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NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2017

EQUINE STUDIES

Time: 3 hours | 200 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 16 pages and 3 sections. Please check that your question paper is complete.
2. You are required to answer **all** the questions.
3. All answers must be written in the Answer Book provided.
4. Answers must be numbered exactly as the questions are numbered.
5. Read the questions carefully.
6. It is recommended that you spend approximately 1 hour on each section.
7. It is in your own interest to write legibly and to present your work neatly.

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SECTION A

QUESTION 1

1.1 Match the pictures in Column A to the correct skin condition in Column B. Write only the number and correct letter in the Answer Book.

Column A	Column B
1. [<https://www.flickr.com/photos/nottinghamvets/5755472634>]	(a) Mange (b) Urticaria
2. [<https://heathershorses.wordpress.com/author/heathershorses/>]	(c) Mud fever (d) Sarcoids
3. [<https://equinenutritionnerd.com/2014/02/05/bee-pollen-for-horses/>]	(e) Sweet itch (f) Papilloma
4. [<http://keywordsuggest.org/gallery/407662.html>]	(g) Melanoma
5. [<http://drcollatosblog.highdesertequine.com/>]	(h) Ringworm (i) Lice

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1.2 Describe the following terms:

(a) Wobbler syndrome

(b) Lymphangitis

(c) Anaerobic respiration

(d) Miller's disease

(e) Windgalls (10)

1.3 1.3.1 Give the number in the diagram below that corresponds to the following tendon or ligament. Write only the letter and the corresponding number.

(a) Superficial digital flexor tendon

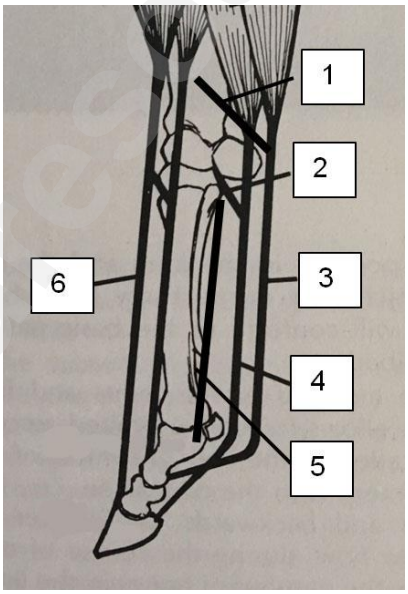
(b) Suspensory ligament

(c) Deep digital flexor tendon

(d) Common digital extensor tendon

(e) Proximal check ligament

(f) Distal check ligament



[Peter D. Rossdale. The Horse. Page 157]

(6)

1.3.2 Describe the immediate care, and justify this treatment, of a bowed tendon before the vet can get to see the horse. (6)

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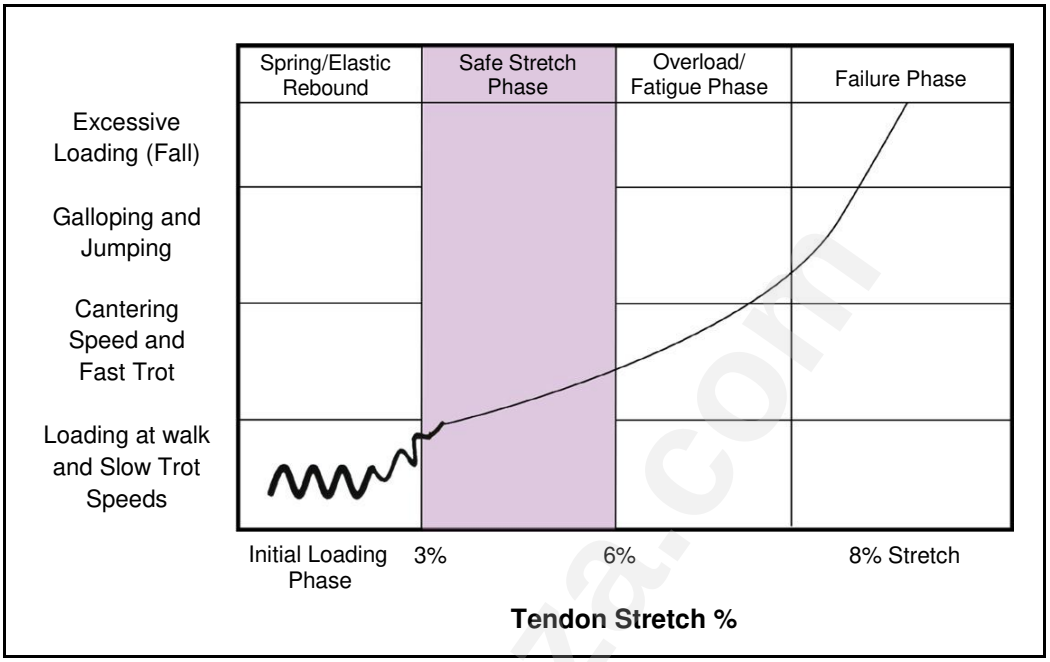
1.3.3 Study the following graph and answer the questions that follow.



