NAME: _____

VMP 930 Lecture Exam #2

(100 points total --- 2 points each question)

There is one best answer for each question.

1. Clinical presentation of diarrhea in a foal at 2 weeks of age suggests infection with *Strongyloides westerii*. What question below is not relevant to a presentation of *Strongyloides*?

A. did a previous new-borne from this mare present with diarrhea?

B. is the stall kept clean and with dry bedding?

C. did a fecal exam of this foal show strongyle-type ova?

2. The most economically important parasitic nematodes of cattle and small ruminants are found whereas adult worms?

A. on pastures.

B. in large intestine of ruminants.

C. in trachea and bronchi of ruminants.

D. in abomasum of ruminants.

3. The most economically important parasitic nematodes of horses are found whereas adult worms?

A. on pastures.

B. in large intestine of horses.

C. in trachea and bronchi of horses.

D. in stomach of horses.

4. When working with dog breeders or anyone raising a litter of puppies most veterinarians routinely recommend starting anthelmintic treatment of puppies at 2 weeks of age and repeating treatments twice at 2-week intervals. What is the justification for this recommendation?

A. to prevent patent *Trichuris vulpis* infections.

B. to treat clinical disease from adult *Toxocara canis*.

C. to prevent patent *Ancylostoma caninum* infections.

D. to kill arrested L4 *Ancylostoma caninum*.

5. Anthelmintic treatment of horses at two-month intervals starting at two months of age and continuing until 8-9 months of age is intended to prevent patent infections with what parasitic nematode?

A. *Strongyloides westerii*

B. *Parascaris equorum*

C. *Habronema*

D. Large strongyles

6. This nematode is unique among parasites of warm-blooded animal in that there are no ova, larval or adult forms that occur outside of the host. What nematode is it?

A. *Strongyloides* B. *Oesophagostomum*

C. *Trichinella* D. *Capillaria*

7. What is the intermediate host for *Dracunculus insignis,* which mainly infects raccoons but can occur in dogs with access to ponds and streams?

A. mosquito B. aquatic copepod

C. dung beetle D. face fly

8. Pathological lesions and clinical signs associated with most cases of *Dirofilaria immitis* infection in dogs involve what organ?

A. heart B. lung

C. liver D. kidney

9. *Strongyloides* species are considered to be mostly host-specific. Which species has the greatest potential for zoonotic infections?

A. *Strongyloides ransomi*: pig and human

B. *Strongyloides stercoralis*: dog and human

C. *Strongyloides westerii*: horse and human

D. *Strongyloides papillosus*: human and ruminant

10. What are the clinical signs associated with *Haemonchus contortus* infection in sheep and goats?

A. pale mucous membranes, low hematocrit, intermandibular edema in all ages of animals grazing pasture.

B. anorexia, watery diarrhea, poor growth and body condition, in lambs and kids.

C. labored breathing and cough in lambs at 3 weeks after placed on spring pastures.

D. bloody diarrhea.

11. Which life stage of the large strongyles (e.g. *Strongylus vulgaris*) causes the most important pathological lesions?

A. larvae migrating in host tissues.

B. adult worms.

C. infective larvae entering the mucosa of the small intestine.

D. arrested, hypobiotic larvae.

12. Severe anemia in puppies less than 2 weeks old with negative fecal ova results may be due to which nematode infection?

A. *Ancylostoma caninum*.

B. *Uncinaria stenocephala*.

C. *Toxocara canis*.

D. *Strongyloides stercoralis*.

13. A horse owner that maintains her 5-year-old horse in stable, and trains on a paddock so it is rarely on pasture. She has her horse on a selective deworming program where consistently low fecal egg counts allow her to deworm only at 6-month intervals. Five months after the last deworming she collected a large white nematode passed by her horse and is afraid her horse is infected with the large strongyle, *Strongylus vulgaris*. She presents you with the nematode she collected. Based on what you see you recognize *Oxyuris equi*. What did you see?

A. well-developed buccal capsule with teeth.

B. three fleshy lips at the anterior end.

C. large copulatory burse.

D. a long tapering posterior end (tail).

14. What activity creates the greatest risk for being infected by *Trichinella*?

A. walking barefoot over areas where pigs have been raised outdoors.

B. eating meat that has not been cooked.

C. eating well-cooked meat from omnivore or carnivore game species.

D. not being careful to wash vegetables before eating them raw.

15. What is the intermediate host for *Habronema* in horses?

A. mosquito

B. *Gasterophilus*

C. *Stomoxys* or *Musca*

D. *Cochliomyia*

16. Symptoms of *Dirofilaria immitis* infection in cats at pre-adult worm stage, about 3-4 months after infective mosquito bite, resemble what clinical presentation?

