

Kwame Nkrumah University of Science and Technology
Science Students' Association

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SCISA President

-Hopeful-

Rising Beyond Limits

Daniel

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design IMPACT

Leadership stems from the positivity of influence
and not power seeking or self glorification.

Leadership presents a unique opportunity for a
true leader to perform and transform while
serving.

The line has been drawn and I ask you to join me
so we rise together beyond all limitations to make
SCISA better for all.

- DANIEL ADJEI FOR SCISA PRESIDENT 21'...RISING BEYOND LIMITS

1. An organism is completely dependent on atmospheric O₂ for growth. This organism is _____.
a. Osmotolerant
b. Acidophile
c. Facultative anaerobe
d. Obligate aerobe
2. Microaerophilic bacteria are those which require _____.
a. 21 % oxygen for growth
b. low levels of oxygen for growth (less than O₂ present in atmosphere)
c. oxygen for activation of enzymes
d. none of the above
3. A culture broth tube was very turbid at the surface but clear throughout the rest of the tube indicating that the _____.
a. organism is aerobic
b. organism should be grown in an anaerobic chamber
c. organism cannot produce superoxide dismutase and/or catalase
d. organism cannot tolerate oxygen
4. The term aerotolerant anaerobe refers to an organism that _____.
a. doesn't use oxygen but can grow in the presence of oxygen
b. is killed by oxygen
c. requires less oxygen than is present in air
d. prefers to grow without oxygen
5. Which of the following is not the characteristic of a growth curve?
a. Shows development of microbial population under relatively stable environmental conditions
b. Plotted with logarithmic numbers
c. Graphs numbers of microbes versus time
d. Each growth curve consists of four distinct phases
6. The term obligate anaerobe refers to an organism that _____.
a. doesn't use oxygen but tolerates it
b. is killed by oxygen
c. uses oxygen when present or grows without oxygen when oxygen is absent
d. prefers to grow without oxygen
7. The average size of cells during the exponential phase of growth is _____.
a. greater than that of the lag phase
b. lesser than that of the lag phase
c. equal to that of the lag phase
d. none of these
8. Starvation proteins are produced by a culture during which of the following segments of the growth curve?
a. Lag phase
b. Exponential phase
c. Stationary phase
d. Death phase

9. Which of

10. W
b

9. Which of the following problem makes it impossible to satisfy all of Koch's postulates?
a. Microorganism causes serious symptoms in humans
b. Microorganism cannot be isolated in pure culture
c. Species of microorganism is in question
d. Genes from the microorganism cannot be amplified by PCR
10. Which of the following hint(s) suggest/s that a given specimen is likely to contain anaerobic bacteria?
a. Gas in specimen
b. Foul odour
c. Presence of sulphur granules
d. All of these
11. The organism which grows best above 45°C are called _____
a. Psychrophilic
b. mesophilic
c. thermophilic
d. any of these
12. The organism which obtain their energy from chemicals are designated as _____
a. prototrophs
b. chemotrophs
c. organotrophs
d. autotrophs
13. The protein from which hooks and filaments of flagella are composed of, is _____
a. keratin
b. flagellin
c. gelatin
d. casein
14. Gram positive cells have a _____
a. second outer membrane that helps to retain the crystal violet stain
b. multiple layer of peptidoglycan that helps to retain the crystal violet stain
c. thick capsule that traps the crystal violet stain
d. periplasmic space that traps the crystal violet
15. A microbe, which grows at temperatures above 95° C is most likely to be _____
a. an archaean
b. a fungus
c. a protozoan
d. none of these
16. Teichoic acids are typically found in _____
a. cell walls of Gram positive bacteria
b. outer membranes of Gram positive bacteria
c. cell walls of Gram negative bacteria
d. outer membranes of Gram negative bacteria
17. The arrangement, in which flagella are distributed all-round the bacterial cell, is known as _____

- a. lophotrichous
- b. amphitrichous
- c. peritrichous
- d. monotrichous

18. A spore differs from an actively replicating bacterium in that the spore _____

- a. is produced during a process involving asymmetric division
- b. is able to withstand more extreme conditions than the replicating cell
- c. is metabolically inactive
- d. all of the above

26.

19. The growth is normally expressed as _____ in turbidimetric measurement

- a. cells per ml
- b. cfu/ml
- c. optical density
- d. mg N₂/ml

20. Which of the following has peptidoglycan as a major constituent of cell wall?

- a. Gram-negative bacteria
- b. Gram-positive bacteria
- c. Fungi
- d. None of these

21. Cyanobacteria have _____

- a. a Gram-positive cell wall
- b. a Gram-negative cell wall
- c. Neither (a) nor (b)
- d. No cell wall

22. Which of the following may be most likely to be missing from a Gram-positive bacterium?

- a. Penicillin binding protein
- b. Peptidoglycan
- c. Lipopolysaccharide
- d. Phospholipid bilayer membrane

