Examination #1 Bio 308-General Microbiology—Spring 2012 Steiner

If there appears to be more than one answer, choose the **best** answer. This test covers c**hapters 1,2,3,4 and part of 5, 6 ,7 and 8.**

1. The unique aspect of Pasteur's "swan neck" flask experiment, used to disprove spontaneous generation, was that he (choose the **BEST** answer):

A. used a very rich broth that would support a large number of different bacteria

B. allowed the growth medium to be exposed to air unobstructed by any cotton or other stopper\*

C. used glass for his apparatus

D. used medium that was sterilized

2. Which of the following findings is **NOT** attributed to Louis Pasteur but rather to Robert Koch?

A. heating of wine (pasteurization) so that pure seed cultures could be used in wine production

B. demonstration that microorganisms caused silk worm disease

C. development of rabies vaccine

D. development of agar plates to isolate pure colonies of bacteria\*

E. All of the above findings are attributable to Louis Pasteur (if you believe that all of the above findings are attributable to Pasteur, choose this answer).

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was one of the pioneers aseptic technique although he received little to no credit when he was alive.

A. Alexander Fleming

B. Thomas H. Morgan

C. Ignaz Semmelwis\*

D. Gerhard Domagk

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was one of the scientists who received a Nobel prize for discovering the *Helicobacter pylori* was involved in causing ulcers.

A. Robert Warren\*

b. Mario Capecchi

C. Robert Edwards

D. Bruce Beutler

5. Which of the above individuals (question #4 A-D) received the Nobel Prize for discoveries concerning the activation of innate immunity?

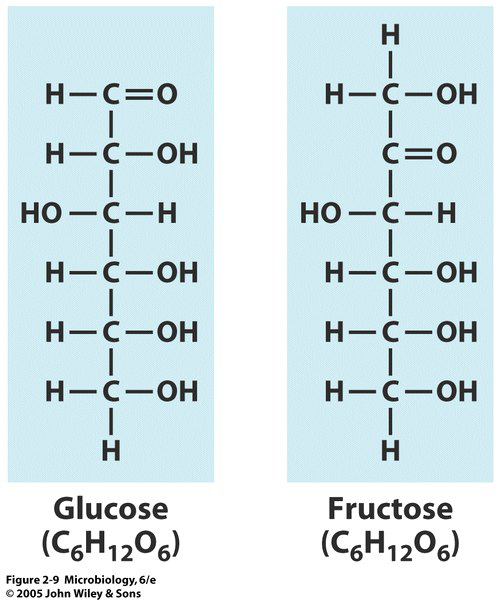
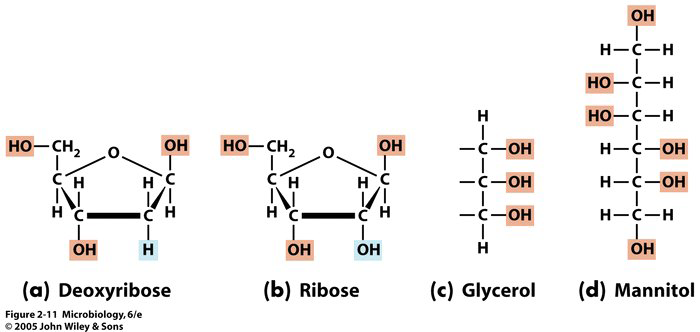
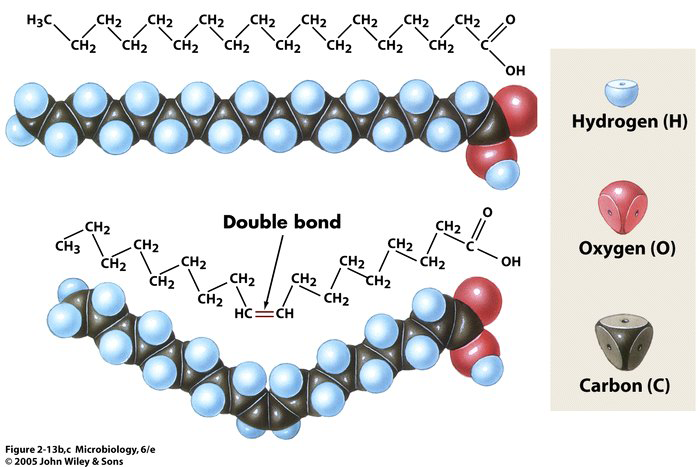
A.