A. pneumonia
B. asthma
C. heart valve disease
D. allergic dermatitis

17. The anatomical feature called the “copulatory spicule” refers to what structure in nematodes?

A. present at the posterior end of adult males to facilitate insemination of females.
B. present at the anterior end of males and females to facilitate feeding.
C. present at the vulvar opening of adult females.
D. present in the body cavity to facilitate movement.

18. When are the numbers of infective larvae of trichostrongyles (*Ostertagia*, *Haemonchus*, *Cooperia*) usually highest on pastures grazed from April to November in cool temperate regions such western North Carolina, Ohio and Virginia?

A. April and May.
B. June and July.
C. August, September and October.

19. One of the pasture management approaches to minimize exposure of grazing ruminants to trichostrongyle infective larvae is to move animals to new pastures (not previously grazed for 2 months) at less than 3-day intervals. What lifecycle feature supports the 3-day interval?

A. the prepatent time for the adult worms in the host.
B. the number of eggs in the feces prior to moving.
C. the time for eggs to develop to infective larvae on pasture.

20. Which life stage of the small strongyles (cyathostomes) causes the most important pathological lesions?

A. larvae migrating in host tissues.
B. adult worm.
C. larvae emerging from large intestinal submucosa.
D. arrested, hypobiotic larvae.

21. On a farm call your client draws your attention to her horse showing skin inflammation localized to the ventral midline that is very itchy. You suspect infection with *Onchocerca cervicalis*. How would you confirm this diagnosis?

A. fecal flotation will show small, narrow embryonated ova.

B. Baermann will show larvae with a terminal spine.

C. skin snip biopsy of the lesion will show fly larvae.

D. skin snip biopsy or the lesion will show microfilariae.

22. The target for monthly prophylaxis treatment is what stage of *Dirofilaria immitis* development?

A. infective larval stage in the mosquito.

B. infective larval stage and migrating L4 stage in the host.

C. young adult stage in pulmonary arteries.

D. adult stage.

23. How would you confirm the presence of *Strongyloides* infection in the small intestine at post mortem exam?

A. gross observation of nematodes about 50 mm long on the mucosal surface.

B. observation of a nematode about 2 – 7 mm long in mucosal scraping using a microscope.

C. gross observation of nodules in the submucosa containing 10 mm long nematodes and caseous exudate.

D. gross observation of nematodes about 200 mm long on the mucosal surface.

24. Multi-drug resistance indicated by post-treatment failure of fecal egg count reduction in small ruminants is due to what nematode?

A. *Ostertagia*

B. *Trichostrongylus*

C. *Haemonchus*

D. cyathostomes

25. In a cool temperate region, re-stocking calves that are due to return to pasture in the Spring are treated at the end of Fall first grazing season with Ivermectin that kills adult and arrested L4 stages of *Ostertagia*. What is the purpose of this treatment?

A. to prevent Type II ostertagiasis and contamination of Spring pastures with eggs.

B. to prevent infective L3 larvae already on Fall pasture from surviving over-winter on pasture.

C. to boost immunity against *Ostertagia* during winter housing.

D. to prevent transmission of *Ostertagia* infections during winter housing indoors.

26. Reduction of development of drug-resistance in populations of small strongyles (cyathostomes) is attempted by selective deworming of horses in herds using results of individual fecal egg counts (McMasters technique). The justification for this approach to reduce drug resistance is what?

A. about 20% of horses in a herd produce 80% of the small strongyle eggs shed on pasture and are selected for more frequent treatment leaving many horses untreated as sources of refugia populations of worms to reduce selection for resistance.

B. horses with low egg counts have the most resistant worms and are selected for more frequent treatment.

C. McMasters fecal egg counts reveal horses with high metabolic breakdown of drugs with loss of efficacy.

D. refugia populations of worms can be identified post-treatment by fecal egg counts.

27. All the genera of ascarid nematodes discussed in this course, such as *Toxocara, Ascaris, Parascaris*, have a common feature that makes their control very difficult. What is common to these genera of ascarids?

A. all have 3 large lips at their anterior end.

B. all have free-living infective larvae.

C. all have long-lived infective larvae in ova that are highly resistant to environmental elements and even to chemical disinfectants.