23. Which of the following is true about cell wall of Gram-positive bacteria?

- a. It consists of multiple layers
- b. It is thicker than that associated with Gram-negative bacteria
- c. It contains teichoic acids
- d. All of these

24. In eukaryotic cells, ribosomes are _____

- a. 70S
- b. 60S
- c. 80S
- d. Not specific

25. Important example(s) of enriched medium/media is/ are _____

- a. Loeffler's serum slope
- b. Bordet-gengou medium

- c. Blood agar
- d. All of these

26. The solidifying agent commonly used in preparation of media is/are _____

- a. agar
- b. silica gel
- c. both (a) and (b)
- d. none of these

27. Which of the following is used for the proper maintenance and preservation of pure cultures?

- a. Periodic transfer to fresh media
- b. Preservation by overlaying cultures with mineral oil
- c. Preservation by lyophilization
- d. All of the above

28. Cell size and cell number can be measured using _____

- a. hemocytometer
- b. coulter counter
- c. Petroff-hausser counting chamber
- d. none of these

29. Which of the following bacteria can grow in acidic pH?

- a. *Vibrio*
- b. *Lactobacillus*
- c. *Shigella*
- d. *Salmonella*

30. Which of the following methods is most likely to be quantitative?

- a. Dilution and plating
- b. Gram staining
- c. Wet mount
- d. None of these

31. Peptone water and nutrient broth are _____

- a. selective media
- b. enriched media
- c. basal media
- d. none of these

32. Plate counts are often reported as _____

- a. cfu
- b. cfu/ml
- c. Both (a) and (b)
- d. thousands/ml

33. The medium which allows the growth of more than one microorganism of interest but with morphologically distinguishable colonies is known as _____

- a. selective medium
- b. enrichment medium
- c. differential medium

34. Selective media facilitate growth of only one kind of organism. Sabouraud medium is used to selectively isolate _____
a. coliform bacteria
b. Gram positive bacteria
c. yeasts
d. acid fast organisms
35. Viable plate count can be obtained using _____
a. Spread plate method
b. Pour plate method
c. Both (a) and (b)
d. Hemocytometer
36. In the pour plate method, the mixed culture is diluted directly in tubes of _____
a. liquid agar medium
b. sterile liquid usually water
c. both (a) and (b)
d. none of these
37. When a substance is added to a solid medium which inhibits the growth of unwanted bacteria but permits the growth of wanted bacteria, it is known as _____
a. differential medium
b. enriched medium
c. enrichment medium
d. selective medium
38. All bacteria that inhabit the human body are _____
a. heterotrophs
b. chemolithotrophs
c. autotrophs
d. phototrophs
39. Cell counting can be carried out by _____
a. direct microscopic count using Petroff Hausser counting chamber
b. plate counting
c. membrane filter count
d. all of the above
40. Which of the following techniques may be performed quantitatively to determine the number of bacteria of a particular type?
a. Pour plate
b. Spread plate
c. Both (a) and (b)
d. Streak plate technique
41. Intestinal bacteria can grow in the presence of _____ whereas non-intestinal bacteria are usually inhibited.
a. bile salts
b. low concentration of various dyes

- c. sugars
- d. low levels of nitrogen

42. Catalase production is negative in which of the following?

- a. *Streptococcus*
- b. *Salmonella*
- c. *Proteus*
- d. *Staphylococcus*

43. Which of the following is a substitute for crystal violet used in Gram-staining procedure?

- a. Methylene blue
- b. Bromocresol green
- c. Safranin
- d. Phenolphthalein

44. Which of the following inference(s) indicate(s) the ability of an organism to utilize citrate as a sole source of carbon in Simmon's citrate medium?

- a. Blue colour
- b. Appearance of growth
- c. Both (a) and (b)
- d. None of these

45. The primary stain of Gram's method is _____

- a. safranin
- b. phenolphthalein
- c. crystal violet
- d. methyl red

46. Which of the following is commonly used as Gram's decolouriser?

- a. Ethyl alcohol
- b. Methyl alcohol
- c. Acetone
- d. A mixture of ethyl alcohol and acetone

47. The process of Gram staining is based on the ability of bacterial cell wall _____

- a. to retain the safranin dye
- b. to retain the crystal violet dye during solvent treatment.
- c. to retain part of both dyes
- d. none of above

48. Which of the following is a primary stain for acid fast staining of mycobacteria?

- a. Crystal violet
- b. Carbol fuchsin
- c. Giemsa
- d. Methylene blue

49. Which of the following organisms typically get their carbon for biosynthesis from carbon dioxide?

- a. Glucose-fermenting bacteria (fermentation)
- b. Anaerobic, glucose-respiring bacteria (anaerobic respiration)
- c. Aerobic, glucose-respiring bacteria (aerobic respiration)
- d. Ammonia-oxidizing bacteria (chemolithotrophic bacteria)

following a Gram stain
you do next?
a. An endospore
b. An acid-fast
c. A simple stain
d. Another Gram
e. A flagellum

59.

