

Name: _____

VMP 930 -- Final Exam

Each multiple choice has one best answer. Please use the scantron provided for your one (1) choice

Protozoa

Random Questions

1. Which one of the following is a good general statement about how all protozoan parasites are able to overcome host defenses and cause pathology? (2 points)
 - A. The infective stage utilizes insect vectors.
 - B. The infective cyst stage is highly resistant.
 - C. The ability to asexually reproduce and produce large populations.
 - D. Protozoa always hide in red blood cells.
 - E. Protozoa infect the epithelial cells of the small intestine of the definitive host.

2. _____ is a systemic apicomplexan that can accidentally infect a horse, causing neural pathology; with disease manifestations including ataxia and muscle atrophy. (2 points)
 - A. *Sarcocystis neurona*
 - B. *Toxoplasma gondii*
 - C. *Spirometra mansonioides*
 - D. *Neospora caninum*
 - E. *Sarcocystis cruzi*

3. Which parasite shows high host specificity for its feline definitive host; but very low host specificity for paratenic host, allowing it to infect any warm-blooded animal? (2 points)
 - A. *Toxoplasma gondii*
 - B. *Eimeria tenella*
 - C. *Cystoisospora felis*
 - D. *Neospora caninum*
 - E. *Sarcocystis cruzi*

4. *Toxoplasma gondii* is a serious zoonotic disease for pregnant women, with the potential for causing fetal defects. Which of the following presents the greatest risk for congenital toxoplasmosis in the human fetus? (2 points)
 - A. A mother, whose primary infection occurs early in pregnancy.
 - B. A mother who is seropositive before pregnancy.
 - C. An old indoor cat

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5. Which feline protozoan causes a disease that is seasonal (spring & summer), with clinical signs of febrile disease, dyspnea, jaundice, and lab diagnostics showing pancytopenia, hyperbilirubinemia and schizont-laden macrophages on blood smear? (2 points)

- A. *Toxoplasma gondii*
- B. *Cytauxzoon felis*
- C. *Babesia gibsoni*
- D. *Cystoisospora rivolta*
- E. *Tritrichomonas foetus feline*

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Protozoa Cases

Case 1: A feline comes into your clinic with diarrhea.

6. Which list of feline protozoan parasites would be on your differential list? (2 points)
- A. *Cytauxzoon felis*, *Babesia gibsoni*, *Toxoplasma gondii*
 - B. *Leishmania infantum*, *Trypanosoma cruzi*, *Sarcocystis cruzi*
 - C. *Cystoisospora (Isospora) felis*, *Tritrichomonas foetus*, *Giardia sp.* Assembly F
 - D. *Platynosomum fastosum*, *Eurytrema procyonis*, *Paragonimus kellicotti*
7. If this feline with diarrhea: is an adult Show Cat that has a good body score and is Bright and Alert, which protozoan parasite moves to the top of your list? (2 points)
- A. *Tritrichomonas foetus*
 - B. *Trypanosoma cruzi*
 - C. *Cystoisospora (Isospora) felis*
 - D. *Giardia sp.* Assembly F
 - E. *Cytauxzoon felis*
8. If this feline with diarrhea: is an adult cat that has been losing weight and lethargic, which protozoan parasite moves to the top of your list? (2 points)
- A. *Tritrichomonas foetus*
 - B. *Trypanosoma cruzi*
 - C. *Sarcocystis cruzi*
 - D. *Giardia sp.* Assembly F
 - E. *Cytauxzoon felis*
9. If this feline with diarrhea: is a kitten that has just been adopted from an animal shelter, which protozoan parasite moves to the top of your list? (2 points)
- A. *Paragonimus kellicotti*
 - B. *Trypanosoma cruzi*
 - C. *Cystoisospora (Isospora) felis*
 - D. *Sarcocystis cruzi*
 - E. *Cytauxzoon felis*
10. Which diarrhea-causing protozoan of cats infects the Large Intestine? (2 points)
- A. *Tritrichomonas foetus*
 - B. *Trypanosoma cruzi*
 - C. *Cystoisospora (Isospora) felis*
 - D. *Giardia sp.* Assembly F
 - E. *Cytauxzoon felis*

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18. Both diarrhea-causing protozoans of calves produce large numbers of oocysts, consequently the ideal control method to prevent infection is: (2 points)
- A. Strict Sanitation
 - B. Vector Control
 - C. Eliminate Feral Canids
 - D. Rodent Control

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Case 3: A free-range swine farmer calls you out to attend to some 12 day old piglets with scours (diarrhea). You know that there are many causes of diarrhea in piglets, including viruses, bacteria, and protozoa.

