1. Anthrax may be acquired by all of the following methods except
   A) consumption of contaminated meat.
   B) inhalation of airborne spores.
   C) contact with infected animals.
   D) consumption of food from vacuum sealed jars.
   E) contact with animal products.

2. The toxins produced by tetanus bacilli
   A) are endotoxins.
   B) induce uncontrolled contractions of the muscles.
   C) cause paralysis.
   D) are normally manufactured in the human intestine.
   E) are produced under aerobic conditions.

3. Which of the following describes the plague bacillus:
   A) an aerobic sporeforming rod
   B) an anaerobic Gram-negative rod with bipolar staining
   C) a Gram-negative rod with bipolar staining
   D) a Gram-positive aerobic coccus displaying metachromatic granules
   E) an aerobic sporeforming rod

4. The primary mode of transmission for Rocky Mountain spotted fever is
   A) blood transfusion.
   B) sexual contact.
   C) bite of an infected tick.
   D) inhalation of organisms.
   E) contact with infected animals.

5. Epidemic typhus is likely to occur where sanitation is lacking and where hygiene is poor because
   A) lice flourish under these conditions.
   B) contaminated water transmits the rickettsiae.
   C) squalid living conditions attract ticks which carry the disease.
   D) poor nutrition favors establishment of typhus.
   E) viruses flourish under these conditions.
6. Epidemics of relapsing fever may occur when
   A) molds complicate the initial infections.
   B) the initial infections spread to the intestine.
   C) lice are present on the victim.
   D) the organisms are found to be streptomycin resistant.
   E) mosquito populations are high.

7. Leptospirosis may pose a threat to those who
   A) shear sheep for wool production.
   B) are allergic to penicillin drugs.
   C) work with barnyard animals or household pets.
   D) consume raw vegetables.
   E) fail to sterilize canned food properly.

8. Two forms of disease associated with *Listeria monocytogenes* are
   A) intestinal ulcers and brain lesions.
   B) jaundice and destruction of phagocytes.
   C) fetal damage and meningitis.
   D) pneumonia and blockage of the gall bladder.
   E) paralysis and rose spots.

9. Various forms of tularemia may affect the
   A) kidney, eyes and skin.
   B) conjunctiva, lungs and skin.
   C) brain, spinal cord and meninges.
   D) intestine, gall bladder and brain.
   E) kidney, brain and pancreas.

10. Endemic typhus may be expected to occur where there are
    A) large herds of cows.
    B) heavy tick infestations.
    C) extensive populations of rodents and fleas.
    D) dairy product manufacturing plants.
    E) many contaminated cans of food.
11. Anthrax may be treated with antibiotics because
   A) anthrax spores germinate into vegetative cells.
   B) anthrax spores are susceptible to antibiotics.
   C) the spores remain dormant during disease.
   D) anthrax only infects the brain.

12. Infections due to *Clostridium perfringens* are accompanied by
   A) rapid multiplication of leukocytes.
   B) intestinal lesions.
   C) a red skin rash.
   D) gas in the muscle tissue.
   E) digestion of the lung tissues.

13. *Clostridium perfringens* exists widely in the soil and in the spore form in the
   A) lung secretions of patients who have tetanus.
   B) skin glands of birds.
   C) skin glands of animals.
   D) cerebrospinal fluid of fish.
   E) intestines of many humans and animals.

14. The characteristic fever and rash of rickettsial disease are evident in cases of
   A) melioidosis.
   B) anthrax.
   C) plague.
   D) epidemic typhus.

15. Endemic typhus occurs sporadically in human populations because
   A) food is routinely sterilized.
   B) dairy products contain acid.
   C) the organism cannot exist within the body.
   D) humans do have the anaerobic environment required.
   E) fleas are not natural parasites of humans.
16. The lockjaw associated with tetanus arises from
   A) infection of the jaw muscles.
   B) generalized muscle stiffness in the jaws.
   C) endotoxin invasion of the jaw muscles.
   D) microbial invasion of the jaw tissues.
   E) hyaluronidase production in the jaw.