[<http://equinenetwork.kohnkesown.co.uk/Injury-Prevention/Injury-Prevention.html>]

(a) What percentage of tendon stretch is considered safe? (1)

(b) During what exercise is the safe stretch phase seen? (1)

(c) When is the failure phase seen? (2)

(d) Why is the line zigzagged in the initial loading phase? (2)

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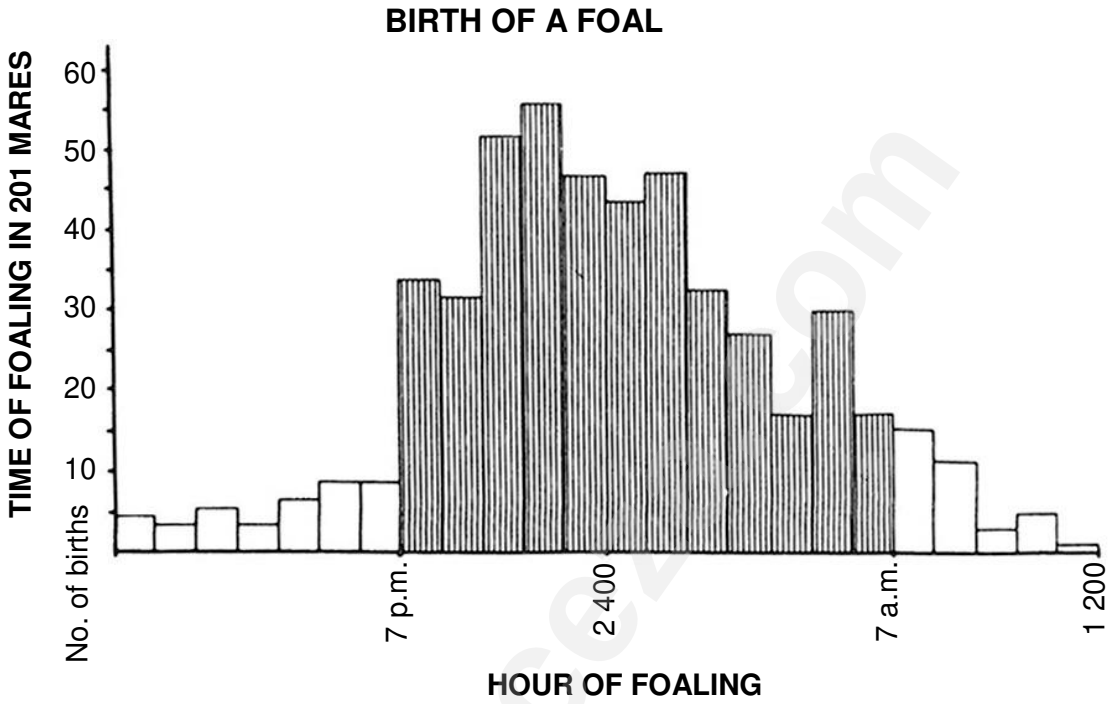
QUESTION 2

2.1 Study the graph below and answer the following questions.



This chart shows that 90 per cent of 501 foals born arrived between 7 p.m. and 7 a.m.

