

CORRECT ANSWERS ARE UNDERLINED AND **BOLD**

Read each question completely and choose the best response.

1. The biological vectors of this human filarial disease requires an environment with well-oxygenated freshwater for development. The nematode causing this disease is:
 - a) *Wuchereria bancrofti*
 - b) *Ascaris suum*
 - c) *Enterobius vermicularis*
 - d) *Onchocerca volvulus***
 - e) *Dracunculus medinensis*

2. Nematodes are members of the phylum:
 - a) Nematomorpha
 - b) Nematoda**
 - c) Secernentea
 - d) Arthropoda
 - e) Adenophorea

3. In the life cycle of *Dracunculus mediensis*, the crustacean serves as a:
 - a) paratenic host
 - b) final host
 - c) intermediate host**
 - d) definitive host
 - e) dead-end host

4. Which of the following statements is true:
 - a) There is no cure for human malaria
 - b) More people die of West Nile virus in the United States each year than from HIV (AIDS)
 - c) In 1900, more people in the United States died of cancer than infectious diseases
 - d) In the United States, the death rate due to infectious diseases has declined in each and every year since 1900
 - e) Developments in sanitation and public health reduced the death rate due to infectious diseases in the United States prior to the development and use of antibiotics**

5. In Dracunculiasis, female worms tend to emerge from:
 - a) the lungs during the first two weeks following initial infection
 - b) the lower extremities within 2 months of initial infection
 - c) the leg or foot approximately one year following initial infection**
 - d) the chest, just like in the film "Alien"
 - e) the waist area (in Africa), around the head (in Central America)

6. This nematode structure often displays modifications (adaptations) related to how the nematode feeds:
- a) intestine
 - b) stoma**
 - c) body muscles
 - d) bursa
 - e) amphid
7. Which of the following is true for root-knot nematodes:
- a) Females are sedentary endoparasites**
 - b) Males are sedentary endoparasites
 - c) J3 hatch from eggs and invade root tissues
 - d) Eggs are retained within the female's body (the cyst)
 - e) both "a" and "c"
8. The sensillum cell that has a secretory function is called the:
- a) pocket cell**
 - b) socket cell
 - c) trouser cell
 - d) finger cell
 - e) dendrite
9. In lymphatic filariasis, the stage that is released by female nematodes and can be found in the peripheral blood of infected humans is the:
- a) L3
 - b) filariform larva
 - c) rhabditiform larva
 - d) microfilaria**
 - e) L2
10. The most reliable method for diagnosis of lymphatic filariasis is:
- a) fecal exam
 - b) thin blood film
 - c) thick blood film
 - d) tests based on CFA (circulating filarial antigen)**
 - e) urine examination
11. Scientists estimate that nematode parasites of plants make up this percentage of all nematode species:
- a) 5%
 - b) 10%**
 - c) 15%
 - d) 25%
 - e) 50%

12. A plant-parasitic nematode species is likely to have:

- a) a stylet
- b) no males
- c) well-developed esophageal glands
- d) teeth in its stoma
- e) both "a" and "c"**

13. The region of nematode cuticle that gives it most of its strength is the:

- a) hypodermis or epidermis
- b) cortex zone
- c) basal zone**
- d) epicuticle
- e) medial zone

14. Which of the following statements is true regarding the nematode cuticle:

- a) it contains chitin
- b) the main proteins making up the cuticle are called globins
- c) it is composed of living cells
- d) it lines the intestine
- e) it functions as part of the hydrostatic skeleton**

15. In the United States, most cases of VLM in humans are caused by a nematode that uses this animal as its definitive host:

- a) raccoon
- b) skunk
- c) dog**
- d) cat
- e) rabbit

16. These paired sensilla are only found in the tail end of Secernentean nematodes:

- a) phasmids**
- b) chemids
- c) papillae
- d) amphids
- e) plasmids

17. This "side" of the nematode has most of the openings (e.g., vulva, cloaca, anus, excretory pore):

- a) left lateral
- b) dorsal
- c) ventral**
- d) right lateral
- e) sub-dorsal

18. The stoma chamber that is most anterior (farthest from the esophagus) is the:
- a) prostom
 - b) cheilostom**
 - c) gymnostom
 - d) stegostom
 - e) regalstom
19. During successful migration of *Meloidogyne* in the plant root:
- a) J2 nematodes enter roots and migrate between plant cells to their preferred site**
 - b) J2 nematodes enter roots and migrate within plant cells to their preferred site
 - c) J3 nematodes enter roots and migrate between plant cells to their preferred site
 - d) J3 nematodes enter roots and migrate within plant cells to their preferred site
 - e) J1 nematodes enter roots and migrate both between and within plant cells as the nematode finds its preferred site
20. The main pathology of *Onchocerca volvulus* in humans is caused by:
- a) L4 larvae or macrofilaria
 - b) L3 larvae
 - c) L2 larvae
 - d) L1 larvae or microfilaria**
 - e) adults
21. Which of the following is NOT a symptom or potential consequence of Onchocerciasis:
- a) itching skin
 - b) blindness
 - c) skin depigmentation
 - d) diarrhea**
 - e) loss of skin elasticity
22. The definitive hosts of *Anisakis* species are:
- a) humans
 - b) fish
 - c) small invertebrates such as shrimp
 - d) cetaceans (whales and their kin)**
 - e) abalone
23. Which of the following nematodes is known to have non-human reservoir hosts:
- a) Brugia malayi**
 - b) *Necator americanus*
 - c) *Wuchereria bancrofti*
 - d) *Enterobius vermicularis*
 - e) both "a" and "d"

24. Thin projections of cortical and medial cuticle found in the head ends of some nematode species are also known as:

- a) annules
- b) cephalic alae**
- c) lateral alae
- d) phasmids
- e) caudal alae or bursa

25. The biological vectors of Onchocerciasis are called:

- a) mosquitos
- b) blackflies
- c) *Simulium*
- d) ticks
- e) both "b" and "c"**

26. The symptoms of Anisakiasis can mimic food poisoning

- a) True**
- b) False

27. This nematode, which can cause VLM, is particularly likely to invade the central nervous system of humans:

- a) Baylisascaris procyonis**
- b) *Ancylostoma caninum*
- c) *Toxocara cati*
- d) *Ascaris lumbricoides*
- e) *Toxocara canis*

28. This disease of humans occurs when water containing infected crustaceans (copepods) is ingested:

- a) Enterobiasis
- b) Onchocerciasis
- c) Dracunculiasis**
- d) Ascariasis
- e) Lymphatic filariasis

29. Which of the following is NOT a characteristic of the Nematoda:

- a) bilateral symmetry
- b) cephalization
- c) pseudocoelomate
- d) segmentation**
- e) 4 larval or juvenile stages

30. Diagnosis of human pinworms is best accomplished by:

- a) stool examination
- b) ELISA immunological test
- c) "scotch tape test" examination**
- d) blood film examination
- e) skin snip examination

31. Which of the following human nematode infections cannot be readily cured (infection eliminated in most cases) by anthelmintic drugs?
- a) Anisakiasis
 - b) Enterobiasis
 - c) Dracunculiasis
 - d) Ascariasis
 - e) both "a" and "c"**
32. Storage of energy (as fat) and excretion of waste products are functions of the nematode:
- a) sensilla
 - b) pseudocoelom
 - c) intestine**
 - d) amphids
 - e) esophagus
33. Which of the following is NOT a frequent symptom of Visceral Larva Migrans:
- a) fever
 - b) liver enlargement
 - c) itching**
 - d) persistent eosinophilia
34. A host within which a nematode undergoes development (molting) but does not sexually mature is known as a:
- a) paratenic host
 - b) intermediate host**
 - c) heteroxenous host
 - d) definitive host
 - e) monoxenous host
35. The larvae that cause anisakiasis in humans can be killed by:
- a) freezing at -20°C
 - b) cooking
 - c) refrigeration
 - d) table salt
 - e) both "a" and "b"**
36. In nematodes:
- a) body wall muscles have processes that extend to nerves**
 - b) the axons of nerves extend to and innervate the muscles
 - c) there are no nerves
 - d) the body wall muscles are innervated without any connection to the nerve cords
 - e) all body wall muscle is circular

