Prof. Lester's BIOL 210 Practice Exam 2 (There is no answer key. Please do not email or ask me for answers.)

Chapters 7, 8, 10, 11, 20

1) Which of the following is the best method to sterilize heat-sensitive solutions?
A) Dry heat B) Autoclave C) Membrane filtration D) Pasteurization E) Freezing

2) Place the following surfactants in order from the most effective to the least effective antimicrobial activity:
1-Soap; 2-Acid-anionic detergent; 3-Quats.
A) 1, 2, 3 B) 1, 3, 2 C) 2, 1, 3 D) 3, 2, 1 E) 3, 1, 2

3) The antimicrobial activity of chlorine is due to which of the following?
A) The formation of hypochlorous acid B) The formation of hydrochloric acid
C) The formation of ozone D) The formation of free O E) Disruption of the plasma membrane

4) Which of the following affects the elimination of bacteria from an object?
A) Number of bacteria present B) Temperature C) pH D) Presence of organic matter
E) All of the above

5) Which concentration of ethanol is the most effective bactericide?
A) 100% B) 70% C) 50% D) 40% E) 30%

A disk-diffusion test using *Staphylococcus* gave the following results:

Table 7.1

Disinfectant	Zone of inhibition (mm)
A	0
B	2.5
C	10
D	5

6) In Table 7.1, which compound was the most effective against *Staphylococcus*?
A) A B) B C) C D) D E) Can't tell

7) In Table 7.1, which compound was the most effective against *E. coli*?
A) A B) B C) C D) D E) Can't tell

8) Which of the following substances is *NOT* used to preserve foods?
A) Biguanides B) Nisin C) Potassium sorbate D) Sodium nitrite E) Sodium propionate

9) Which of the following will *NOT* preserve foods?
A) Desiccation B) High pressure C) Ionizing radiation D) Microwaves E) Osmotic pressure

10) A drug that inhibits mitosis, such as griseofulvin, would be more effective against
A) Gram-positive bacteria. B) Gram-negative bacteria.
C) Fungi. D) Wall-less bacteria. E) Mycobacteria.

11) Which of the following antibiotics is *NOT* bactericidal?
A) Aminoglycosides B) Cephalosporins C) Polyenes D) Rifampins E) Penicillin

12) Which one of the following does *NOT* belong with the others?
A) Bacitracin B) Cephalosporin C) Penicillin D) Streptomycin

13) Which of the following antibiotics is recommended for use against gram-negative bacteria?
A) Polyenes B) Bacitracin C) Cephalosporin D) Penicillin E) Polymyxin

14) Which of the following antimicrobial agents is recommended for use against fungal infections?
A) Amphotericin B B) Bacitracin C) Cephalosporin D) Penicillin E) Polymyxin

15) More than half of our antibiotics are
A) Produced by fungi. B) Produced by bacteria. C) Synthesized in laboratories.
D) Produced by Fleming. E) Produced by eukaryotic organisms.

16) Which of the following antibiotics does *NOT* interfere with cell wall synthesis?
A) Cephalosporins B) Macrolides C) Natural penicillins
D) Semisynthetic penicillins E) Vancomycin

17) Which of the following organisms would most likely be sensitive to natural penicillin?
A) L forms B) *Streptococcus pyogenes* C) Penicillinase-producing *Neisseria gonorrhoeae*
D) *Penicillium* E) *Mycoplasma*

18) Which of the following statements about drug resistance is false?
A) It may be carried on a plasmid.
B) It may be transferred from one bacterium to another during conjugation.
C) It may be due to enzymes that degrade some antibiotics.
D) It is found only in gram-negative bacteria.
E) It may be due to increased uptake of a drug.

19) In the presence of penicillin, a cell dies because
A) It lacks a cell wall. B) It plasmolyzes. C) It undergoes osmotic lysis.
D) It lacks a cell membrane. E) Its contents leak out.
25. A gene is best defined as
A) A segment of DNA. B) Three nucleotides that code for an amino acid.
C) A sequence of nucleotides in DNA that codes for a functional product.
D) A sequence of nucleotides in RNA that codes for a functional product.
E) A transcribed unit of DNA.

26. Which of the following pairs is mismatched?
A) DNA polymerase - makes a molecule of DNA from a DNA template
B) RNA polymerase - makes a molecule of RNA from an RNA template
C) DNA ligase - joins segments of DNA D) Transposase - insertion of DNA segments into DNA
E) DNA gyrase - coils and twists DNA

27. Which of the following statements is false?
A) DNA polymerase joins nucleotides in one direction only.
B) The leading strand of DNA is made continuously.
C) The lagging strand of DNA is started by an RNA primer.
D) DNA replication proceeds in one direction around the bacterial chromosome.
E) Multiple replication forks are possible on a bacterial chromosome.