19. Which herd-disease characteristic would move *Cystoisospora (Isospora) suis* higher on your differential list?
- A. High Morbidity, Low Mortality
 - B. High Morbidity, Low Mortality
20. While trying to catch some of the piglets you slip and fall face first in some of the piglet diarrhea. You accidentally swallow some infective oocysts of *Cystoisospora (Isospora) suis*. You shouldn't be concerned about developing coccidiosis, because:
- A. *Cystoisospora (Isospora) suis* requires a snail intermediate host.
 - B. *Cystoisospora (Isospora) suis* requires an ant intermediate host.
 - C. *Cystoisospora (Isospora) suis* has very high host specificity for its swine host.
 - D. *Cystoisospora (Isospora) suis* must encyst in the pig muscle to become infective to humans.
21. During your visit to the swine farm you notice many feral "barn cats" roaming around the farm. Which feline protozoan can infest the muscles of the pigs, and be a serious zoonotic issue for pregnant women that ingest raw pork?
- A. *Isospora felis*
 - B. *Tritrichomonas foetus*
 - C. *Cytauxzoon felis*
 - D. *Toxoplasma gondii*

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Case 4: You take a job as a Large Animal Vet in California. You are called out to a cattle farm that has been having abortions.

22. Which list of bovine protozoan parasites would be on your differential list? (2 points)
- A. *Eimeria bovis*, *Cryptosporidium parvum*
 - B. *Taenia saginata*, *Dicrocoelium dendriticum*
 - C. *Tritrichomonas foetus*, *Neospora caninum*
 - D. *Fasciola hepatica*, *Fascioloides magna*

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23. If the farmer complains of early abortions, which protozoan parasite moves to the top of your list? (2 points)
- A. *Cryptosporidium parvum*
 - B. *Neospora caninum*
 - C. *Fascioloides magna*
 - D. *Eimeria bovis*
 - E. *Tritrichomonas foetus*
24. The farmer indicated that a couple of his cows had almost come to term but had abortions relatively late. He was able to retrieve one of the aborted fetuses for necropsy, but the other aborted fetus was carried off by a pack of feral dogs that has been roaming the area. From this information, which protozoan parasite moves to the top of your list? (2 points)
- A. *Cryptosporidium parvum*
 - B. *Neospora caninum*
 - C. *Fascioloides magna*
 - D. *Eimeria bovis*
 - E. *Tritrichomonas foetus*
25. You do prepuce washings on the farm's bull. Which abortion-causing protozoan do you suspect? (2 points)
- A. *Cryptosporidium parvum*
 - B. *Neospora caninum*
 - C. *Fascioloides magna*
 - D. *Eimeria bovis*
 - E. *Tritrichomonas foetus*
26. Assuming the offending parasite is *Tritrichomonas foetus*, how did the cows become infected? (2 points)
- A. Sexually transmitted by an infected bull
 - B. Bitten by a tick vector
 - C. Ingesting an oocyst from calf feces
 - D. Ingesting an infected ant.
27. Assuming the offending parasite is *Tritrichomonas foetus*, what would be the best way to prevent infection? (2 points)
- A. Use sanitary hutches on a hill-side.
 - B. Eliminate stray canids
 - C. Use sanitary artificial insemination.
 - D. Eliminate sandfly vectors
28. Assuming the offending parasite is *Neospora caninum*, how did the cows become infected? (2 points)
- A. Bitten by a tick vector
 - B. Ingestion of oocysts from canine feces.
 - C. Ingesting a cyst on aquatic vegetation
 - D. Ingesting an oocyst from calf feces
29. Which abortion-causing protozoan of cattle is a flagellate? (2 points)
- A. *Cryptosporidium parvum*
 - B. *Neospora caninum*
 - C. *Fascioloides magna*
 - D. *Eimeria bovis*
 - E. *Tritrichomonas foetus*

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Case 5: A canine is brought to your clinic. The dog is very lethargic & has a fever.