17. All the following pairs of diseases and modes of transmission are correct except
   A) scrub typhus and the mite.
   B) trench fever and the louse.
   C) bubonic plague and the flea.
   D) epidemic typhus and the mite.
   E) endemic typhus and the flea.

18. The large joints can become stiff and swollen with arthritis as a complication of
   A) leptospirosis.
   B) relapsing fever.
   C) the blood form of tularemia.
   D) Lyme disease.
   E) the spleen involvement of anthrax.

19. All the following may be symptoms of tularemia except
   A) influenza-like symptoms.
   B) swollen salivary glands.
   C) lesions of the eye.
   D) skin ulcers.
   E) pancreatic lesions.

20. Erythema chronicum migrans (ECM) is the distinctive skin lesion
   A) associated with typhoid fever.
   B) that appears with Lyme disease.
   C) that develops to the maculopapular rash.
   D) associated with meningococcal meningitis.
   E) that forecasts the development of anthrax.
21. The flea is important to the transmission of
   A) bubonic plague but not pneumonic plague.
   B) epidemic typhus but not endemic typhus.
   C) anthrax but not tularemia.
   D) tularemia but not anthrax.
   E) Lyme disease but not epidemic typhus.

22. The mortality rate for tularemia
   A) is higher than for tetanus.
   B) is relatively low.
   C) has never been determined.
   D) is as high as for bubonic plague.
   E) has been calculated as one of the highest for all microbial diseases.

23. All the following apply to Lyme disease except
   A) the causative organism is *Borrelia burgdorferi*.
   B) transmission is by the *Xenopsylla* flea.
   C) the disease is named for a town in Connecticut.
   D) the disease was unknown before the 1970s.
   E) treatment is possible with penicillin or tetracycline.

24. When it grows in the dead, anaerobic tissue of a wound, *Clostridium perfringens*
   A) produces large amounts of gas.
   B) destroys the nerve tissues.
   C) causes the tissue to shrink and degenerate.
   D) is easily destroyed by phagocytes.
   E) produces a green, aromatic pigment.

25. A zoonosis is a disease
   A) found in animals and arthropods.
   B) transferred from animals to humans.
   C) found in epidemic proportions around animals.
   D) transmitted from humans to animals.
26. Woolsorter’s disease is another name for  
   A) anthrax.  
   B) plague.  
   C) tetanus.  
   D) tularemia.

27. Hyperbaric oxygen is a(n)  
   A) symptom in which the lungs collect oxygen but cannot expel carbon dioxide.  
   B) treatment in which oxygen is forced into a wound to treat gas gangrene.  
   C) treatment in which oxygen is forced into the lungs to treat zoonosis.  
   D) symptom in which oxygen cannot enter muscle tissue, causing muscles to contract.

28. A disease caused by a spirochete is  
   A) leptospirosis.  
   B) tetanus.  
   C) anthrax.  
   D) tularemia.

29. All of the following diseases are caused by sporeforming organisms, except  
   A) anthrax.  
   B) tetanus.  
   C) gas gangrene.  
   D) bubonic plague.

30. An antitoxin is an effective treatment for  
   A) tetanus.  
   B) gas gangrene.  
   C) tularemia.  
   D) bubonic plague.

31. A disease spread by ticks and which causes skin ulcers is  
   A) relapsing fever.  
   B) bubonic plaque.  
   C) bartonellosis.  
   D) tularemia.
32. Penicillin is a recommended treatment for each of the following diseases, except
   A) anthrax.
   B) tularemia.
   C) tetanus.
   D) gas gangrene.

33. Characteristic signs of relapsing fever include
   A) skin ulcers.
   B) recurring fever, headache, and shaking chills.
   C) intermittent fever without jaundice.
   D) buboes.

34. The "second most powerful toxin known to science" is produced by
   A) Clostridium botulinum.
   B) Clostridium perfringens.
   C) Salmonella typhi.
   D) Clostridium tetani.