28. Which of the following statements about bacteriocins is false?
A) The genes coding for them are on plasmids.
B) They cause food-poisoning symptoms.
C) Nisin is a bacteriocin used as a food preservative.
D) They can be used to identify certain bacteria.
E) Bacteriocins kill bacteria.

Data Table

Culture 1: F+, Bacterial chromosome = leucine+, histidine+
Culture 2: F-, Bacterial chromosome = leucine-, histidine-

29. In the data Table, what will be the result of conjugation between cultures 1 and 2?
A) 1 will remain the same; 2 will become F+, Bacterial chromosome = leucine-, histidine-
B) 1 will become F-, Bacterial chromosome = leu+, his+; 2 will become F+, Bacterial chromosome = leu-, his-
C) 1 will become F-, Bacterial chromosome = leu-, his-; 2 will remain the same
D) 1 will remain the same; 2 will become F+, Bacterial chromosome = leu+, his+
E) 1 will remain the same; 2 will become F+ and recombination may occur

30. An enzyme produced in response to the presence of a substrate is called
A) An inducible enzyme. B) A repressible enzyme. C) A restriction enzyme.
D) An operator. E) A promoter.

31. Transformation is the transfer of DNA from a donor to a recipient cell
A) By a bacteriophage. B) As naked DNA in solution.
C) By cell-to-cell contact. D) By crossing over. E) By sexual reproduction.

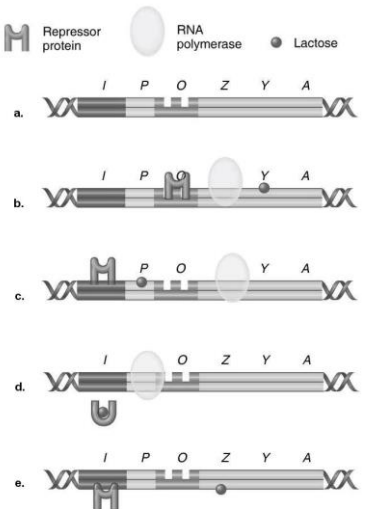
32. Genetic change in bacteria can be brought about by
A) Mutation. B) Conjugation. C) Transduction. D) Transformation. E) All of the above.

33. (Use genetic code table in your book.) What is the sequence of amino acids encoded by the following sequence of bases in a strand of DNA? 3′-ATTACGCTTTGC-5’
A) Leucine-arginine-lysine-alanine
B) Asparagine-arginine-lysine-alanine
C) Asparagine-cysteine-valine-serine
D) Transcription would stop at the first codon
E) Can’t tell

34. Conjugation differs from reproduction because conjugation
A) Replicates DNA. B) Transfers DNA vertically, to new cells.
C) Transfers DNA horizontally, to cells in the same generation.
D) Transcribes DNA to RNA. E) Copies RNA to make DNA.

35. An enzyme that copies DNA to make a molecule of RNA is
A) RNA polymerase. B) DNA ligase. C) Restriction enzyme. D) Transposase. E) DNA polymerase.

36. Using the diagram, which model of the *lac* operon correctly shows RNA polymerase, lactose, and repressor protein when the structural genes are being transcribed?
A) a B) b C) c D) d E) e

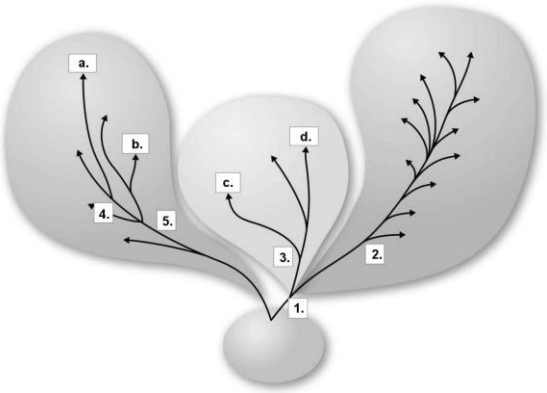


37. In transcription,
A) DNA is changed to RNA. B) DNA is copied to RNA.
C) DNA is replicated. D) RNA is copied to DNA.
E) Proteins are made.

38. Which of the following statements about archaea is false?
A) They are prokaryotes. B) They evolved before bacteria.
C) Some are hyperthermophiles; others are extreme halophiles.
D) They lack peptidoglycan in their cell walls.
E) Some produce methane from carbon dioxide and hydrogen.

39. Biochemical tests are used to determine
A) Staining characteristics. B) Amino acid sequences.
C) Nucleic acid-base composition. D) Enzymatic activities. E) All of the above.