30. Which list of canine protozoan parasites would be on your differential list? (2 points)
- A. *Babesia canis*, *Babesia gibsoni*, *Leishmania infantum*
 - B. *Neospora caninum*, *Sarcocystis cruzi*, *Trypanosoma cruzi*
 - C. *Isospora canis*, *Isospora ohioensis*, *Giardia sp.* Assemblage C
 - D. *Nanophyetus salmincola*, *Paragonimus kellicotti*, *Heterobilharzia americanum*
31. If the dog is an American Pit Bull Terrier and has a history of dog fighting, which protozoan parasite moves to the top of your list? (2 points)
- A. *Babesia canis*
 - B. *Neospora caninum*
 - C. *Babesia gibsoni*
 - D. *Isospora canis*
 - E. *Leishmania infantum*
32. If the dog is a foxhound and has developed skin lesions, which protozoan parasite moves to the top of your list? (2 points)
- A. *Babesia canis*
 - B. *Neospora caninum*
 - C. *Babesia gibsoni*
 - D. *Isospora canis*
 - E. *Leishmania infantum*
33. You do a CBC and find the dog has Thrombocytopenia and Anemia, you also do a blood smear and find organisms within the Red Blood Cells, which protozoans do you suspect? (2 points)
- A. *Neospora caninum*, *Sarcocystis cruzi*
 - B. *Isospora canis*, *Isospora ohioensis*,
 - C. *Babesia canis*, *Babesia gibsoni*
 - D. *Nanophyetus salmincola*, *Paragonimus kellicotti*
34. Using PCR, you determine the dog is infected with *Babesia canis*. How did the dog become infected? (2 points)
- A. The bite of the tick, *Rhipicephalus sanguineus*
 - B. Ingestion of oocysts from canine feces.
 - C. The bite of a sandfly, *Phlebotomus sp.*
 - D. Ingestion of sarcocysts in cattle tissues.

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Trematodes & Cestodes

35. Which one of the following is a good general statement about the life cycle of cestodes? (2 points)
- A. A snail intermediate host is required.
 - B. The intermediate host is always a vertebrate.
 - C. There is always an aquatic larval stage, such as the coracidium.
 - D. Cestodes always require 3 hosts to complete their life cycles.
 - E. The infective larval stage has to be ingested: either via the predator / prey interaction or due to accidental ingestion of the intermediate host.
36. Which one of the following is a good general statement about the life cycle of digenetic trematodes? (2 points)
- A. A snail intermediate host is required.
 - B. The infective (metacercarial) stage always encysts on aquatic vegetation.
 - C. The miracidial stage is always aquatic: hatching from the ova and swimming to its next host.
 - D. The second intermediate host is always a vertebrate.
 - E. The adult fluke is always found in the small intestine of the definitive host.
37. The effects of the pathology caused by *Dicrocoelium dendriticum* infections are seen in _____ . (2 points)
- A. lambs
 - B. older sheep
38. The small intestinal fluke _____, can be a carrier of the bacterium *Neorickettsia helminthoeca*, which in turn can cause a severe disease called "Salmon Poisoning" in canids. (2 points)
- A. *Paragonimus kellicotti*
 - B. *Platynosomum fastosum*
 - C. *Nanophyetus salmincola*
 - D. *Heterobilharzia americana*
 - E. *Spirometra sp.*
39. Control measures for *Fasciola hepatica* may include: (2 points)
- A. Elimination of ants and terrestrial snails
 - B. Elimination of aquatic snails and wet areas in the pasture
 - C. Prevent human defecation in pastures & human ingestion of raw meat
 - D. Prevent access of canids into the pasture and prevent canid access to offal