50. Area of lysis on a bacterial lawn culture produced by a phage is known as _____
a. Pock
b. Plaque
c. Pox
d. All of these

51. Which capsid symmetry is exhibited by most of the phages?
a. Helical
b. Icosahedral
c. Complex
d. None of these

52. In viruses with envelopes _____
a. the envelope and the embedded proteins are encoded by the viral nucleic acid
b. the envelope is derived from the host but it contains embedded proteins coded by the viral nucleic acid
c. the envelope is coded by the viral nucleic acids, but the proteins come from the host's membrane proteins
d. the envelope and its imbedded proteins are derived from the host's membranes

53. Animal viruses with capsids displaying helical symmetry include _____
a. measles and mumps
b. influenza
c. rabies
d. all of these

54. What can be coated to the plastic dish if an ELISA is performed to directly detect polio virus?
a. Patient serum
b. Anti-polio antibody
c. Polio capsid protein
d. Colored substrate

55. Which of the following viruses is transmitted by genital route?
a. Papillomaviruses
b. Herpes simplex virus type
c. Hepatitis B virus
d. All of these

56. The identification of bacteria by serologic tests is based on the presence of specific antigens.
Which of the following bacterial components is least likely to contain useful antigens?
a. Capsule
b. Cell wall
c. Flagella
d. Ribosomes

57. The coagulase test is used to differentiate _____
a. *Staphylococcus epidermidis* from *Neisseria meningitidis*
b. *Staphylococcus aureus* from *Staphylococcus epidermidis*
c. *Streptococcus pyogenes* from *Staphylococcus aureus*
d. *Streptococcus pyogenes* from *Enterococcus faecalis*

58. Following a Gram stain, you observe clear, glassy areas inside the bacterial cells. What would you do next?
- An endospore stain
 - An acid-fast stain
 - A simple stain
 - Another Gram stain
 - A flagellar stain

-1C

59. Which of the following groups of organisms can the Gram stain not distinguish?
- Gram nonreactive organisms which do not stain
 - Gram variable organisms, which stain unevenly
 - Gram negative organisms, whose cell walls retain the mordant iodine
 - Gram positive organisms, whose cell walls retain the primary crystal violet stain
 - Gram negative organisms, whose cells do not retain the primary crystal violet stain

60. The purpose of serial dilution is to reduce bacteria numbers to a particular range that can give accurate estimate when cultured on an agar plate. What is the recommended range of bacteria numbers that gives accurate estimate?

- 10 - 25
- 20 - 50
- 25 - 200
- 30 - 300
- 100 - 600

61. A few drops of 3% hydrogen peroxide was put on bacteria colonies growing on an agar plate. The colony produced effervescence. What test is the colony positive for?
- Oxidase
 - Catalase
 - Indole
 - Hydrogen Sulphide
 - Coagulase

62. A bacterial colony count produced 76 discrete colonies at the 10^{10} dilution. What numbers of these organisms can be estimated in two litres of the original culture.

- 7.6×10^{15}
- 7.6×10^{13}
- 7.6×10^{14}
- 7.6×10^{16}
- 7.6×10^{17}

63. A test culture is stabbed into nutrient agar containing 1% gelatin and incubated for 5hrs. After incubation, four drops of mercuric chloride was added. The development of a clear zone in the upper layer of the gelatin indicates _____.

- Carbohydrate digestion
- Protein hydrolysis
- Positive Catalase test
- Positive oxidase test
- The presence of hydrogen sulfide

- AUDI
- Scientific class have de
64. Taxonomy is the science of classification of living things and provides
a. A way of identifying organisms
b. Arrangement of related organisms
c. Information on how organisms have evolved
d. a, b, and c
e. Only a and b
65. Heat fixation of a bacterial smear during staining will _____.
a. Cause the bacteria to shrink and adhere to the slide
b. Dry organisms, kill them and cause them to adhere to the slide
c. More quickly dry the specimen
d. Cause the bacteria to adhere to the slide
e. Cause the organisms to adhere to the slide, kill microbes and make them stain more readily
66. What types of bacteria are also called Cyanobacteria?
a. blue-green algae
b. Eubacteria
c. Green-green algae
d. Archaeobacteria
e. Protists
67. Which of the following structure(s) is/are not essential for survival of most bacteria
a. Cell wall
b. Plasma membrane
c. Capsule
d. Flagella
e. c and d
68. All the following are acidic dyes used in staining bacteria except _____.
a. Nigrosin
b. Eosin
c. Malachite green
d. Picric acid
e. India ink
69. It is difficult to perform Gram stain on *Mycobacterium*. However, another staining type known as "acid fast" can be performed due to their _____.
a. Lack of peptidoglycan layer
b. Ability to survive in acid conditions
c. Thick, waxy cell walls
d. Resistance to drying
e. Resistance to sunlight
70. A non-dividing bacterial cell has _____ chromosomes.
a. Several
b. Four
c. Three
d. Two
e. One
71. Cells used to start a culture are referred to as _____;