2.1.1 At what time of day or night was the highest number of births recorded? (1)

2.1.2 Between what times would you ensure you had at least 2 foaling staff on duty and why? (2)

2.1.3 What percentage of births were recorded at 10 pm? (3)

2.1.4 Why do you think most births are at night? (2)

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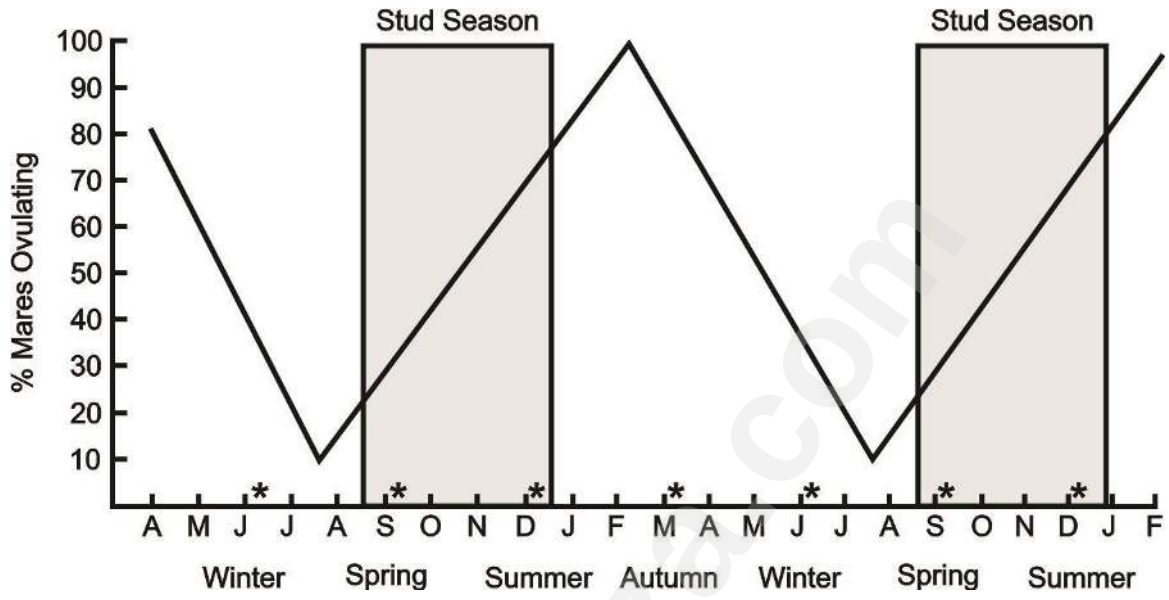
2.2 Study the graph below and answer the following questions.



This figure summarises data collected by Dr. Virginia Osborne of Sydney University, Australia, showing the percentage of mares ovulating during different months. Asterisks mark the solstices.

[Graphs from Peter D. Rossdale. The Horse. Pages 46 and 80]

2.2.1 When is ovulation at its peak? (1)

2.2.2 According to this graph when is stud season? (2)

2.2.3 What three things could influence the mares to ovulate sooner? (3)

2.2.4 What strikes you as strange about this graph with regards to when the stud season is compared to % mares ovulating? (1)

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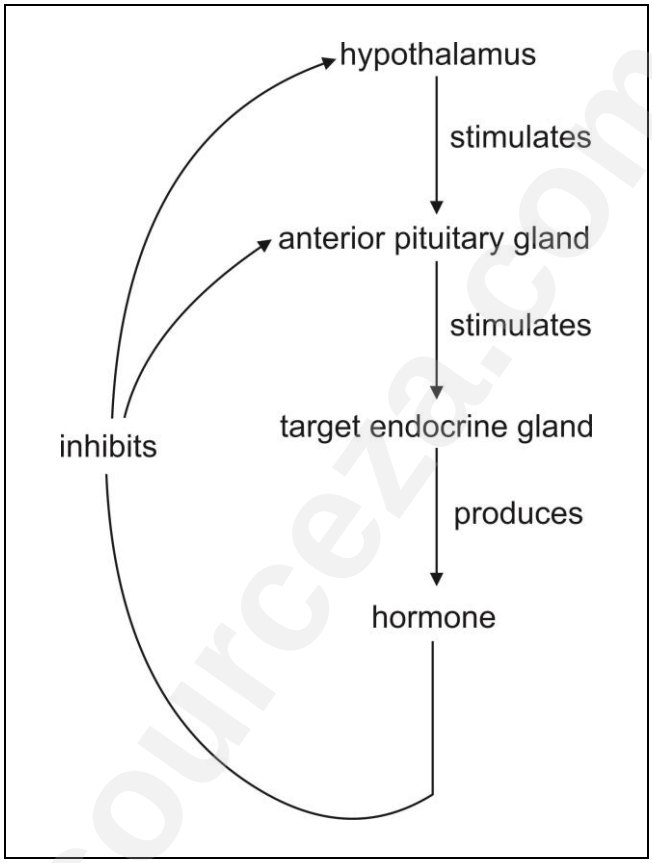
QUESTION 3

In Cushing's syndrome the anterior pituitary gland malfunctions. The diagram below shows the negative feedback mechanisms of hormones.