35. One of the distinctive characteristics of Yersinia pestis cells is
   A) production of polar spores.
   B) acid-fast staining.
   C) bipolar staining.
   D) spirochete cell type.

36. A disease communicated by respiratory droplets is
   A) pneumonic plague.
   B) tularemia.
   C) tetanus.
   D) gas gangrene.

37. The organism that causes Rocky Mountain spotted fever is
   A) Rickettsia rickettsii.
   B) Rickettsia prowazekii.
   C) Rochalimea quintana.
   D) Rochalimea rickettsii.
38. The rickettsial disease which shares with plague, smallpox, and cholera the distinction of having caused pandemics that have significantly reduced the human population is
   A) scrub typhus.
   B) endemic typhus.
   C) epidemic typhus.
   D) Nigerian typhus.

39. All of the following are true about Lyme vaccine except:
   A) it is approved by FDA.
   B) three injections recommended.
   C) it is composed of genetically engineered lipoproteins.
   D) it has been tested on all age groups.

40. Select one of the following four choices for each of the phrases below:

   ______ associated with rat infestations
   ______ symptoms caused by a powerful exotoxin
   ______ due to a Gram-negative rod which shows bipolar staining
   ______ transmitted by ticks
   ______ sometimes called woolsorter's disease
   ______ due to a species of rickettsia
   ______ accompanied by contractions of the body's muscles
   ______ accompanied by a maculopapular rash
   ______ common in cows and sheep but not poultry, dogs or cats
   ______ may develop into septicemic and pneunonic stages
   ______ immunization rendered by an injection of toxoid
   ______ caused by a Gram-positive aerobic sporeforming rod
   ______ organs fill with bloody black fluid
   ______ crusted bulllike lesions on skin
   ______ diagnosis by Weil-Felix reaction
   ______ vaccine included in the DTaP series
   ______ organism used to satisfy Koch's postulates
   ______ transmitted by anaerobic soilborne spores
   ______ studied by Howard Taylor Ricketts
   ______ organism first isolated by Kitasato
41. Match each word or phrase with its correct characteristic.

____ lecithinase
____ tetanospasmin
____ Weil-Felix test
____ bipolar staining
____ buboes
____ axial filaments
____ hyaluronidase
____ hemolysin
____ Black Death
____ ECM
____ maculopapular rash
____ Rocky Mountain Spotted Fever

a. tickborne rickettsial disease; rash and high fever
b. enzyme which destroys hyaluronic acid
c. small rash which expands to 3-inch diameter within days
d. fused pink pimplelike spots
e. enzyme that dissolves lecithin
f. enzyme that destroys red blood cells
g. ends of cell show heavy dye deposits
h. exotoxin influences muscles to contract
i. fibers that cause cell movements
j. characterized by *Proteus* OX19 clumping in presence of rickettsial antibodies
k. plague
l. swellings in lymph nodes

42. Melioidosis is a disease whose causative agent may remain dormant in the body for many years before surfacing.
   A) True
   B) False

43. Trench fever and scrub typhus both are bacterial diseases due to Gram-positive sporeforming rods.
   A) True
   B) False
44. Tetanus spores commonly exist in the soil and revert to vegetative cells when they enter the lungs.
   A) True
   B) False

45. Lecithinase is a toxic substance, produced by gas gangrene bacilli, which dissolves the membranes of tissue cells.
   A) True
   B) False

46. The agent of Lyme disease remains unknown despite years of intensive research efforts.
   A) True
   B) False

47. *Leptospira interrogans* is a spirochete that may infect rats and other animals and spread to human by contact with the animals or water contaminated with their urine.
   A) True
   B) False

48. *Yersinia pestis*, the plague bacillus is transmitted among human populations exclusively by rat fleas.
   A) True
   B) False

49. Tularemia is found throughout most of Europe, but rarely is it detected in the United States.
   A) True
   B) False

50. *Clostridium welchii*, the gas gangrene bacillus, rarely is found in the soil, and can never be located in the intestines of humans or animals.
   A) True
   B) False
51. Typical signs of Lyme disease include an expanding red skin lesion and, weeks later, a stiffening and swelling of the large joints.
   A) True
   B) False