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40. This blood fluke is generally found in the mesenteric vessels of raccoons and other wildlife, but can also infect dogs causing a severe disease, characterized by diarrhea, anorexia, weight loss and eventual death. (2 points)
- A. *Heterobilharzia americana* B. *Nanophyetus salmincola*
C. *Dicrocoelium dendriticum* D. *Paragonimus kellicotti*
E. *Platynosomum fastosum*
41. Which one of the following groups do ALL the flatworms (flukes and/or tapeworms) listed result in economic loss to a cattle farmer because of condemnation of cattle meat and/or liver? (2 points)
- A. *Echinococcus granulosus*, *Moniezia sp.*, *Taenia pisiformis*
B. *Fasciola hepatica*, *Taenia saginata*, *Fascioloides magna*
C. *Moniezia sp.*, *Dipylidium caninum*, *Fascioloides magna*
D. *Taenia solium*, *Taenia taeniaformis*, *Taenia pisiformis*
E. *Dicrocoelium dendriticum*, *Taenia pisiformis*, *Spirometra sp.*
42. Which one of the following canine tapeworms does NOT shed its proglottids in the host's feces? The lack of segments in the feces requires the veterinarian to utilize fecal sedimentation to diagnose this tapeworm infection. (2 points)
- A. *Taenia pisiformis* B. *Mesocestoides corti*
C. *Dipylidium caninum* D. *Taenia taeniaeformis*
E. *Spirometra sp.*
43. *Anoplocephala perfoliata* is very easily and often diagnosed using the simple, passive fecal floatation technique. (2 points)
- A. True B. False

Matching I

Many digenetic trematodes utilize a second intermediate host or an environmental substrate to infect the definitive host. Knowledge of these 2nd intermediate hosts assists the veterinarian in planning means for controlling fluke infections. Match each listed fluke with the appropriate 2nd intermediate host or environmental substrate with which the fluke utilizes. (2 points each)

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|---------|-----------------------------------|-----------------------|
| ___C___ | 44. <i>Fasciola hepatica</i> | A. Salmon |
| ___A___ | 45. <i>Nanophyetus salmincola</i> | B. Crayfish |
| ___B___ | 46. <i>Paragonimus kellicotti</i> | C. Aquatic Vegetation |

Matching II

All tapeworms utilize at least one intermediate host to infect the definitive host. Knowledge of these intermediate hosts assists the veterinarian in planning means for controlling tapeworm infections. Match each listed tapeworm with the appropriate intermediate host with which the tapeworm utilizes. (1 point each)

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|---------|--------------------------------|-----------------|
| ___D___ | 47. <i>Dipylidium caninum</i> | A. Rabbit |
| ___C___ | 48. <i>Moniezia sp.</i> | B. Rodent |
| ___A___ | 49. <i>Taenia pisiformis</i> | C. Pasture Mite |
| ___B___ | 50. <i>Taenia taeniaformis</i> | D. Flea |
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51. Parasitic arthropods include both arachnids and insects. Arachnids have simple metamorphosis where stages that hatch from eggs and develop to adults look very similar to the adult stage. This is important to know because immature larval stages can be found on the host and sometimes transmit infectious diseases. Which one of the following has larval stages that look like the adult stage?

- A. Ticks
- B. Fleas
- C. Blow flies
- D. Bot flies

52. Many insect genera, but not all, have complete metamorphosis where the larval stages that hatch from eggs are very different from the adult stage. Recognition of these larval stages is important because in some cases they are a direct cause of disease. Which one of the following genera has a disease-causing parasitic larval stage?

- A. *Ctenocephalides*
- B. *Musca*
- C. *Stomoxys*
- D. *Cuterebra*

53. Generalized infection with *Demodex* in dogs is very difficult to treat. What is the most sensitive approach to monitoring infection during treatment?

- A. deep skin scraping, hair pluck or biopsy to see cigar-shaped mites
- B. observation of hair coat return
- C. observation of when the dog stops itching