Use the diagram to answer the following questions relating to Cushing's syndrome.



[Zoe Davies. Introduction to Horses in Biology. 'Negative feedback system.' Page 135]

3.1 Name the target endocrine gland that is overstimulated by the anterior pituitary gland in Cushing's syndrome. (1)

3.2 Name the hormone that is produced by the stimulated target endocrine gland named in Question 3.1. (1)

3.3 Describe the effects that the malfunctioning pituitary gland has on the negative feedback cycle. (5)

3.4 State three symptoms you would notice in a horse with Cushing's syndrome. (3)

[10]

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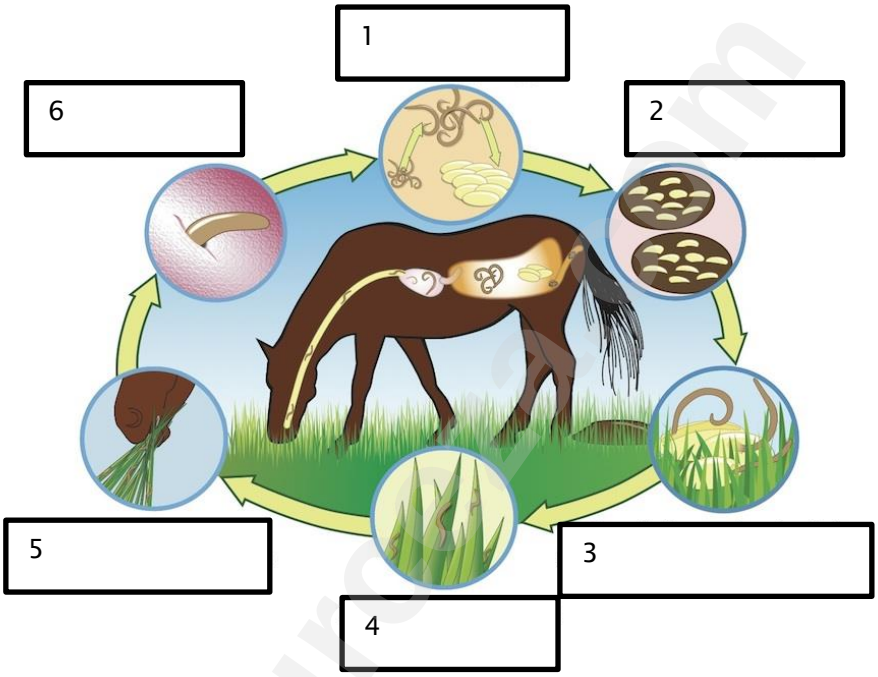
QUESTION 4

Use the diagram below to answer the questions which follow.

Life cycle of small strongyle in horses



* *They may enter hypobiosis and emerge later as L4 larvae, or immediately emerge as L4 larvae. There is a high damage risk if large numbers of encysted L4 emerge from the mucosa at the same time.*

[<https://www.bimectin.com/testimonials/author/848-superuser?start=140>]

4.1 Provide suitable labels for the stages numbered 1–6 above. (6)

4.2 What is the other name for small strongyles? (1)

4.3 What two dewormers are effective against this worm? (2)

4.4 Why is it high risk if large numbers of encycsted larvae emerge from the gut wall at the same time? (3)

[12]