B.

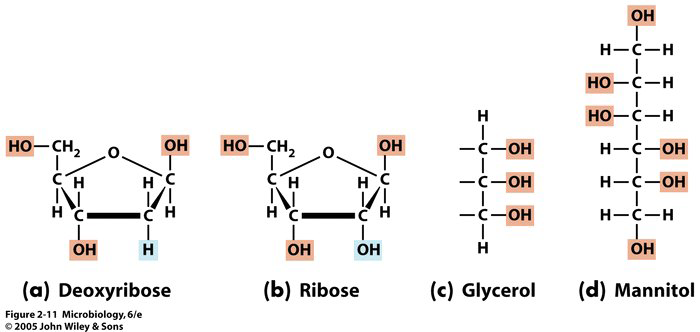
C.

D.\*

6. Which of the following compounds is the **MOST** reduced?

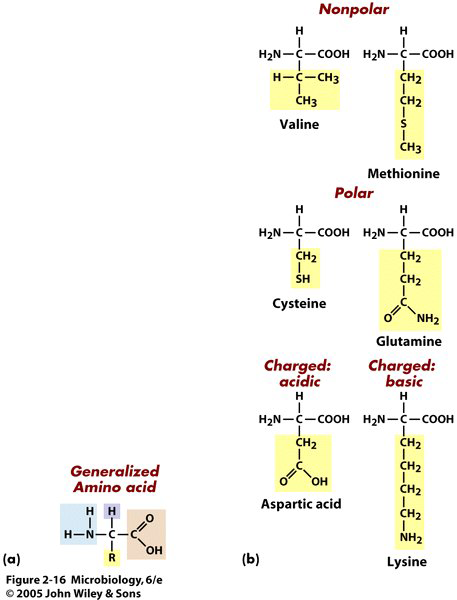
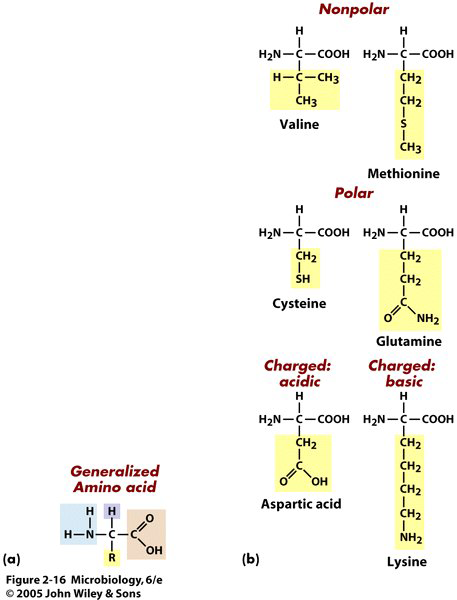
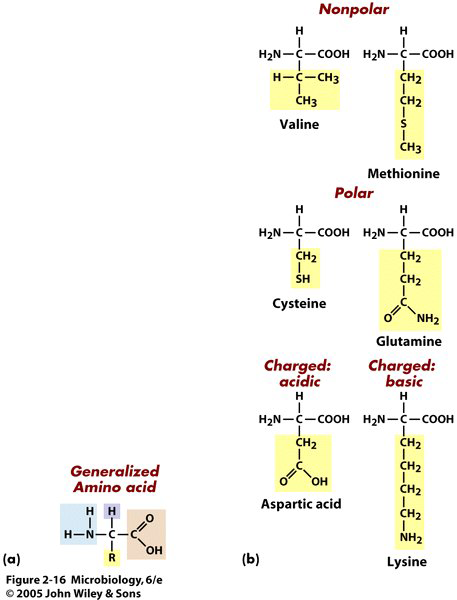
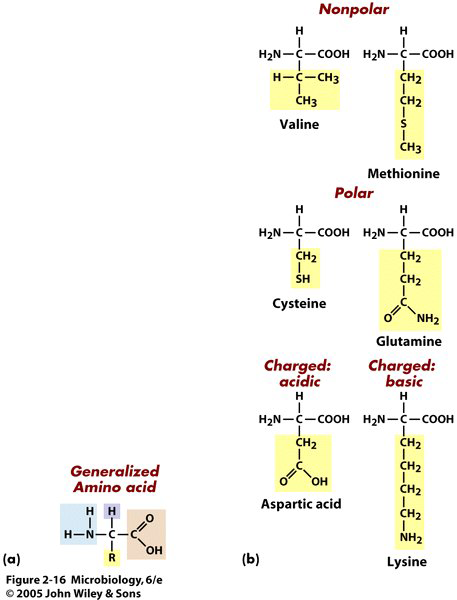
  