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54. Texas cattle fever caused by the protozoa, *Babesia bigemina*, has been nearly eradicated (except for a narrow area in Texas bordering on Mexico) in the USA. *B. bigemina* is transmitted by the one host tick *Rhipicephalus annulatus*. The success of this eradication has not been repeated with the numerous protozoal, rickettsial and bacterial diseases transmitted by three host ticks. What is the best reason for success in eradication of the one host tick but not three host ticks?
- A. the larval and nymph stages of most three host ticks are resistant to current drugs used for killing ticks.
 - B. one host ticks feed on only one host in the adult stage, but are off the host during larval and nymph stages.
 - C. one host ticks feed on only one host during all of their life stages, making it possible to kill almost all stages with one treatment of the host.
 - D. all developmental stages and adult stages of most three host ticks are resistant to current drugs used for killing ticks.
55. The most important potential consequence of tick infections considering production and companion animals is which one of the following?
- A. tick paralysis
 - B. anemia
 - C. wounds caused by feeding tick
 - D. diseases transmitted by ticks
56. The threat of flea infestation to client-owned dogs and cats must be constantly guarded against with insecticide collars, topical or oral systemic medication because of what characteristic of the flea life cycle?
- A. a large portion of the flea development stages, as well as adult fleas, are off the host in the environment where the dog or cat can be exposed.
 - B. fleas readily and frequently jump from one host to another.
 - C. insecticide resistant larval and pupal stages exist on the dog or cat that can mature to adults and begin feeding when there is no insecticide protection.
 - D. adult fleas can be in an insecticide-resistant dormant stage when on the host.

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57. While killing adult fleas on the host, flea control targeting pre-adult stages off the host by use of insect growth regulators, chitinase inhibitors and juvenile hormone analogue will require a period of time to clear the environment. During this time the dog or cat is still under threat of adult flea attack. The recommendation of repeated thorough vacuuming of carpets and upholstered furniture during this time is important. How long would you expect the process of clearing the pet's environment to take?
- A. 2 days
 - B. 3 months or more
 - C. one week
58. The most important pathology caused by louse infestation is which one of the following?
- A. irritation caused by mallophagan lice and anemia caused by anapluran lice
 - B. irritation caused by anaphulran lice and anemia caused by mallophagan lice
 - C. blood-borne diseases
 - D. allergic dermatitis
59. *Musca autumnalis* (face fly) is associated with transmission of which one of the following common infections in cattle?
- A. *Moraxella bovis* causing pink eye or keratoconjunctivitis
 - B. *Babesia bigemina* causing bovine piroplasmiasis (Texas fever)
 - C. *Anaplasma marginale* causing hemolytic anemia in cattle
 - D. *Borrelia theileri* causing bovine borreliosis in cattle
60. *Gasterophilus* has three species of bot flies that infect horses. What is one of the most important pathological lesions caused by the larval stages of these flies?
- A. damage to mucosa of the mouth and stomach
 - B. ulcers of the colon
 - C. skin erosions
 - D. subcutaneous cysts

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61. A client brings you a one year old cat that has been mainly outdoors this past summer. The cat has a subcutaneous swelling on the left lateral side of the neck. Close examination reveals a hole to that swelling in the skin and a pair of dark spots on the end of what appears to be a cattle grub in the cyst. What is this likely to be?
- A. *Hypoderma bovis*, cattle grub
 - B. *Gasterophilus intestinalis*, horse bot
 - C. *Oestrus ovis*, sheep bot
 - D. *Cuterebra emasculator*, rodent bot
62. A nursing one month old foal presents with diarrhea, and fecal flotation shows embryonated ova. What is the most likely nematode infection causing these clinical signs?
- A. *Strongyloides westeri*
 - B. small strongyles
 - C. *Trichostrongylus axei*
 - D. *Strongylus vulgaris*
63. What are the pathological changes caused by *Haemonchus contortus*?
- A. blood loss anemia and hypoproteinemia
 - B. gastric gland dysfunction, abomasal mucosal cell hyperplasia, increased systemic protein catabolism
 - C. colitis caused by emergence of larvae from the mucosa of the large intestine
 - D. ischemia and infarction of the arteries flowing to the large intestine, subsequent necrosis of the bowel.
64. What are the pathological changes caused by *Ostertagia ostertagi*?
- A. blood loss anemia and hypoproteinemia
 - B. gastric gland dysfunction, abomasal mucosal cell hyperplasia, increased systemic protein catabolism
 - C. colitis caused by emergence of larvae from the mucosa of the large intestine
 - D. ischemia and infarction of the arteries flowing to the large intestine, subsequent necrosis of the bowel.