- a. Inoculum
b. Start cult
c. Seed cult
d. Sampl
e. Popul

72. Keepin

- a. Inoculum
- b. Start culture
- c. Seed culture
- d. Sample
- e. Population

72. Keeping food in the refrigerator preserves the food by _____.

- a. Killing microorganisms
- b. Inhibiting the growth of microbial populations
- c. Dehydrating microbial cells
- d. Denaturing proteins
- e. Keeping it cold

73. The enzyme catalase is important for the survival of many bacteria. It serves the important function of _____.

- a. Breaking down hydrogen
- b. Breaking down hydrogen peroxide
- c. Catalyzing respiratory reactions
- d. Preventing water loss
- e. Catalyzing salt breakdown

74. An original cell concentration in nutrient broth is 3000 per ml. Each step of a serial dilution reduces the concentration of cells in the suspension by one tenfold. After four dilution steps the concentration of cells is _____ per ml.

- a. 0.003
- b. 0.03
- c. 0.3
- d. 3.0
- e. 30.0

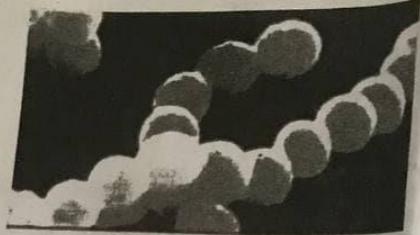
75. Speed and accuracy for a plate count occur by choosing growth plates with 30 to 300 colonies. After being diluted to 0.001 of its original concentration, one ml of a bacterial culture in broth is plated for counting. To achieve an accurate count, the original cell concentration in the broth was about _____ cells per ml.

- a. 3.0×10^{10}
- b. 3.0×10^7
- c. 3.0×10^5
- d. 3.0×10^2
- e. 3.0×10^1

76. One species of *Mycobacterium* causes _____.

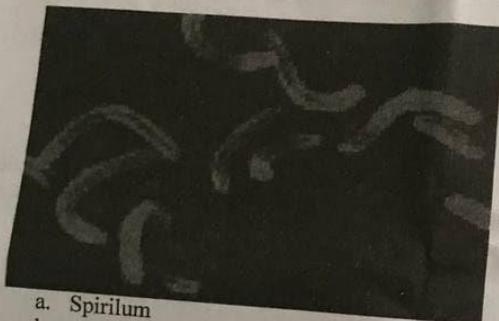
- a. Common cold
- b. Leprosy
- c. Botulism
- d. Gonorrhea
- e. Syphilis

77. What name is given to the following bacterial arrangements?



- a. Streptobacillus
- b. Staphylococcus
- c. Tetrad
- d. Streptococcus

78. The bacteria shown in the picture below is a _____.



- a. Spirillum
- b. Spirochete
- c. Bacillus
- d. Vibrio

79. The most common method of reproduction in bacteria is _____.

- a. Binary fusion
- b. Binary fission
- c. Binary fixing
- d. Binary friction
- e. None of the above

80. Which of the following is true of antigens?

- a. Antibody-generating foreign macromolecules
- b. Proteins embedded in the B-cell membranes
- c. Proteins that consist of two light and two heavy polypeptide chains
- d. Proteins found in the blood that causes foreign blood cells to clump
- e. Both a and d are correct

81. A fungicidal agent will _____.

- a. Kill bacteria
- b. Kill bacteria endospores and fungal spores
- c. Kill yeasts and molds
- d. Inactivate viruses

e. Inhibit the growth of fungi

82. _____ is a test for the presence of cytochrome c using p-amino dimethyl aniline
- a. Indole test
 - b. Oxidase test
 - c. Catalase test
 - d. Hydrogen sulphide test
 - e. Proteolysis

83. The ease with which a microbe can spread in a tissue is known as _____.
- a. Infection
 - b. Defense
 - c. Invasion
 - d. Infectivity
 - e. Virulence

84. ELISA test popularly used in HIV test is based on the interaction of
- a. HIV Antigen, secondary antibody, enzyme substrate and optical density
 - b. Antibody, secondary antibody, nitro-cellulose membrane and enzyme
 - c. Nitro-cellulose membrane, Antigen, enzyme antibody and secondary antibody
 - d. HIV Antigen, antibody, secondary antibody, enzyme and substrate
 - e. None of the above

85. The presence of well-controlled microbes with a potential for harm is referred to as _____.
- a. Immunization
 - b. Colonisation
 - c. Infection
 - d. Defense
 - e. Invasion

86. A nosocomial infection can be defined as _____.
- a. A community acquired infection
 - b. An infection caused by a fungus
 - c. An infection transmitted by close relatives
 - d. An infection acquired by patients in an institution like a hospital
 - e. An infection caused by a virus

87. In 1876 a Scientist provided convincing evidence associating specific microorganisms with infectious agents. From this work, FOUR hypotheses were formulated and these have remained as the main criteria for identifying infectious agents causing particular diseases. The scientist on whose work these hypotheses are based is _____.