**A B C\***



**D**

7. Which of the following would be the least likely to easily dissolve in water (which is the **MOST** hydrophobic)?

**A B C\* D.**

8. Which of the following is **NOT** a reason for heat fixing microscopic slides with bacterial samples on them?

A. kills the organisms

B. allows the organism to better accept staining

C. adheres the organism to the slide

D. allows an initial assessment of Gram + versus Gram - organisms\*

E. All of the above are accurate (if you believe that all of the above are accurate choose this answer).

9. If you suspected that an individual had tuberculosis, you would use the \_\_\_\_\_\_\_\_\_\_ stain on their sputum.

A. Gram stain

B. Ziehl-Neelsen acid fast stain\*

C. Negative stain

D. simple stain of crystal violet

10. Which of the following does **NOT** distinguish prokaryotic from eukaryotic cells?

A. no nucleus

B. no internal membrane bound structures

C. 80S ribosomes\*

D. peptidoglycan cell wall

E. All of the above are exclusively associated with prokaryotic cells (if you believe that all of the above are exclusively associated with prokaryotic cell choose this answer).

11. A small comma shaped bacteria is described as being a \_\_\_\_\_\_\_\_\_\_\_\_.

A. spirochete

B. bacillus

C. spirillum

D. vibrio\*

12. Extrachromosomal DNA, in prokaryotic cells, can be found in the form of:

A. chromosomes

B. plasmids\*

C. mitochondria

D. chloroplasts

13. Some bacteria have two membranes while others have a single membrane. The outer membrane of the bacteria that contain two membranes is:

A. found only in Gram positive bacteria

B. contains lipopolysaccharide\*

C. is made primarily of peptidoglycan

D. is primarily a reproductive structure

14. The periplasmic space is found almost exclusively :

A. in Gram positive organisms

B. in Gram negative organisms\*

C. in acid fast bacteria

D. between the nuclear area and the cell membrane

15. Complex lipids, e.g., lipoarabinomannan, and mycolic acid, are found in:

A. Gram positive bacteria

B. Gram negative bacteria

C. Gram variable bacteria

D. acid-fast bacteria\*

16. Prokaryotic cells divide by

A. mitosis

B. binary fission\*

C. meiosis

D. mitosis asexually and meiosis sexually

17. The **MOST IMPORTANT FACTOR** in the heat resistance of spores is:

A. waxy coat

B. calcium dipicolinate

C. dehydration\*

D. the presence of peptidoglycan in the spore coat

18. Which bacterial genus normally lacks a cell wall?

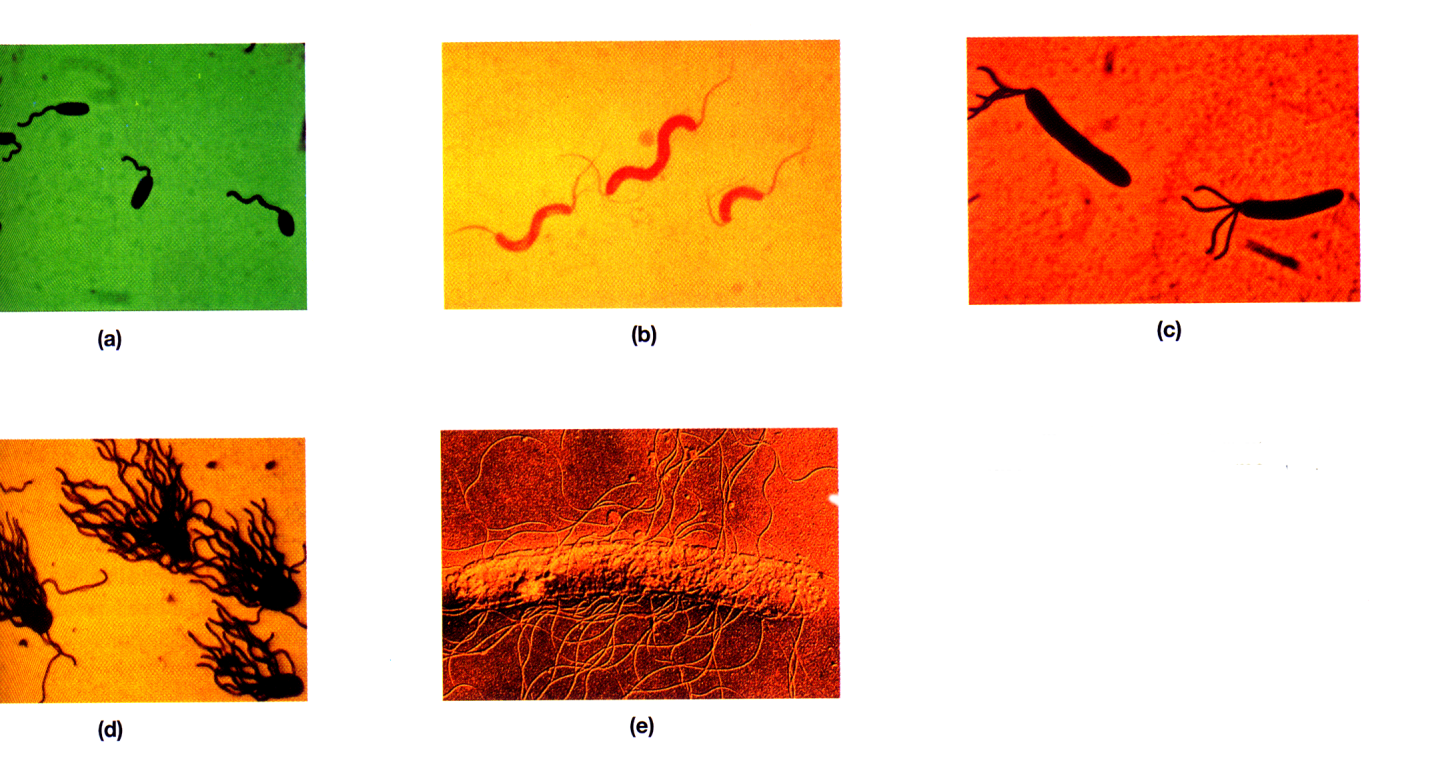
A. *Mycobacterium*

B. *Streptococcus*

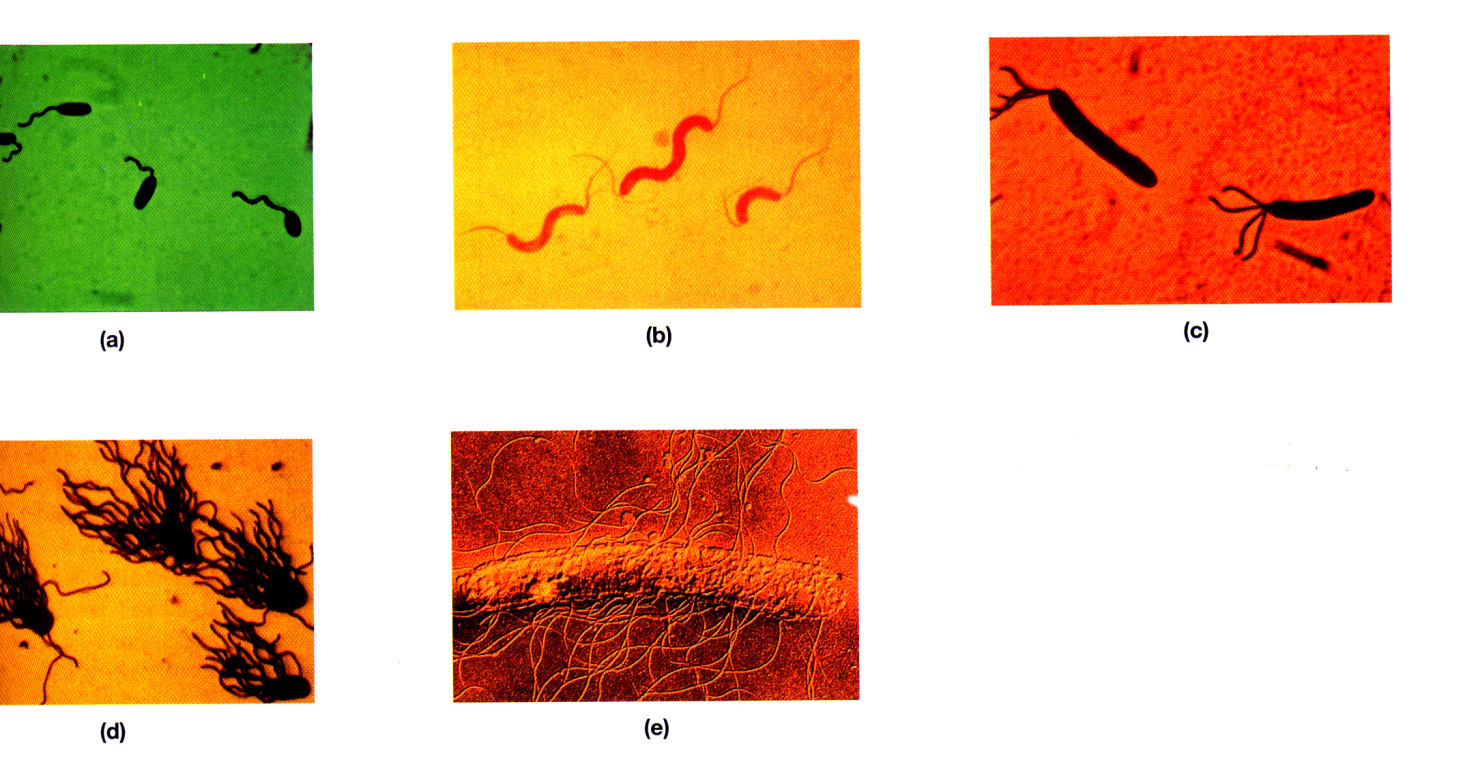
C*. Mycoplasma\**

D. *Bacillus*

19. You do a flagellar stain on a suspected culture of *Salmonella*. Which of the following would you expect to see if you indeed had isolated *Salmonella?* A, B, C. D.\*



**A B C**

****

**D**

20. Some bacteria can transfer DNA to another cell using:

A. conjugation pili\*

B. axial filaments

C. lophotrichous flagella

D. teichoic acid structures

21. Which of the above (question 20, A-D) is associated only with Gram positive organisms?

A. B. C. D.\*

22. I am an organism that utilizes inorganic compounds as my energy source and CO2 as my carbon source. I am a:

A. chemoheterotroph

B. photoheterotroph

C. chemoautotroph\*

D. photoautotroph

23. Animals (humans for example) are which of the above (question 22 A-D)?

A.\* B. C. D.

24. Fermentation by the reduction of pyruvic acid by NADH+ + H+ yields many different products, depending on the organism doing the fermentation. We are quite familiar with ethyl alcohol and CO2 production as being alcoholic fermentation. The type of fermentation that results in acetic acid, succinic acid, ethyl alcohol, CO2 and H2 is known as:

A. butanediol fermenation

B. propionic fermentation

C. homolactic acid fermentation

D. mixed-acid fermentation\*

E. butyric-butylic fermentation

25. In the stationary phase of bacterial growth, the number of newly generated cells:

A. is greater than the number of dying cells

B. is less than the number of dying cells

C. is the same as the number of dying cells\*

D. none of the above describes the stationary phase of bacterial growth

26. Which of the following bacterial counting techniques relies on a statistical estimate to determine the number of bacteria in a culture?