D. all have infective larvae that can infect offspring by transuterine or trans mammary routes.

28. Signs of bloody diarrhea in a dog would suggest inflammation of the large intestine, including the cecum. Which nematode can be found inhabiting the cecum and possibly the colon of the dog?

A. *Trichuris* B. *Capillaria*

C. *Ancylostoma* D. *Toxocara*

29. The most important reason for not attempting to do a "slow kill" of adult *Dirofilaria immitis* in dogs is what?

A. there is continuing development of lung pathology due to presence of adult worms for several months.

B. the drug used to do a "slow kill" is toxic to dogs.

C. giving monthly prophylactic drugs to a dog with circulating microfilariae is never recommended.

D. only very active dogs should be treated by "slow kill" methods.

30. A rancher near Boone, NC (western region of NC) is grazing 9-month-old angus calves, weaned before being put on pasture in April, on the same pasture lot from April to September. Several calves have watery diarrhea, and many appear to be in poor body condition, and do not appear to be grazing. Fecal egg counts for most of the calves are above 500 eggs per gram. What is at the top of your differential diagnosis list?

A. *Ostertagia ostertagi* B. *Haemonchus contortus*

C. *Oesophagostomum* D. *Dictyocaulus viviparous*

31. *Oesophagostomum* has species that specifically infect ruminants and pigs. Why is it called the "nodular worm"?

A. the adult male worm has an expanded cuticular nodule in the copulatory bursa.

B. adult worms are surrounded by nodular cysts in the skin of infected hosts.

C. larvae are found in cystic nodules in the intestine of the infected hosts.

D. the adult female worm has an expanded cuticular nodule at the vulvar opening.

32. Which ascarid below can arrest as a larva in host tissues and infect pre-natal or newborn offspring by transuterine or lactogenic routes?

A. *Ascaris suum* B. *Parascaris equorum*

C. *Toxocara canis* D. all of the above

33. Successful treatment of a dog infected with *Trichuris* requires repeated dosage of an appropriate anthelmintic at monthly internals for 3 months even when reinfection is prevented. Why?

A. *Trichuris* adults can be killed only by high levels of drugs sustained for 3 months.

B. *Trichuris* has a 3-month prepatent time when developing early stage larvae are not susceptible to most drugs.

C. tissue-inhabiting arrested larval stages of *Trichuris* repopulate the cecum with adults after each treatment until they are depleted by three treatments.

34. A client brings you a 4-5 cm long, thick white nematode that was vomited with blood by her 3-year-old beagle. You thought initially that it might be *Toxocara canis* but upon close inspection you see that anterior end lacks three fleshy lips and cervical alae characteristic of *Toxocara*, and instead has a well-defined anterior cuticular collar. What is this nematode most likely to be?

A. *Physaloptera* B. *Dirofilaria immitis*

C. *Draschia* D. *Ancylostoma*

35. For all dogs having the possibility of patent infection with *Dirofilaria*, the American Heartworm Society Guidelines state that “all dogs should be tested for microfilariae”. Which one below is not a valid reason to do microfilaria testing?

A. microfilaremia validates antigenemia serological results.

B. microfilaremia identifies the patient as a reservoir infection.

C. microfilaremia alerts you to a high microfilaria burden that my precipitate a severe reaction following administration of a microfilaricidal monthly preventative.

D. the number of microfilariae is highly correlated with lung pathology.

36. Late in the summer grazing season (August) in Ohio after a month without much rain the weather changes and thunderstorms bring rain to pastures where mature ewes are grazed. One week after the storms the shepherd finds 3 ewes that are in good body condition but are down on pasture and unable to get up, showing labored breathing, dark pasty feces but no diarrhea, and very pale mucous membranes. You suspect *Haemonchus contortus* infection but a fecal exam shows less than 100 eggs per gram of feces. What is likely the source of the clinical signs of anemia?

A. toxic plants in the pasture.

B. massive mite infection.

C. coccidiosis.

D. prepatent *Haemonchus contortus* infection.

37. A three-year-old, indoor/outdoor cat is presented to your clinic with coughing and loss of appetite. Thoracic radiographs show density of parenchymal lung tissue. You suspect infection with *Aelurostrongylus abstrusus*. How would you confirm your diagnosis?

A. perform a Baermann preparation of feces to identify L1 larvae.

B. do an antigenemia test on heated serum.

C. look for larvated ova on fecal flotation.

D. look for strongyle-type ova on fecal flotation.

38. A producer of organic eggs from free-range hens had 20% of his last shipment of 2-3-month-old replacement birds die within one week of arrival at his farm. Clinical signs included bloody diarrhea. On post-mortem examination you find the small intestine full of 5 – 10 cm long, thick nematodes. What is this nematode?