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65. What are the pathological changes caused by small strongyles in horses?
- A. blood loss anemia and hypoproteinemia
 - B. gastric gland dysfunction, abomasal mucosal cell hyperplasia, increased systemic protein catabolism
 - C. colitis caused by emergence of larvae from the mucosa of the large intestine
 - D. thromboembolism causing ischemia and infarction of the arteries flowing to the large intestine, subsequent necrosis of the bowel.
66. Heavy infections with *Haemonchus contortus* in sheep present with what set of clinical signs?
- A. pale mucous membranes, intramandibular edema, dark pasty feces
 - B. watery diarrhea, intramandibular edema, anorexia (lack of appetite)
 - C. bloody diarrhea, loss of weight, pale mucous membranes
 - D. constipation, loss of weight, jaundice
67. Heavy infections with *Ostertagia ostertagi* in cattle present with what set of clinical signs?
- A. pale mucous membranes, intramandibular edema, dark pasty feces
 - B. watery diarrhea, intramandibular edema, anorexia (lack of appetite)
 - C. bloody diarrhea, loss of weight, pale mucous membranes
 - D. constipation, loss of weight, jaundice
68. Treatment and control of *Haemonchus contortus* infection in small ruminants is very difficult due to what feature of this nematode?
- A. it has developed drug resistance to almost all of the current anthelmintic drugs
 - B. it is transmitted by transmammary infection
 - C. it has infective larvae that are highly resistant to cold
 - D. it has adult worm stages outside of the host that can generate infective larvae
69. What is the prepatent time for *Parascaris equorum* in foals?
- A. 10 days
 - B. 80 days
 - C. 180 days
 - D. 360 days

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70. What is the prepatent time for *Toxocara canis* in new born puppies infected in utero?
- A. 10 days
 - B. 3 weeks
 - C. 8 weeks
71. What is the prepatent time for small strongyles in horses when not arresting?
- A. 10 days
 - B. 3 weeks
 - C. 2.5 to 3 months
72. Pathological changes caused by small strongyles in horses can occur in any horse that is or has been grazing on pasture. What are these changes and how are they caused?
- A. granulomatous colitis due to numerous larvae embedded in the mucosa of the large intestine
 - B. thromboemboli of the large intestine vasculature due to migrating larvae
 - C. non-healing granulomas in the skin on the face or at previous wound sites
 - D. gastritis caused by adult worms present on the mucosa of the stomach
73. Because of the growing threat of resistance to anthelmintic drugs by small strongyles in horses it is being recommended that horses be treated on a selected individual basis rather than one deworming program for an entire herd. This approach is thought to preserve a refugia population of worms that will not be selected for resistance. What approach is used to select which horses to treat?
- A. measurement of anemia by FAMACHA
 - B. measurement of fecal egg count by McMasters
 - C. Baermann technique
74. A three year old cat is presented to your clinic with a chronic cough, loss of weight and lack of appetite. Thoracic radiographs show density in parenchymal tissue of the lungs. Examination of sputum from the cat produced during a coughing episode shows nematode larvae with a "S" shaped tail or spine. What nematode is most likely infecting this cat?
- A. *Aelurostrongylus abstrusus*
 - B. *Ancylostoma tubaeforme*
 - C. *Toxocara cati*
 - D. *Paragonimus kellicotti*

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75. Adult stage *Ancylostoma* in dogs or cats is found at what organ site?
- A. small intestine
B. large intestine
C. lungs
D. liver
76. A client brings you a large (10 cm or ~ 4 inches) white worm with a long tapering tail that she found in the feces of her 3 year old horse. What is the nematode that most likely fits this description and how it was found?
- A. *Stongylus vulgaris*
B. *small strongyle*
C. *Parascaris equorum*
D. *Oxyuris equi*
77. Bowel obstruction and possible rupture can be the consequence of which nematode infection in horses 3 to 10 months of age.
- A. *Dictyocaulus arnfieldi*
B. *Parascaris equorum*
C. small strongyles
D. *Oxyuris equi*
78. Ingestion of ova containing infective larvae in the life cycle of *Toxocara canis* and *Toxocara cati* in their respective hosts, the dog and the cat, can result in tracheal migration and somatic migration of the larval stage. Which route of migration leads without delay to establishment of adult stage worms usually in young animals?
- A. tracheal migration
B. somatic migration
79. Infection with *Toxocara canis* and *Toxocara cati* in dogs and cats, respectively, can occur by ingestion of a paratenic or transport host (bird or rodent usually) that contains the infective larva. This route of infection leads to establishment of the adult worms without migration outside of the gut wall. It is often the source of infections seen in adult hosts. Which host is this most common in?
- A. cats
B. dogs

