1. Fill in the Blank (2 points each)

1. ___ is the genus of bacteria that causes spotted fevers such as typhus.

2. Four corners disease is caused by a ___ virus.


4. Plague is spread from one host to another by ___.

5. ___ plague is the most contagious form of the disease and often starts epidemics.

6. The most deadly waterborne disease caused by a member of the genus Salmonella is ___.

7. Listeria monocytogenes often cause problems in prepackage food because it is ___.

8. ___ dysentery is caused by Entamoeba histolytica.

9. The most severe type of food poisoning is caused by ___ botulinum.

10. Legionnaires disease is treatable with the antibiotic ___.

11. A common technique in genetic engineering is to make DNA from mRNA using the enzyme, ___.

12. Sticky ends are sealed in recombinant molecules using the enzyme, ___.
13. *E. coli*, the most common host for recombinant work, has the inherent problem of producing ___ which must be removed if the product is to be ingested or injected.

14. ___ vectors insure that the recombinant molecule will be pumped out of the producing cell.

15. Yeast ___ chromosomes are used to store large pieces of foreign DNA for sequencing at a later time.

16. ___ inactivation is a technique used to detect the insertion of foreign DNA into a cloning vector by the lose of a phenotypic trait of the vector.

17. Site directed mutagenesis creates ___ mutations.

18. The enzyme, ___, is the key in making the PCR reactions work.

19. The ___ plasmid is able to conduct “natural” genetic engineering in plant.

20. A thermo stable enzyme, ___, is added to some laundry detergents to help remove stains.

21. Wine is converted aerobically to ___.

22. Sludge digester produces the gas, ___, which can be sold commercially.

23. ___ metabolites are produced during the stationary phase of bacterial growth.

24. ___ are used to introduce oxygen in the fermentors.

25. The liquid mixture that is actually
fermented to produce beer is called the ___.

26. ___ is added to some wines to inhibit the growth of the naturally occurring yeast on the grape.

27. ___ filters are the most common way of secondary treatment of sewage in cities.

28. Bacteria are different from Archaea in their cell wall composition and their ___.

29. ___ in situ hybridization, also called FISH, is used to visualize individual bacteria within a group.

30. ___ methyl esters, also called FAME, is often used to identify anaerobes.

31. DNA chips rely on DNA/DNA ___ to detect specific sequences of DNA.

32. In bacteria, rRNA is often used as a(n) ___ chronometer.

33. Mitochondria and chloroplast evolved from free living bacteria through the process of ___.

34. Antibody ___ refers to the concentration of antibody in a sample.

35. ___ antibodies allow for visualization of the tagged bacteria under an epifluorescent microscope.

36. ELISA stands for enzyme linked ___ assay.

37. Because viruses are difficult to grow in the hospital they are often magnified by ___ and identified using probes.

38. The magnifying effects of ___ make ELISHA such a sensitive tool.
39. ____ columns can be used to demonstrate bacterial stratification in the sediment.

II. Briefly Define (2 points each)

40. Asilomar conference of 1975

41. Luminescent reporter gene

42. selective/differential media

43 DAPI counts
III. Discussion
44. What is the difference between an intoxication and an infection type food poisoning? Give an example of each. (5 points)

45. Define coliform and give me the differences in definitions and isolation techniques for coliforms vs. fecal coliforms. (5 points)
46. Once a foreign gene has been successful cloned it may not produce the recombinant protein in sufficient quantities. List at least 2 ways that you would try to insure that the recombinant protein is produce in its new host. (4 points)
I. Bacterial (B) or viral (V) infections (1 point each)

___1. Legionnaires disease  
___2. Typhoid fever  
___3. Peptic ulcers  
___4. Mumps  
___5. Hepatitis  
___6. Lyme disease  
___7. Syphilis  
___8. Botulism  
___9. AIDS  
___10. Gonorrhea  
___11. Common cold  
___12. Cholera  
___13. Rabies  
___14. German measles

II. Fill in the Blank (2 points each)

__________________________________________________________________________ 15. Precipitin reactions bring molecules out of solution whereas____ reactions bring particles out of suspension.

__________________________________________________________________________ 16. Vaccines made from denatured exotoxins are called ___.

__________________________________________________________________________ 17. A vaccine that protects against multiple diseases is said to be ___.

__________________________________________________________________________ 18. ___ diseases are the result of a mistake in the immune system which causes the immune system to attack its host.

__________________________________________________________________________ 19. Monoclonal antibodies are made by fusing cancer cells with B cells to from a(n) ___.

__________________________________________________________________________ 20. The immunity conferred on a baby raised on mothers milk is an example of a type of immunity called ___.
I. Match the genus/group with disease (1 point each)

___1. Corynebacterium  a. whooping cough
___2. Bordetella  b. German measles
___3. Rhinovirus  c. gonorrhea
___4. Rubeola  d. red measles
___5. Varicella  e. typhoid fever
___6. Neisseria  f. chickenpox
___7. Treponema  g. typhus
___8. Helicobacter  h. Lyme disease
___9. Rickettsia  i. plague
___10. Coxiella  j. cholera
___11. Borrelia  k. peptic ulcers
___12. Yersinia  l. tuberculosis
___13. Clostridium  m. diphtheria
___14. Vibrio  n. botulism
___15. Entamoeba  o. common cold
___16. Salmonella  p. syphilis
___17. Mycobacterium  q. dysentery
___18. Rubella  r. Q fever

II. Fill in the Blank (2 points each)

______________________________  19. The MMR vaccine gives immunity against red measles, German measles and ___.

______________________________  20. Influenza viruses are identified by 2 surface antigens, hemagglutinin and ____.

______________________________  21. Lyme disease is a zoonose spread from animals to human by ___.

______________________________  22. Legionnaire disease is typically spread thorough contaminated ____.

______________________________  23. Four corners disease is caused by a virus in the ___ group.
24. *Listeria monocytogenes* is often associated with prepared foods because it is ____.