70 marks

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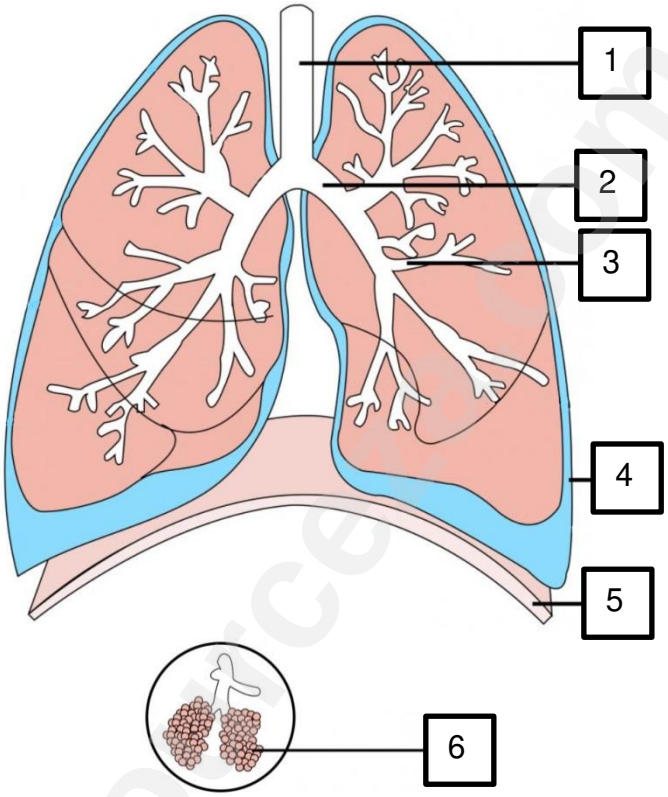
SECTION B

QUESTION 5

By referring to the diagram below, answer the questions which follow.



[<http://healthfavo.com/>]

5.1 Provide the above diagram with a heading. (1)

5.2 Provide labels for the parts numbered 1–6. (6)

5.3 Explain the functions of this system. (3)

5.4 Identify two common diseases of this system (2)

5.5 What is the normal breathing rate of the horse? (2)

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5.6 Regardless of whether your horse is used for high-level competition or weekend trail riding, it is important that it be fit for the task.

5.6.1 Define fitness in general terms. (4)

5.6.2 What is interval training? (3)

5.6.3 Study the following tables and answer the questions that follow.

ONE HORSE'S FITNESS TRAINING EXPERIENCE

These speed and heart rate data are from a 10-year-old Thoroughbred event horse during an incremental fitness test before beginning a conditioning program.

Week 0

INTERVAL/ LAP	SPEED (SECONDS/ FURLONG)	SPEED (MPH)	HEART RATE (BPM)
1	30	14	152
2	24	17	179
3	20.5	20	188
4	17.8	23	208

Following are speed and heart rate data from this horse during incremental fitness tests after four and eight weeks of conditioning.

Week 4/Week 8

INTERVAL/LAP	SPEED (MPH)		HEART RATE (BPM)	
	Week 4	Week 8	Week 4	Week 8
1	14.1	14.0	145	141
2	17.8	17.3	170	161
3	20.4	19.5	182	173
4	24.8	23.8	200	189

(a) Plot a graph of the horse's speed versus heart rate for the zero, four and eight week results. (8)

(b) Provide an interpretation of the graph. (4)

(c) What other reading could have been taken, as a good indicator of fitness? (2)

(d) Name three ways that the heart rate of a horse can be measured. (3)

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5.6.4 What role does the respiratory system play in fitness? (3)

5.7 5.7.1 How does dorsal displacement of the soft palate (DDSP) affect the horse's performance? (2)

5.7.2 What other condition of the upper respiratory tract has a similar effect as DDSP on the horses performance? (1)

5.8 In historic paintings, which showed horses at the gallop, the artist's depiction of the gait was incorrect. Artists had no means of observing the exact movement as we do today. In the picture below, the suspension phase is shown with the horse's legs in extension forward and behind. Explain how the artist should draw a galloping horse by describing the footfall pattern of the gallop to the artist. (6)

[Source: The Encyclopaedia of The Horse Ebury Press, Lieutenant-Colonel C.E.G. Hope and G.N. Jackson]

Flat racing Bay Malton defeats King Herod, Turf and Askam in a 500-guinea sweepstake at Newmarket in 1767.

5.9 Explain how a horse's breathing is influenced by the gait that the horse is in and how the horse's movement assists breathing. (10)

[60]

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QUESTION 6

Examine the advert below and use it to answer the questions which follow.