- a. Robert Hooke
- b. Robert Koch
- c. Robert Sachs
- d. Edward Jenner
- e. Louis Pasteur

88. In fermentation tests, the production of gas can be confirmed by the addition of _____ prior to inoculation and incubation.
- a. Addition of zinc
 - b. Addition of hydrogen peroxide
 - c. Addition of aluminum

89. All the following are dyes
a. Nigrosine
b. Picric acid
c. Indian ink
d. Eosin
e. Malachite green

90. _____ is an example of a Glycocalyx.

- a. Slime layer
b. Plasma membrane
c. Cell wall
d. Fimbrae
e. Mesosome

91. A subculture is a _____.

- a. Culture made in an embryo
b. Colony growing beneath the media surface
c. Culture made from a contaminant
d. Culture made from an isolated colony
e. Culture made from colonies growing on an agar

92. _____ is present in both Gram positive and Gram-negative cell walls.

- a. Lipopolysaccharide
b. Teichoic acid
c. An outer membrane
d. Peptidoglycan
e. Capsule

93. Spirochetes are differentiated from spirilla by _____.

- a. Size
b. Shape
c. The presence of flagella
d. A cell with coils
e. The nature of motility

94. The time required for a bacterial cell to undergo division is known as _____.

- a. Lag time
b. Generation time
c. Exponential growth rate
d. Growth curve
e. Generation phase

95. Spore forming bacteria may produce more endospores in response to _____.

- a. Adverse environmental stress
b. Increased aeration
c. Need for reproduction
d. Nutrient surplus

e. Colony formation

96. Bacteria are described as which type of cell?

- a. Eukaryotic
- b. Virus
- c. Prokaryotic
- d. Non-living
- e. None of the above

97. _____ enzymes are produced all the time during the period of adjustment in the life of bacterium.

- a. Appropriate
- b. Inducible
- c. Nutritive
- d. Constitutive
- e. Substitutive

98. Microorganisms that can grow at 10°C are known as _____ and an example is _____.

- a. Mesophile, *Clostridium*
- b. Thermophile, *Proteus*
- c. Psychrophile, *Listeria*
- d. Thermophile, *Clostridium*
- e. Hyperthermophile, *Treponema*

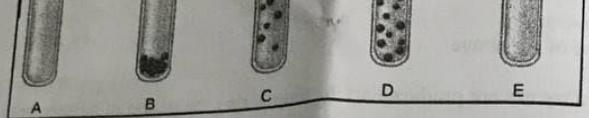
99. Some bacteria have complex nutritional requirements because they:

- a. Are composed of a large number of different types molecules
- b. Lack many enzymes and must therefore be provided with many of the molecules they need for growth.
- c. Can make a great number of the molecules found in the cell from simple precursor
- d. Have many different enzymes and therefore can make many molecules
- e. Contain unique molecules not normally found in bacterial cells

100. A culture of bacteria produces 4 generations in 2 hours. What is the generation time for this bacterium under those conditions?

- a. 20 minutes
- b. 24 minutes
- c. 25 minutes
- d. 30 minutes

Use the diagram below to answer questions 103-107



10

101. The bacteria in the tube labeled A are most likely to be _____.

- a. Facultative anaerobes
- b. Obligate aerobes
- c. Microaerophiles
- d. Aerotolerant anaerobes

102. The bacteria in the tube labeled C are most likely to be _____.

- a. Obligate anaerobes
- b. Facultative anaerobes
- c. Microaerophiles
- d. Aerotolerant anaerobes

103. The bacteria in the tube labeled B are most likely to be _____.

- a. Obligate anaerobes
- b. Facultative anaerobes
- c. Obligate aerobes
- d. Aerotolerant anaerobes

104. The bacteria in the tube labeled E are most likely to be _____.

- a. Obligate anaerobes
- b. Obligate aerobes
- c. Microaerophiles
- d. Aerotolerant anaerobes

105. The bacteria in the tube labeled D are most likely to be _____.

- a. Obligate anaerobes
- b. Facultative anaerobes
- c. Obligate aerobes
- d. Microaerophiles

106. Which of the following statements about the Turbidimetry is NOT true

- a. Optical abundance is directly proportional to concentration of bacteria in suspension
- b. It is a direct way of estimating bacteria numbers
- c. It is based on the diffraction or scattering of light by bacteria in a broth culture
- d. Measuring turbidity is a practical way of monitoring bacteria growth
- e. As bacteria numbers increase the less light reaches the photovoltaic cells

107. Which of the following is not one of the steps for validating Koch's Postulates?

- a. Inoculate a test animal to observe the disease
- b. Isolate the causative agent of the disease
- c. Produce a vaccine
- d. Cultivate the microbe in the lab
- e. Grow the organism in pure culture

108. Bacteriological media, that is composed of ingredients whose exact chemical composition are known are called _____ media.