A. *Heterakis* B. *Ascaridia*

C. *Capillaria* D. *Syngamus*

39. Which one of the following parasitic nematode genera does not require an arthropod intermediate host?

A. *Trichuris* B. *Dirofilaria*

C. *Physaloptera* D. *Habronema*

40. Which nematode does not have the ability to undergo arrested larval development in a hypobiotic state in its host?

A. *Ostertagia ostertagi* B. *Toxocara canis*

C. *Ancylostoma caninum* D. *Dirofilaria immitis*

41. Co-grazing horses with sheep increases the risk of catarrhal gastritis and/or nodular hyperplasia in the stomach of horses by infection with what nematode?

A. *Strongyloides westerii* B. *Ostertagia ostertagi*

C. *Haemonchus contortus* D. *Trichostrongylus axei*

42. The most common clinical signs associated with ascarid infections in dogs, cats, horses, and pigs are due to adult worms in what organ?

A. small intestine B. large intestine

C. stomach D. heart

43. A 3-year-old dog with outdoor yard access is presented to you because the dog is repeatedly rubbing its nose on the ground or on carpets inside, in addition to having sneezing fits. The physician owner wants you to prescribe corticosteroid pills to treat this obvious case of allergic rhinitis. You are not sure that this is allergic disease and you are suspicious it may be due to a nematode infection in the nose. What would confirm your suspicions?

A. presence of bipolar ova with pitted surface on fecal flotation.

B. larvae collected from Baermann of sputum or feces.

C. strongyle-type ova on fecal flotation.

D. larvae seen in a drop of blood.

44. The geographic distribution of where *Dirofilaria immitis* is found to be transmitted is limited by what factor?

A. presence of mosquitoes will always permit transmission.

B. summer temperatures that do not stay high enough to allow infective larvae to develop during the life span of potential mosquitos vectors.

C. lack of domesticated dogs.

D. lack of the only mosquito that transmits *Dirofilaria immitis*, *Aedes albopictus*.

45. Strategic deworming with repeat dosing or sustained release rumen bolus of avermectin class drugs (e.g. ivermectin) of calves during their first two months on pasture is done for what purpose?

A. to treat clinical disease due to adult *Ostertagia* infection.

B. to prevent development of adult egg-shedding *Ostertagia*.

C. to treat disease due to *Dictyocaulus* infection.

D. to treat clinical disease due to *Cooperia* infection.

46. *Parascaris* infection in horses and *Ascaris* infection in pigs and humans involve what route of infection and larval migration to establish adult worms?

A. ingestion of ova containing infective larva and tracheal migration.

B. ingestion of ova containing infective larva and somatic migration.

C. infective larva skin penetration and tracheal migration.

D. infective larva ingestion and mucosal migration.

47. Clinical disease from *Ancylostoma caninum* is very common in puppies but disease caused by *Ancylostoma tubaeformae* in kittens is much less common. Why might this be the case?

A. kittens are resistant to anemia due to their smaller size.

B. *Ancylostoma tubaeformae* does not infect by the lactogenic route in cats.

C. puppies are more likely to be infected by eating a paratenic host.

D. puppies have a much lower iron reserve than kittens.

48. Calves at 4 – 5 months of age were placed on a pasture in Alamance county, NC with low-lying areas that remain wet year-round. Older cattle had grazed this pasture ahead of the calves. One to two weeks after being on the pasture the young calves showed signs of coughing and increased respiratory rate that increased in severity over the following 4 weeks. What nematode would you suspect as a cause of these respiratory signs?

A. *Haemonchus placei*

B. *Dictyocaulus viviparous*

C. *Ostertagia ostertagi*

D. *Trichostrongylus axei*

49. Trichuris infection occurs by what route?

A. ingestion of free-living infective larvae.

B. ingestion of infective larvae contained in the required beetle intermediate host.

C. ingestion of the infective larva contained in the long-lived, environmentally resistant ova.

D. skin penetration by first stage larvae in soil.

50. Adulticide treatment of *Dirofilaria immitis* should follow what protocol?

A. treat cats and dogs the same.

B. 2 months before giving adulticide drug, pre-treat with doxycycline and macrocyclic lactone monthly prophylaxis.

C. give a single injection of the adulticide drug.

D. restraint from activity is <u>not</u> necessary after the adulticide injection.