[<www.mitavite.com/speedi_beet>]

6.1 Why is it important that the advertisement states that there is "no added molasses"? (2)

6.2 Give three reasons why molasses is added to many feeds. (3)

6.3 What is meant by a prebiotic effect? (1)

6.4 Why is "starch free" important? (2)

6.5 What does "non-GM" stand for? (2)

6.6 Why is it important to state that it is "ready in 10 minutes"? (2)

6.7 What is Speedi-Beet made from? (1)

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6.8 Why would you feed a horse Speedi-Beet? (3)

6.9 Explain the way in which fibre is digested and its usefulness to the horse's body. (4)

6.10 What nutrient group do starches and sugars belong to? (1)

6.11 What is the difference between sugars and starch? (2)

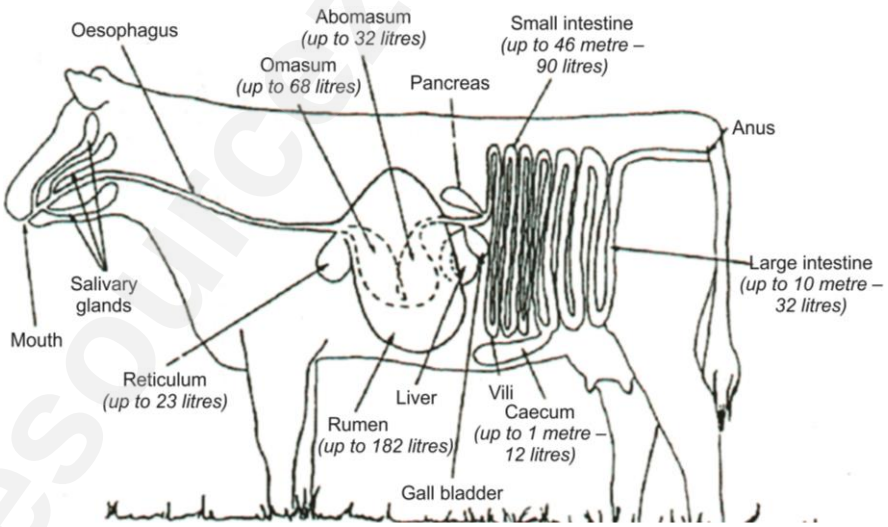
6.12 What makes up non-digestable fibre? (1)

6.13 Suggest what may be misleading about this product's name? (2)
[26]

QUESTION 7

Read the information below relating to the digestive tract of a cow and use it to answer the questions which follow.

The cow's digestive tract consists of the mouth, oesophagus, a complex four-compartment stomach (the largest part of which is the rumen), small intestine and large intestine.



[<http://www.milkproduction.com/Library/Scientific-articles/Animal-health/Digestive-Physiology-of-the-Cow/>]

The rumen can hold 150–200 litres or more of material, depending on the size of the cow. Because of its size, the rumen acts as a storage or holding vat for feed. It is also a fermentation vat. A microbial population in the rumen digests or ferments feed eaten by the animal. Conditions within the rumen favour the growth of microbes. The rumen absorbs most of the volatile fatty acids produced from fermentation of feedstuffs by rumen microbes. Absorption of volatile fatty acids and some other products of digestion is enhanced by a good blood supply to the walls of the rumen.

The small intestine measures about 40 metres. It is composed of three sections: the duodenum, jejunum and ileum. The small intestine receives the secretions of the pancreas and bile from the gallbladder, which aid digestion. Most of the digestive process is completed here, and many nutrients are absorbed through the villi into the blood and lymphatic systems.

The caecum is the large area located at the junction of the small and large intestine, where some previously undigested fibre may be broken down. The exact significance of the caecum

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Large intestine is the last segment of the tract through which undigested feedstuffs pass and is about 1 metre in length. Some bacterial digestion of undigested feed occurs, but absorption of water is the primary digestive activity occurring in the large intestine.

Large quantities of gas, mostly carbon dioxide and methane, are produced in the rumen. Production amounts to 500–1500 litres per day and must be removed; otherwise bloating occurs. Under normal conditions, distension from gas formation causes the cow to belch and eliminate the gas.

A cow may spend as much as 35 to 40 per cent of each day ruminating (cud chewing). During rest periods, feed boluses (cud) are regurgitated for rechewing to reduce particle size and for resalivation. Feed is more readily digested by rumen microbes as particle size is reduced.

[Extracted from: <http://www.extension.umn.edu/agriculture/dairy/feed-and-nutrition/feeding-the-dairy-herd/ruminant-anatomy-and-physiology.html>]

Tabulate 4 similarities and 5 differences between a horse's and a cow's digestive system.

1 mark for each similarity and 2 marks describing each difference.

[14]

100 marks

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SECTION C

QUESTION 8

Read the following case study and answer the questions that follow.