- a. selective
- b. exact
- c. designated
- d. defined
- e. aesthetic

-10:30

109. In estimating the bacterial density bacteria, a second year microbiology student obtains 37 colonies on a culture plate obtained from inoculation with 1 ml from a 1/10,000 dilution sample. What is the total number of bacteria in the original sample?

- a. 0.0032
- b. 0.0037
- c. 320,000
- d. 350,000
- e. 370,000

109

110. Gram staining is an example of _____.
a. Simple staining
b. Differential staining
c. Negative staining
d. Positive staining
e. Irregular staining

111. If you start out with a population density of 300 CFU/ml of a bacterium that divides every 20 minutes, what will the population density after five generations, assuming the cells are in the log phase of growth?

- a. 1200 cfu/ml
- b. 2400 cfu/ml
- c. 4800 cfu/ml
- d. 9600 cfu/ml
- e. 19200 cfu/ml

112. Which of the following bacterial groups would you not expect to be most likely associated with several human infections?

- a. Stereothermophiles
- b. Lactophiles
- c. Mesophiles
- d. Psychrophiles
- e. Thermophiles

113. The bacteria that multiply in improperly treated, sealed canned food are most likely to be:
a. Aerobes

114. Which phase of bacteria growth curve is employed for industrial purposes?
a. Lag phase
b. Exponential phase
c. Stationary phase
d. Death phase
e. Survival phase

115. Which of the following methods allows determination of the specific number of viable cells in a specimen?
a. Turbidity measurement
b. Petroff-Hausser bacterial counter
c. Dry weight measurement
d. Total plate count
e. Total nitrogen measurement

116. Which of the following statement about the most probable number is NOT TRUE?
a. It is a statistical assay of cell numbers based on the theory of probability
b. The goal is to successively dilute a sample and determine the point at which subsequent dilution receive the most number of cells
c. To determine the MPN 3 sets of 3 or 5 tubes containing the same media are used
d. The 2nd set of tubes receive 10 fold less of the 1st set
e. The 3rd set receives 100 fold less of the 1st set

117. The order of reagents used in Gram stain are _____.
a. Crystal violet, iodine, safranin, alcohol
b. Crystal violet, safranin, alcohol, iodine
c. Crystal violet, iodine, alcohol, safranin
d. Alcohol, Crystal violet, iodine, safranin
e. Iodine, Crystal violet, safranin, alcohol

118. Anthrax is a disease caused by a species of _____.
a. *Bacillus*
b. *Brucella*
c. *Borrelia*
d. *Clostridium*
e. *Pseudomonas*

119. A bacterial cell that assumes several shapes is said to be _____.
a. Cleomorphic
b. Pheomorphic
c. Monogramic
d. Monomorphic
e. Pleomorphic

120. Which of the following is NOT a protozoan disease?

121.

- a. Giardiasis
- b. Cholera
- c. Cryptosporidiosis
- d. Amoebiasis
- e. Malaria

121. Each of the following is caused by a viral pathogen except _____.

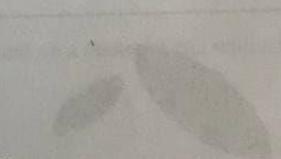
- a. Rubella
- b. Leprosy
- c. Herpes
- d. Chicken pox
- e. Measles

122. Gas gangrene is most likely associated with infection with _____.

- a. *Staphylococcus aureus*
- b. *Clostridium difficile*
- c. *Clostridium perfringens*
- d. *Streptococcus pyogenes*
- e. *Clostridium botulinum*

123. *Salmonella typhi* has the ability to persist within the gall bladder of humans while causing no clinical symptoms. The infected individual is still contagious, however, and would be considered a _____.

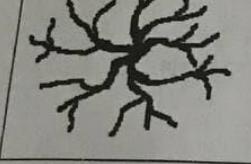
- a. Symptomatic
- b. Reservoir
- c. Endemic
- d. Pathogen
- e. Nuisance

124. A method of estimating the number of bacteria in a sample of inoculum is _____.


- a. Slant culture
- b. Streak plate
- c. Broth culture
- d. Pour plate
- e. Serial dilution

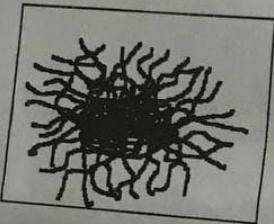
125. The bacterium _____ causes the disease _____.

- a. *Treponema pallidum*/ Syphilis
- b. *Neisseria gonorrhoeae*/Tuberculosis
- c. *Diplococcus gonorrhoeae*/ Diphtheria
- d. *Lactobacillus acidophilus*/Legionellosis
- e. *Shigella*/Influenza



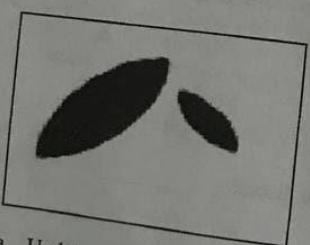
- a. Filamentous
- b. Rhizoid
- c. Irregular
- d. Spindle

127.