A. serial dilution

B. standard plate count

C. spread plate

D. most probable number\*

27. An obligate psychrophile would produce a turbid culture at \_\_\_\_\_\_\_\_\_\_\_ degrees Celsius

A. 15\*

B. 30

C. 45

D. 60

28. Most human pathogens are

A. psychrophiles

B. mesophiles\*

C. thermophiles

D. acidophiles

29. Which type of cell will generally shift to aerobic metabolism when oxygen is available but can also grow anaerobically (using fermentation)?

A. aerotolerant anaerobes

B. facultative anaerobes\*

C. obligate anaerobes

D. obligate aerobes

30. Which of the above (question 29 A-D) are likely to have both catalase and superoxide dismutase (SOD)?

A. A and B

B. B and D\*

C. C and D

D. A and D

31. Some of the hot springs at Yellowstone National Park have temperatures around 90C. Organisms from which of the following genera would you expect to isolate from these hot springs?

A. *Escherichia sp.*

B. *Falvobacterium sp.*

C. *Thermococcus sp.\**

D. *Thermus sp.*

E. *Thiobacillus sp.*

32. Which of the above genera would you expect to isolate from acid mine waste of pH 0.1 to pH 5.4 (question 31 A-E)?

A. B. C. D. E.\*

33. The following organism is an obligate aerobe and a very common cause of nosocomial infections:

A. *Pseudomonas sp.\**

B. *Bacteroides sp.*

C. *Camplyobacter sp*.

D. *Lactobacillus sp.*

E. *Escherichia sp.*

34. Which of the above (question 33 A-E) organisms is an obligate anerobe?

A. B.\* C. D. E.

35. Sporulation occurs in:

A. *Clostridium sp.*\*

B. *Staphylococcus sp.*

C. *Klebsiella sp.*

*D. Citrobacter sp.*

36. Microaerophiles

A. grow best when the environment has a small amount of carbon dioxide

B. grow best when the environment has a small amount of free oxygen\*

C. need a high concentration of carbon dioxide

D. need a high concentration of oxygen

37. During bacterial DNA replication

A. the leading strand is syntheized in the 3' to 5' direction

B. the leading strand is synthesized discontinuously

C. the lagging strand is synthesized in the 5' to 3' direction\*

D. both strands are synthesized discontinuously

38. An anticodon would be found in/on a \_\_\_\_\_\_\_\_ molecule of

A. mRNA

B. tRNA\*

C. the lagging strand

D. rRNA

39. tRNA molecules serve as a link between

A. DNA and mRNA

B. codons and anticodons

C. codons and amino acids\*

D. mRNA and rRNA

40. If you were given a bacterium in which the sliding clamp protein was defective you would anticipate that that organism would be unable to (choose the **BEST** answer- the one that **MOST DIRECTLY** is affected by non-functional sliding clamp):

A. unwind its DNA

B. prevent its unwound DNA from reforming the double helix

C. replicate its DNA\*

D. produce DNA primers

41. Organisms that have lost the ability to synthesize a particular enzyme and which require certain nutrients to be added to their medium to maintain growth are termed

A phototrophs

B auxotrophs\*

C. prototrophs

D. autotrophs

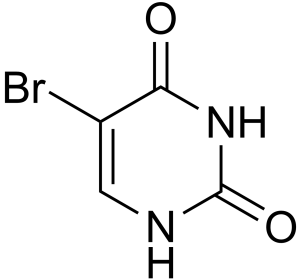
42. Mutagens such as 5-bromouracil (shown below) cause mutations by

