[33]

100 marks

SECTION C

QUESTION 6

BLISTER BEETLE POISONING

By Benjamin Espy, DVM, DACT

Many horse owners feed lucerne to supplement their horse's diet as this is a very efficient source of protein and calcium. Lucerne requires very specific growing conditions and is primarily harvested in the western United States. Even if you are using lucerne that has been harvested months or years previously, your horse is still at risk for blister beetle toxicity.

The blister beetle (Epicauta) is highly toxic to sheep and cattle, but primarily to horses. As little as four to six grams of blister beetles can be deadly to a 550-kilogram horse. Blister beetles swarm in lucerne fields and are drawn into bales by accident. Even small parts of these beetles are toxic to a horse. Whole insects need not be present to be dangerous.

Cantharidin is the chemical found in blister beetles that causes the damage noticed by the owner and veterinarian. It is a contact irritant and a vesicant (causes blister formation). The tissues most often affected by cantharidin are gastrointestinal mucosa (including the mouth), renal or bladder and the heart muscle. Although this may seem simple enough, most of the symptoms in the early stages of poisoning are non-specific and death may occur rapidly. Some of the clinical signs that may occur are as follows:

- Endotoxic shock and various degrees of colic – usually result from mucosal damage and from the migration of normal intestinal bacteria.
- Salivation and anorexia – result from vesicle (blister) formation and erosions in mouth and tongue.
- "Toxic Line" – indicates a purple-blue line that forms on the gums around the base of the incisor teeth. This usually indicates some degree of endotoxemia.
- Watery faeces or bloody stool – from abraded and deteriorating gastrointestinal mucosa.
- Cardiac arrhythmias – occur most often from electrolyte abnormalities (or hypocalcaemia) or damage to the heart muscle itself (myocardium).
- Haematuria (bloody urine) – evidence of renal damage or may be from ureter, bladder or urethral mucosa damage.
- "Thumps" – this is a curious syndrome unique to the horse. It is also called synchronous diaphragmatic flutter. It is seen as rhythmic contractions of the abdominal musculature. It occurs because of hypocalcaemia and your horse may appear to have various degrees of the "hiccups."
- Bloodwork your veterinarian will run may reveal low levels of magnesium (hypomagnesemia) and calcium (hypocalcaemia).
- Increased packed cell volume (PCV) and protein levels in the blood will indicate dehydration.
- Increased blood urea nitrogen and creatinine indicate renal damage and dehydration.

Depending on what stage of the syndrome your horse is in, your veterinarian may observe a transient, or short-lived, hyperglycaemia. There is no antidote for cantharidin. The only treatment your veterinarian can provide is supportive. Intravenous fluids with or without calcium are indicated to combat dehydration. Activated charcoal and mineral oil may be administered through a nasogastric tube by your veterinarian to help evacuate toxins from the gastrointestinal

tract and delay potential absorption. Gastric protectants may decrease gastrointestinal discomfort and colic. Antibiotics are mainly preventative.

Ask your veterinarian about this extremely deadly disease, especially if you feed lucerne from a new or unknown harvesting source. Since there are many representatives of the species Epicauta, your county agricultural agent may be able to provide you with pictures or pamphlets of poisonous beetles in your area or from the geographical area where you purchase your lucerne.

[Source: <https://aaep.org/horsehealth/blister-beetle-poisoning>]

6.1 What toxic chemical is found in the blister beetle? (1)

6.2 How many grams of blister beetle would be toxic to a 225 kg pony? (2)

6.3 Which tissues are most often affected by the blister beetle toxin? (4)

6.4 Give one word from the text that describes blister formation. (1)

6.5 There is no anti-toxin for this beetle. Explain what is meant by supportive treatment. (2)

6.6 Why do you think this beetle is toxic to sheep and cattle but is primarily a problem in horses? (2)

6.7 How would you as a farmer prevent this beetle getting into your lucerne bales? (3)

6.8 Why do you think the beetles are a problem in lucerne and not in *Eragrostis* hay? (3)

6.9 A different genus of blister beetle does occur in South Africa. Why do you think it is not as big a problem as in the western United States? Justify your answer. (4)

6.10 Would you rather have African Horse Sickness or blister beetle in South Africa? Justify your argument with sound reasoning. (8)

30 marks

Total: 200 marks