37. Regarding *Ascaris lumbricoides*, which of the following statements is true?
- a) infective eggs contain the L2 (J2) stage
 - b) *Ascaris* larvae are L3 when they complete successful tracheal migrations to establish in the intestines
 - c) humans infected with 1-3 worms typically will not have any symptoms**
 - d) *Ascaris* eggs are infective when passed in human feces
 - e) adult females are parthenogens
38. Regarding the life cycle of *Wuchereria bancrofti*, which of the following statements is false?
- a) the adult worms live within lymphatic vessels
 - b) the infective stage for the intermediate host is the L3**
 - c) the nematode molts 2 times within the intermediate host
 - d) the intermediate host is a female mosquito
 - e) the adult female nematode is ovoviviparous
39. Regarding *Meloidogyne*, which of the following statements is false?
- a) J2 hatch from eggs
 - b) some species do not produce males
 - c) adult females produce a gelatinous matrix within which they lay eggs
 - d) they are parasites of plant roots
 - e) they are considered ectoparasites**
40. Regarding *Enterobius vermicularis*, which of the following statements is false?
- a) the life cycle is direct
 - b) eggs remain infectious for only a few days
 - c) larvae that hatch from eggs on the perianal skin sometimes migrate back into the colon (via the anus) to reinfect
 - d) there is no drug treatment for this infection**
 - e) females typically migrate out of the human host before laying eggs
41. In the United States, the nematode species that is responsible for more human infections than any other is:
- a) *Onchocerca volvulus*
 - b) *Enterobius vermicularis***
 - c) *Anisakis*
 - d) *Ascaris lumbricoides*
 - e) *Toxocara canis*
42. Regarding the life cycle of human hookworms, which of the following statements is false?
- a) L1 hatch out of the egg
 - b) L3 (filariform larvae) are infective for humans
 - c) hookworms reproduce sexually in the small intestine
 - d) L4 break out of the lung alveoli and undergo tracheal migration to reach the intestine**
 - e) adult hookworms feed on blood and intestinal mucosa

43. In which of the following diseases is the most important pathology in humans associated with larval (juvenile) nematodes?

- a) Hookworm disease
- b) Anisakiasis
- c) Ascariasis
- d) Onchocerciasis
- e) both "b" and "d"**

44. With *Ascaris lumbricoides*, the second larval molt occurs:

- a) in the human intestine
- b) in the human lungs
- c) in the Ascaris egg**
- d) in the soil, following egg hatching
- e) in the human liver

45. Which of the following structures is present in females of some nematode species, but absent in females of other nematode species?

- a) ovary
- b) uterus
- c) oviduct
- d) spermatheca**
- e) vagina

46. Most parasitic nematode species are members of the class:

- a) nemata
- b) Adenophorea
- c) Secernentea**
- d) Ascaridoidea
- e) Oxyurida

47. This structure, when present, lines the dorsal side of the cloaca:

- a) gubernaculum**
- b) spicule
- c) spermatheca
- d) capitulum
- e) vas deferens

48. The hypodermis:

- a) produces the cuticle
- b) can produce hormones
- c) is syncytial in adult Secernentea
- d) has 4 cords that project into the pseudocoelom
- e) all of the above**

49. "Ground itch" is a symptom sometimes associated with:

- a) Dracunculiasis
- b) Hookworm infection**
- c) Ascariasis
- d) Onchocerciasis
- e) Lymphatic filariasis

50. All plant parasitic nematodes have a stylet, but not all nematodes with a stylet are plant parasites.

- a) True**
- b) False