25. *Clostridium* ____ causes a mild food poisoning often associated with unrefrigerated gravy.

26. ____ plague occurs naturally in wild animals and only occasionally infects man.

27. The industrial process of ____ refers to carefully inoculating increasingly larger volumes of culture.

28. Many antibiotics are ____ which means they are produced during the stationary phase of the growth curve.

29. In some wine the chemical, ____, is added to insure successful fermentation.

30. ____ is the name of the carefully prepared liquid that is actually fermented to make beer.

31. Primary sewage treatment is used to remove the solid material which is called ____.

32. ____ is often added in water treatment plants to increase coagulation.

33. In municipal water treatment plants the final step in treatment is to sterilize the water with either chorine or ____.

34. Anaerobic digestion of sewage solids produces the gas, ____, which can be used or sold.

35. The aerobic breakdown of wine produces ____.

36. Recombinant pharmaceuticals produced in *E. coli* must be purified to remove ____
37. To insure appropriate transcription of the cloned gene, the vector must contain the proper ____.

38. The enzyme, TAQ, is the key component in the ___ technique.

39. ___ directed mutagenesis produces knockout mutations.

40. A(n) ___ vaccine confers immunity to several diseases.

41. FISH stands for fluorescent ___ hybridization.

42. The ___ content of DNA is constant in all members of a bacterial species.

43. ___ Manual of Systematic Bacteriology is the definitive reference book for bacterial taxonomy.

44. Two things that are different in Bacteria than in Archaea are cell wall composition and ___.

45. ___ columns can be used to display bacterial diversity in sediment columns.

46. ___ reverse transcription can be used to estimate actual bacterial metabolism in the environment.

47. ___ isotopes are a way to differentiate biological from abiotic chemical activity.


49. Hydrothermal vents use ___ as their primary producers.
III. Briefly Define (2 points each)

50. *Chlamydia*

51. Intoxication food poisoning

52. *Cryptosporidium*

53. Luminescent reporter gene

54. DNA vaccine
Discussion
57. Why are restriction nucleases used in recombinant DNA work and what do they do? (6 points)
I. Fill in the Blank (2 points each)

______________________________ 1. Tuberculosis and ___ are 2 important human diseases caused by *Mycobacterium*.

______________________________ 2. The MMR vaccine protects against Red Measles, Mumps, and ____.

______________________________ 3. The Varicella virus causes the disease ___.

______________________________ 4. When an influenza virus is identified as H1N5, the H stands for ____.

______________________________ 5. The most common bacterial STI in college students is ____.

______________________________ 6. Detecting the presence of reverse transcriptase in a patient is used to diagnosis ____.

______________________________ 7. Genital herpes is caused by the virus ___ (full name).

______________________________ 8. Gonorrhea is caused by the bacterium ___ *gonoerhoeae*.

______________________________ 9. A chancre is the first symptom of the STI called ____.

______________________________ 10. ___ are diseases spread from animal to humans.

______________________________ 11. ___ virus is the causal agent of four corner disease.

______________________________ 12. The disease caused by most heat tolerant bacterium passed in milk is ____.
13. Deer ticks are often involved in spreading the disease, ___.

14. ___ plague is the most infective form of the plague.

15. Coliforms have the taxonomically useful trait of being able to use the sugar, ___.

16. Legionnaires disease is usually treated with the antibiotic, ___.

17. ___ is the most life threatening disease caused by a member of the genus *Salmonella*.

18. Amoebic dysentery is caused by ___ *histolytica*.

19. *Clostridium ___* is a type of food poisoning often associated with eating gravy that has been stored without refrigeration.

20. ___ is the most common cause of intoxication type food poisoning in the USA.

21. ___ are used in sewage treatment plants for the anaerobic breakdown of the solid materials.

22. Trickling filters and ___ are the 2 most common techniques for the secondary treatment of municipal sewage.

23. ___ is a fermentation product only produced during the stationary phase of microbial growth.

24. The aerobic breakdown of wine will produce ___.

25 ___ is added to wort to help insure successful fermentation and to give beer its distinctive bitter taste.
26. When grapes are pressed, they release the must and the solid material called ___.

27. ___ cloning involves cloning total fragmented DNA and then screening the multitude of clones produced.

28. ___ uses small bits of lambda virus to permit packaging of large pieces of foreign DNA inside a lambda viron.

29. ___ vectors have a controllable promoter that can be manipulated to turn the recombinant gene on or off.

30. *E. coli* continues to be the most widely used cloning vehicle even though it complicate produce purification because it produces___.

31. The ___ plasmid is able to “naturally” genetically engineer plants.

32. The toxin gene from *Bacillus ___* is frequently inserted into plant genomes to give them insect resistant.

33. DNA chips are also called ___.

34. Site directed mutagenesis is used to produce ___ mutations.

35 ___ is the molecule most commonly used by molecular biologists as evolutionary chronometers.

36. The FISH assay stands for fluorescent ___ hybridization.

37. The ___ ratio is particularly useful for bacterial taxonomy because it is not particularly susceptible to mutations.

38. ___ Manual of Systematic Bacteriology
is the definitive reference book for bacterial systematic.

II. Short Answer (2 points)

39. MPN

40. *E. coli* O157-H7

41. Biodics

42. BOD

43. Sparger
III. Discussion

46. Describe the process by which Wilmington treats the drinking water we consume. (4 points)
47. Describe in detail how you would produce human insulin using recombinant DNA technology. (6 points)