80. Routine treatment with anthelmintic drugs for puppies usually starts at 2-3 weeks of age, whereas for kittens it usually starts at 6 weeks of age. Why is this initial routine treatment at different ages for puppies and kittens?
- A. there is transuterine infection by *Toxocara canis* in dogs but not for *Toxocara cati* in cats
 - B. both have major transmammary infection potential with *Toxocara*, but the prepatent time by this route in kittens is much longer
 - C. kittens cannot tolerate treatment with anthelmintic drugs before 6 weeks of age
81. Visceral larval migrans leading to pathological changes in the eye or brain of humans is most often caused by ingestion of infective larvae of what nematode?
- A. *Ancylostoma*
 - B. *Stongyloides*
 - C. *Toxocara*
 - D. *Capillaria*
82. Experimentally all mammals can be infected with *Trichinella spiralis* by feeding isolated infective larvae, but under most circumstances in nature infections are not found in herbivores (plant eaters). Why is that so?
- A. herbivore digestive tracks lack the ability to activate the infective larvae
 - B. infective larvae are only found in muscle tissue
 - C. eggs containing *Trichinella* infective larvae will not hatch in herbivore digestive tracks
 - D. plant polyphenols and tannins found in herbivore digestive tracks kill infective larvae of *Trichinella*.
83. Which of the following food items presents the highest risk for infection with *Trichinella* when eaten by humans?
- A. bear meat eaten after a hunt and cooked over a camp fire
 - B. frozen and well cooked pork from pigs raised in confinement with good biosecurity
 - C. beef
 - D. lamb

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84. Your client in Raleigh has a 4 year old spayed female boxer dog and has purchased a house with a sunny backyard that the previous owner fenced for her dogs. The previous owner raised two litters from a female dog that he did not have on monthly prophylaxis, and complained about having "worms" in the puppies. Your client would like her dog to have access to the backyard but is concerned about her dog getting infected with "worms". The house has been vacant for 3 months over the summer. What nematode presents the highest risk for establishing adult worms in your client's dog from being in the backyard?

- | | |
|-----------------------|-------------------------|
| A. <i>Ancylostoma</i> | C. <i>Strongyloides</i> |
| B. <i>Toxocara</i> | D. <i>Trichuris</i> |

85. There are many species of *Capillaria* or *Eucoleus* that infect the digestive tract of birds, but in dogs adult *Capillaria* infect sites other than the intestine that present with signs characteristic for inflammation of the tissue site. Where are adult *Capillaria* (*Eucoleus*) *bohmi* found in the dog?

- | | |
|---------------------------------------|------------------------|
| A. arterial blood vessels of the lung | C. subcutaneous tissue |
| B. nasal mucosa | D. liver |

86. Knowing that a parasitic nematode belongs to the order Spirurida informs you that the nematode life cycle requires an arthropod intermediate host. This information is important in how you proceed to prevent further infection. Which one of the following is NOT in the order Spirurida?

- | | |
|------------------------|-----------------------|
| A. <i>Physaloptera</i> | D. <i>Dracunculus</i> |
| B. <i>Habronema</i> | E. <i>Onchocerca</i> |
| C. <i>Trichuris</i> | |

87. *Habronema* infective larvae when deposited on the surface of an open wound or near lips or eyes of a horse by feeding flies, such as *Musca*, can remain at the site and cause an eosinophil infiltrated granulomatous reaction or continue migration to establish adult worms. Where are adult *Habronema* nematodes found in the horse?