A. substituting for one of the bases normally found in DNA\*

B adding an alkyl group to a nucleotide

C. removing an amino group from a nucleotide

D. causing breaks in chromosomes



43. Pyrimidine dimers (e.g., thymine dimers) are a type of mutation most commonly caused by:

A. alkylating agents

B. deaminating agents

C. ultraviolet light\*

D. acridine

44. The fluctuation tests done by Luria and Delbruck showed that

A. antibiotics induce the development of resistance in bacteria

B. the growth of bacteria fluctuates based on the concentration of antibiotics in the medium

C. the concentration of antibiotics fluctuates in the response to the number of bacteria in a sample

D. resistance to antibiotics occurs spontaneously in bacteria\*

45. In an experiment such as Griffith's pneumococcal experiment, which of the following, when injected into a mouse, would result in death?

Smooth and rough refer to the colony type of the *Streptococcus pneumoniae (*pneumococcus))?

A. heat killed smooth pneumococci

B. live rough pneumococci

C. a mixture of heat killed smooth pneumococci and live rough pneumococci \*

D. a mixture of heat killed rough pneumcocci and live rough pneumococci

46. A virus which incorporates its DNA into the DNA of its host bacterial DNA, is a:

A. virulent or lytic phage

B. prophage\*

C. pathogenic phage

D. none of the above

47. "Specialized" transduction refers to the fact that

A. transduction only happens at specific times in the cell cycle

B. only specific bacteria can participate as hosts in transduction

C. only genes from a specific region of the host DNA are transferred in the transduction\*

D. only specific bacterial viruses take part in the process

48. During the process of lysogeny

A. a phage integrates into the chromosome of the bacterium\*

B. a bacterium takes up DNA from the medium

C. new phage particles are assembled in the host bacterium

D. a bacterium is split open to release new phage particles

49. In a culture containing both **F- (minus)** and **F+ (plus**) cells**,** which of the following will occur if we wait long enough?

A. no conjugation will occur

B. the cells will all be lysed

C. All F- minus cells will become F+ plus cells\*

D. all F+ plus cells will become F- minus cells

50. High frequency recombination (Hfr) cells arise when

A. the donor cells have multiple F plasmids

B. the cell's F plasmid has been incorporated into the bacterial chromosome\*

C. conjugation and transformation happen at the same time

D. the bacterial chromosomes fragments

51. When successful conjugation occurs between an Hfr donor and an F- recipient which of the following describes the most likely outcome of the recipient cell?

A. It becomes F plus ( **F+)**

B. It remains F minus ( **F-)** with some quantity of the donor DNA\*

C. It remains F minus (**F-)** with no detectable donor DNA

D. it becomes F prime (F')

52. The Ti plasmid is known primarily for its ability to

A. direct synthesis of conjugation pili

B. provide resistance to certain antibiotics

C. induce the formation of tumors in plants

D. to readily transform *Escherichia coli*

53. Bacteria that contain recombinant plasmids can be easily isolated because they:

A. are larger than non-recombinant bacteria

B. are designed to be resistant to certain antibiotics\*

C. grow much faster than non-recombinant bacteria

D. are smaller than non-recombinant bacteria

54. A recent study shows, that between heterosexual couples \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the single most important risk factor for sexual transmission of HIV.

A. Number of sexual encounters

B. having sex without condom

C. viral load of a partner\*

D. one partner has a cold or other viral infection

55. India will mark a milestone in having no cases of \_\_\_\_\_\_\_\_\_\_\_ reported over the past year.

A. HIV

B. tuberculosis

C. polio\*

D. smallpox

56. An interesting finding is that \_\_\_\_\_\_\_\_\_\_\_\_ is less common in sunny states:

A. gonorrhea

B. syphilis

C. Inflammatory bowel disease\*

D .Parkinson's disease

E. Multiple sclerosis

57. A recent study has indicated a reason why heavy coffee drinkers may have a lower risk of \_\_\_\_\_\_\_\_\_\_\_

A. having children with autism

B. multiple sclerosis

C. diabetes\*

D. arthritis

58. For the first time in two decades, there were no \_\_\_\_\_\_\_\_\_ deaths in California last year.

A measles

B. HIV

C. diphtheria

D. tetanus

E. whooping cough\*