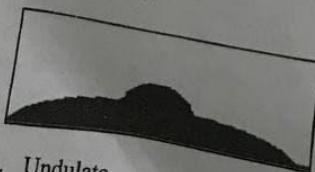
- a. Rhizoid
- b. Filamentous
- c. Irregular
- d. Spindle

128.



- a. Undulate
- b. Filiform
- c. Spindle
- d. Filamentous

129.



- a. Undulate

130. In the Microbiology lab, staining methods are employed to appreciate the _____.

- a. Shape and arrangement of bacteria
- b. Biochemical and morphological properties of bacteria
- c. Movement and biochemical properties of bacteria
- d. Shape and metabolic activities of bacteria
- e. Metabolic and arrangement of bacteria

131. All the following are good reasons why negative staining technique is exploited for the capsule except _____.

- a. They are non ionic
- b. They are water soluble
- c. Simple stains will not adhere to them
- d. They are tightly linked to the cell wall of the bacteria

132. The Petroff-Hauser counting chamber is used to _____.

- a. Count cells
- b. Measure cell diameter
- c. Remove cells from culture
- d. Stain cells

133. Select the INCORRECT statement about viruses.

- a. It is a cellular organism
- b. It contains a small packet of nucleic acid
- c. It has a protein coat
- d. Its nucleic acid contains genetic information

134. The greatest number of flagella is usually found on a bacterial cell with a(n) _____ arrangement?

- a. Monotrichous
- b. Amphitrichous
- c. Lophotrichous
- d. Peritrichous

135. Microscopic examination of a patient's faecal culture shows comma-shaped bacteria. These bacteria require 2-4% NaCl to grow. The bacteria probably belong to the genus _____.

- a. *Vibrio*
- b. *Salmonella*
- c. *Escherichia*
- d. *Campylobacter*
- e. *Shigella*

- c. Nucleic acid content
- d. Plasmid content
- e. Cell wall

137. Which pair of microbes can be used as indicators of faecal pollution in water

- a. *Escherichia coli/Clostridium tetani*
- b. Cyanobacteria/*Escherichia coli*
- c. *Escherichia coli/Enterococci*
- d. *Enterococci/Streptococcus*
- e. *Salmonella/Shigella*

138. A bacterium is studied in the lab for identification. Its cells are not rod-shaped. The bacterium does not decolorize by the second step of the Gram staining procedure. They appear in chains under the microscope. Among the following choices the bacterium is _____.

- a. *Bacillus*
- b. *Staphylococcus*
- c. *Streptococcus*
- d. *Coccibacillus*
- e. *Streptobacillus*

139. The statement, "In the laboratory, a known volume of test sample is spread with a glass rod across the agar surface in a culture dish, thinning a sample to isolate individuals", describes which of the following:

- a. Spread plate
- b. Broth culture
- c. Streak plate
- d. Dilution plate

140. A bacterial culture is growing in a flask of nutrient broth in a shaking machine. Through a malfunction over the next twelve hours, the machine shakes too vigorously and the seal is lost from the top of the flask. The culture becomes contaminated but cannot support the growth of any _____.

- a. Aerotolerant anaerobes
- b. Microaerophilic
- c. Facultative anaerobes
- d. Strict anaerobes

141. A procedure that allows a laboratory technician to properly handle microbes safely is _____.

- a. Sterilization
- b. Disinfection
- c. Antiseptis
- d. Aseptic techniques

142. Nucleic acids in viruses' are _____.

- a. DNA in all viruses
- b. RNA in all viruses

- negative to the
- c. DNA or RNA, never both in the same virus
d. DNA and RNA in all viruses

143. A virus is essentially made up of a _____.

- a. protein coat and polysaccharides
b. protein coat and tail for attachment
c. protein coat and nucleic acids
d. protein coat and capsomeres

144. Which of the following technique is used to identify proteins

- a. Southern blotting
b. Northern blotting
c. Eastern Blotting
d. Western Blotting

145. All the following are types of indicators that show changes in pH except _____.

- a. Phenol red
b. Bromocresol
c. Methyl orange
d. P-amino dimethyl aniline

146. Which of the following statements is a critique to the Koch' postulates

- a. Both the diseased condition produced by inoculation and the organisms recovered from the inoculated host must correspond to the original diseased condition and to the first organisms isolated, respectively.
b. The organism in question must always be found associated with a particular disease
c. The organism must be isolated and grown in pure culture
d. The disease may also be caused by toxins produced by the bacteria
e. The organism grown in pure culture must be inoculated into a healthy host under favorable conditions and induce a characteristic disease

147. The following are differential stains except _____.

- a. Endospore staining
b. Capsule staining
c. Gram staining
d. Acid fast staining

148. The total destruction of all microbial life forms is termed _____.

- a. Disinfection
b. Sterilization
c. Antisepsis
d. Decontamination

149. For the general formula of exponential growth, where N is 2 and raised to the nth power, 13 cells will form _____ cells after six generations.