- | | |
|-----------------------------------|--------------------|
| A. mucosal surface of the stomach | C. tracheal lumen |
| B. subcutaneous nodules | D. small intestine |

88. Which adult parasitic nematode infection of dogs and cats is readily diagnosed by endoscopic exam of the stomach?

- | | |
|-----------------------|------------------------|
| A. <i>Toxocara</i> | C. <i>Trichuris</i> |
| B. <i>Ancylostoma</i> | D. <i>Physaloptera</i> |

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89. Most cats diagnosed with heartworm infection are treated by which one of the following approaches?
- A. immiticide adulticide drug treatment using the same protocol as dogs
 - B. immiticide adulticide drug treatment as two single injections spaced one month apart
 - C. treat with corticosteroid in reducing doses during episodes of clinical signs, do not give immiticide, there is no safe immediate-kill drug treatment for heartworm in cats
 - D. do not treat with any drug, stop monthly prophylaxis treatments.
90. A frequently used variation of life cycle progression that allows some nematodes (hookworms in dogs, trichostrongyles in ruminants, and cyathostomes in horses are examples) to optimize transmission to a new generation of hosts or to bridge from one grazing season to the next is called what?
- A. arrested development
 - B. asexual replication
 - C. metabolic adjustment
 - D. morphogenesis
91. Although the life cycles of the ascarids of the genus *Toxocara* and the genera *Ascaris* and *Parascaris* are different with regard to routes of infection, the clinical disease presentations can be very similar. What signs are most common to ascarid infections in horses, pigs, dogs and humans?
- A. anorexia and itchy, red lesions on the skin.
 - B. anorexia and watery diarrhea.
 - C. potbellied conformation and itchy, red lesions on the skin.
 - D. potbellied conformation and fetid, mucoid diarrhea.
92. Which is the most important limiting factor for *Dirofilaria immitis* transmission in a canine population for a geographic region?
- A. environmental temperatures not high enough for infective larvae to develop in mosquitoes before the mosquito dies of old age.
 - B. absence of the tiger mosquito as the only really effective mosquito host.
 - C. absence of wild coyote or wolf populations as reservoir hosts.

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93. What is the most common pathological process associated with chronic heartworm infection in dogs?
- A. inflammation and fibrosis of pulmonary arteries.
 - B. blockage of the posterior vena cava leading to the caval syndrome.
 - C. liver damage and kidney failure due to increased venous blood pressure.
 - D. inflammation around alveoli and terminal bronchi resulting in asthma-like signs.
94. Of the ascarids listed below which one is of major public health concern with regard to zoonotic infection of humans?
- A. *Parascaris equorum*
 - B. *Ascaris suum*
 - C. *Toxocara canis*
 - D. *Ascaridia galli*
95. What is the life stage form of *Dirofilaria immitis* detected on blood examination of infected dogs?
- A. microfilariae
 - B. L4 larvae
 - C. circulating immature adult females and males
96. *Habronema* and *Drashia* that cause gastric and cutaneous lesions in horses require what as an intermediate host?
- A. snails
 - B. flies
 - C. rodents
97. One of the two biting filth flies requires fresh manure to lay its eggs and have its maggots develop to pupae. Which one of the flies listed below is a biting fly that requires fresh manure?
- A. *Haematobia irritans* (horn fly)
 - B. *Musca domestica* (common house fly)
 - C. *Gasterophilus* (horse bot fly)

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98. Large amounts of money are spent on deworming horses throughout their lives primarily to reduce persistent burdens of what nematode?

- A. small strongyles (cyathostomes)
- B. large strongyles (*Strongylus sp.*)
- C. *Habronema*

99. Successful treatment of *Trichuris vulpis* (whipworm) infection in dogs requires prolonged repeat dosing with an appropriate anthelmintic drug even when the source of reinfection from the environment can be avoided. This is because early developing immature larvae in the host are not easily killed by current anthelmintic drugs. How long is the prepatent time that must be covered by repeated drug treatment?

- A. 12 weeks
- B. 1 week
- C. 9 months

100. The emergence of drug resistance across all classes of currently used anthelmintic drugs (including avermectins) by a genus of nematodes with major health importance in a particular domestic species is pervasive in which host and parasite?

- | | |
|---|-------------------------------|
| A. small ruminants with <i>Haemonchus</i> . | C. dogs with <i>Toxocara</i> |
| B. cattle with <i>Ostertagia</i> . | D. pigs with <i>Ascaris</i> . |