Oleander Poisoning: The Preventable Illness

Oleander is an evergreen shrub that seems to grow everywhere in California—in yards, parks and along freeways. It is often grown as a hedge that can reach up to 20 feet tall. The leaves are thick, leathery and dark green. White, pink or yellow flowers that are sweetly scented grow in clusters at the end of each branch.

Oleander is one of the most poisonous plants and contains numerous toxic compounds, many of which can be deadly to people and animals. ***It is especially dangerous to horses, as it is sweet. Symptoms of a poisoned horse include severe diarrhea, colic and abnormal heartbeat.***

The primary toxins in oleander are cardiac glycosides, which affect the heart. Cardiac reactions consist of an irregular heart rate, sometimes characterized by a racing heart that subsequently slows to below normal further along in the reaction. The heart may also beat erratically with no sign of a specific rhythm. Other toxic effects include nausea, excess salivation, abdominal pain, diarrhea (sometimes with blood), kidney failure and colic in horses. Poisonings from this plant can also affect the central nervous system and cause drowsiness, tremors, seizures, collapse, and even coma that can lead to death.

Several years ago, a sick four-year-old Standardbred racehorse was brought to the William R. Pritchard Veterinary Medical Teaching Hospital. The owner reported that it had stopped eating the day before and was clearly unwell. The horse appeared to be in shock, judging from the color of its mucous membranes, a heartbeat racing at 160 beats per minute (bpm), and a slightly elevated temperature. (Normal heartbeat for a horse is 28 to 44 bpm.) It also had significant discomfort from ileus—a condition in which the bowel does not move the contents at normal rates of flow because of lack of neuromuscular control. The ileus had caused a backward flow of fluid and intestinal contents back into the stomach. Since horses cannot vomit, this poses a serious problem. To treat this condition, a nasogastric tube was inserted into the horse to drain the accumulating fluid while tests were performed to determine the underlying problem.

Just four oleander leaves (shown above) can kill an adult horse. This plant is just as deadly dry as it is live.

An electrocardiogram (ECG) revealed that the horse had ventricular tachycardia, which is an irregular and overly rapid heartbeat. Pleural effusion—fluid in the chest around the lungs—and pericardial effusion—fluid around the heart—were signs that the horse's heart was failing. This condition was treated as an emergency with lidocaine administered intravenously to slow the heart rate. Eventually the heart rate was brought down to 60 bpm, substantially closer to the normal rate of 40 bpm than before, and the arrhythmia was converted to a normal sinus rhythm.

Blood work and urinalysis results then indicated a build-up of toxins and renal failure. By now, the horse was quite weak and was staggering. It was immediately put on intravenous fluids to flush out the toxins and eventually was stabilized. Meanwhile, testing continued to determine the exact cause of illness.

The diagnosis of toxicity was confirmed by laboratory tests, which showed the presence of oleander in the blood, feces and stomach fluid. The owners of the horse had not realized that the pasture the horse had been turned out in days before was surrounded by oleander. Fortunately, this story has a happy ending. With continued intensive treatment and supportive care, the horse began to recover and was eventually released from the VMTH. Three months after this incident, the owner reported that the horse was doing very well and was back in training.

Not every case ends this well, so remember that preventing exposure to oleander is by far the best course of action for your horses and other animals. ❄

[http://www.vetmed.ucdavis.edu/ceh/local_resources/pdfs/pubs-UR24-4-bkm-sec.pdf;]

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8.1 How many leaves of the oleander plant can kill an adult horse? (1)

8.2 Why is the oleander plant a concern to horses throughout the whole year? (1)

8.3 Why do horses eat the leaves? (2)

8.4 What are the symptoms of oleander intoxication? (3)

8.5 What colour are the mucous membranes of a horse in shock? (1)

8.6 If digesta from the small intestine flowed back into the stomach, how and why would this affect the pH of the stomach contents? (3)

8.7 Why can a horse not vomit? (1)

8.8 What blood vessel is used to administer intravenous fluid and why? (4)

8.9 Describe three treatments given to a horse with oleander poisoning by the vet and what effect these treatments would have. (6)

8.10 Design a programme to get this horse back into work once it has recovered. (5)

8.11 Oleander occurs in South Africa. Give three ways you could prevent exposure of your horses to oleander. (3)

30 marks

Total: 200 marks

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