40. In the diagram, species “c.” is most closely related to
A) a B) b C) c D) d E) e



41. In diagram, the closest ancestor for both species “a.” and species “b.” would be
A) 1 B) 2 C) 3 D) 4 E) 5

42. Protista is a diverse group of organisms that are similar in
A) rRNA sequences. B) Metabolic type.
C) Motility. D) Ecology. E) None of the above.

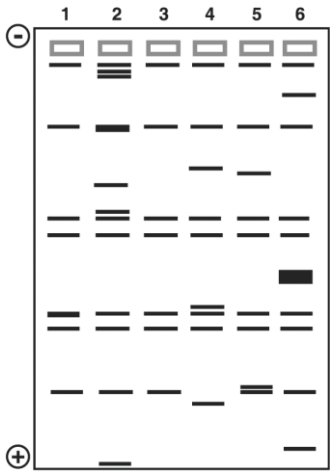
43. In the scientific name *Enterobacter aerogenes*, *Enterobacter* is the
A) Specific epithet. B) Genus. C) Family. D) Order.
E) Kingdom.

44. Serological testing is based on the fact that
A) All bacteria have the same antigens.
B) Antibodies react specifically with an antigen.
C) The human body makes antibodies against bacteria.
D) Antibodies cause the formation of antigens.
E) Bacteria clump together when mixed with any antibodies.

45. One of the most popular taxonomic tools is DNA fingerprinting to develop profiles of organisms. These profiles provide direct information about
A) Enzymatic activities. B) Protein composition. C) Nucleotide sequences. D) Antigenic composition.

46. A clone is
A) Genetically identical cells derived from a single cell. B) A genetically engineered cell.
C) A taxon composed of species. D) A mound of cells on an agar medium. E) None of the above.

This figure shows the results of a gel electrophoresis separation of restriction fragments of the DNA of different organisms.



47. In the diagram, which two are most closely related?
A) 1 and 3 B) 2 and 4 C) 3 and 5 D) 2 and 5 E) 4 and 5

48. Into which group would you place a photosynthetic cell that lacks a nucleus?
A) Animalia B) Bacteria C) Fungi D) Plantae E) Protista

49. Into which group would you place a multicellular heterotroph with chitin cell walls?
A) Animalia B) Archaea C) Bacteria D) Fungi E) Plantae

50. You discovered a unicellular organism that lacks a nucleus and peptidoglycan. You suspect the organism is in the group
A) Animalia. B) Archaea. C) Bacteria. D) Fungi. E) Plantae.

51. Which of the following genera is an anaerobic Gram-negative rod?
A) *Escherichia* B) *Staphylococcus* C) *Neisseria* D) *Treponema*

52. Which of the following is *NOT* an enteric?
A) *Salmonella* B) *Shigella* C) *Escherichia* D) *Enterobacter* E) *Helicobacter*

53. Which of the following does not have a cell wall?
A) *Borrelia* B) *Mycoplasma* C) *Mycobacterium* D) *Clostridium* E) *Nocardia*

54. Which of the following bacteria is Gram-negative?
A) *Treponema* B) *Corynebacterium* C) *Bacillus* D) *Staphylococcus* E) *Mycobacterium*

56. Rickettsias differ from chlamydias in that rickettsias:
A) Are gram-negative. B) Are intracellular parasites. C) Require an arthropod for transmission.
D) Don’t have cell walls.

57. Which of the following bacteria is Gram-positive?
A) *Pseudomonas* B) *Salmonella* C) *Streptococcus* D) *Mycoplasma* E) *Rickettsia*

58. Which one of the following bacteria does *NOT* belong with the others?
A) *Bacillus* B) *Escherichia* C) *Lactobacillus* D) *Staphylococcus* E) *Streptococcus*

59. Salmonella, *Shigella, Yersinia,* and *Serratia* are all
A) Dangerous pathogens. B) Gram-negative facultatively anaerobic rods.
C) Gram-positive aerobic cocci. D) Fermentative. E) Endospore-forming bacteria.

60. You have isolated a prokaryotic cell. The first step in identification is a(n)
A) Gram stain. B) Lactose fermentation test. C) Endospore stain. D) Flagella stain. E) DNA fingerprint.

61. You have isolated a gram-positive rod. What should you do next?
A) Gram stain B) Lactose fermentation C) Endospore stain D) Flagella stain E) Enterotube

63. Which of the following pairs is mismatched?
A) Spirochete - axial filament B) Aerobic, helical bacteria - gram-negative
C) Enterics - gram-negative D) Mycobacteria - acid-fast E) Pseudomonas - gram-positive

64. Explain how you would clone a eukaryotic gene into a prokaryotic cell. What problems would you most likely encounter and how would you deal with them to yield a functional protein from that eukaryotic gene?