52. Melioidosis is not often recognized because it can mimic diseases like pneumonia, arthritis or heart attack.
   A) True
   B) False

53. Epidemic typhus is a rickettsial disease transmitted by a louse and accompanied by a rash and intense fever.
   A) True
   B) False

54. Bubonic plague is basically a disease of the blood, as bacteria localize in the lymph nodes and cause hemorrhaging.
   A) True
   B) False

55. The only recognized form of tularemia is one in which the salivary glands swell and induce taut muscles in the jaw.
   A) True
   B) False

56. Endemic typhus is a tickborne rickettsial disease characterized by mild fever, persistent headache and maculopapular rash.
   A) True
   B) False

57. Anthrax cannot be treated with antibiotics because the bacteria form spores at the infection site.
   A) True
   B) False
58. The DTaP injection imparts immunity to diphtheria, pertussis and tetanus.
   A) True
   B) False

59. Consumption of animal products such as raw milk may transmit the organism of listeriosis.
   A) True
   B) False

60. Rickettsialpox is so-named because the rash is very similar to that in smallpox.
   A) True
   B) False

61. Human monocyte ehrlichiosis (HME) is transmitted by deer ticks.
   A) True
   B) False

62. A vaccine for anthrax is available for veterinarians and others who work with livestock.
   A) True
   B) False

63. In order to survive in the soil, many bacteria produce spores.
   A) True
   B) False

64. Write a complete paragraph on the rickettsiae including descriptions of size, shape, transmission, cultivation, diseases and symptoms of diseases, laboratory diagnosis and treatment.

65. Name several diseases in this chapter that occur in animal populations and indicate how these diseases make the transition from animal diseases to human diseases.
66. Chart the course of the plague organism from an infected rat to the time a person expels the organisms in respiratory droplets during pneumonic plague.

67. Describe the condition called "gangrene" and show how large amounts of gas produced by Clostridium perfringens may lead to this condition.

68. Explain with examples the importance of arthropods in the transmission of bacterial disease and indicate how public health measures can break this chain of transmission.

69. Explain the meaning of each of the following terms:

- tabardillo
- bubo
- tetanospasmin
- rabbit fever
- lecithinase
- Weil-Felix test
- zoonosis
- lockjaw
- bipolar staining
- axial filaments

70. List the various methods by which the anthrax bacillus can be transmitted from animal populations to human populations.

71. Explain how the effects of the tetanus exotoxin can lead to the symptoms observed in patients who have tetanus.

72. Write a comparative paragraph explaining the similarities and differences between tularemia and bubonic plague.

73. Identify several bacterial diseases due to rickettsiae and state the salient characteristics of each disease.
Answer Key -- Chapter 9

1. D
2. B
3. C
4. C
5. A
6. C
7. C
8. C
9. B
10. C
11. A
12. D
13. E
14. D
15. E
16. B
17. D
18. D
19. E
20. B
21. A
22. B
23. B
24. A
25. A
26. A
27. B
28. A
29. D
30. A
31. D
32. B
33. B
34. D
35. C
36. A
37. A
38. C
39. D
40. b,a,b,c,d,c,a,c,d,b,a,d,d,c,a,d,a,c,a
a. tetanus
b. bubonic plague
c. Rocky Mountain spotted fever
d. anthrax

41. e,h,j,g,l,i,b,f,k,c,d,a
42. A
43. B
44. B
45. A
46. B
47. A
48. B
49. B
50. B
51. A
52. A
53. A
54. A
55. B
56. B
57. B
58. A
59. A
60. B
61. B
62. A
63. A

64. (No answer.)
65. (No answer.)
66. (No answer.)
67. (No answer.)
68. (No answer.)
69. (No answer.)
70. (No answer.)
71. (No answer.)
72. (No answer.)
73. (No answer.)