- a. 64
b. 128
c. 256
d. 832

150. Fermentation is an anaerobic enzyme decomposition of organic compounds to produce the following

151. Select the INCORRECT statement.
- They are Gram-negative
 - They are non-spore-forming
 - They are aerobic or facultative anaerobes
 - They are unique with sphere-shaped cells
152. The principle of MPN assay is hinged on.
- Statistical probability
 - The least number of bacteria in culture
 - The serial dilution of bacteria suspension
 - Estimation of the highest number of bacteria in a sample
153. If the gelatinous substance on the surface of bacteria cell is firmly attached to the cell wall, it is called a _____ otherwise, it is called a _____ respectively
- Capsule, slime layer
 - Slime layer, capsule
 - Cell membrane, capsule
 - Capsule, cell membrane
154. To confirm the difference between *Salmonella paratyphi B* and *S. paratyphi A*, moist lead acetate paper turns black in the presence of _____?
- H_2O_2
 - Organic Acids
 - Cytochrome c
 - H_2S
155. Which of the following are surface layers found on bacteria
- Capsule, Pili and fimbriae
 - Cytoplasm, slime layer and fimbriae
 - Capsule, cell wall and cell membrane
 - Nuclear membrane, plasma membrane and pili
156. Antisera are commercially available solutions of such antibodies used in the identification of many medically important microbes: The O poly antisera is used to identify
- To determine the O group
 - For verification of genus (*Salmonella enteric*)
 - To determine the H factor
 - To determine the O factor
157. The capsule is said to increase the virulence of the bacteria because _____.
- it protects the bacteria from phagocytosis
 - it promotes dehydration of bacteria
 - the capsule maintains the shape of bacteria
 - it blocks attachment to host cells

158. A bacterial cell that normally infects the human urinary tract loses its pili. This mainly affects its ability to _____.
- a. Hold on to body cells
 - b. Store nutrients
 - c. Gather nutrients
 - d. Transport materials

159. Serum is the _____.
- a. Cellular part of the blood only
 - b. Liquid part plus the clotting factors
 - c. Liquid part of the blood without cells
 - d. Liquid part of the blood with cells

160. Endospore staining can be used to identify all the following bacteria except _____.
- a. *Clostridium perfringens*
 - b. *Mycobacterium ulcerans*
 - c. *Bacillus cereus*
 - d. *Bacillus anthracis*

161. Phage typing uses _____.
- a. Bacteria to classify protozoa
 - b. Viruses to classify bacteria
 - c. Bacteria to classify viruses
 - d. Viruses to classify plants

162. Which of the following techniques is used to identify DNA
- a. Southern blotting
 - b. Northern blotting
 - c. Eastern Blotting
 - d. Western Blotting

163. Which of the following techniques is used to identify RNA
- a. Southern blotting
 - b. Northern blotting
 - c. Eastern Blotting
 - d. Western Blotting

164. The discovery of _____ was a major step toward the control of gonorrhea
- a. Erythromycin
 - b. Penicillin
 - c. Tetracycline
 - d. Streptomycin

165. MacConkey agar contains a _____ indicator.
- a. Salinity
 - b. pH
 - c. Sugar
 - d. Temperature

166. Select the incorrect association
- a. Hanta virus/rodents
 - b. Rift valley virus/monkeys
 - c. West Nile virus/birds
 - d. Nipah virus/bats

167. The Microbiological technique used to enumerate bacteria in the dairy industry is
- a. Plate count
 - b. Serial dilution
 - c. Direct count
 - d. Membrane filtration

168. The function of plasmid is _____.
- a. DNA replication
 - b. Protein synthesis
 - c. Cell wall synthesis
 - d. None of the above

169. What is the main advantage of using Analytical profile index to identify bacteria
- a. It enables quick identification of known bacteria using conventional profiling
 - b. It enables quick identification of unknown bacteria using conventional profiling
 - c. It enables quick identification of a small group of bacteria
 - d. It enables quick identification of only Gram negative Enterobacteriaceae

170. Each of the following is used to classify viruses except
- a. Life cycle
 - b. Size
 - c. Carbohydrate makeup
 - d. Host range

171. Buruli ulcers are caused by the species of _____.
- a. *Escherichia*
 - b. *Mycobacterium*
 - c. *Helicobacter*
 - d. *Staphylococcus*

172. Bacteria are differentiated based on all the following EXCEPT
- a. Origin
 - b. Morphology
 - c. Source of energy
 - d. Chemical composition

173. If there are 10^5 cells per ml at the middle of log phase, and the generation time of the cells is 30 minutes, how many cells will there be after 2 hours of incubation?
- a. 1.6×10^6
 - b. 4.0×10^6
 - c. 8.0×10^6
 - d. 6.4×10^6

- c. Plant
- d. Yeast

182. An organism that can synthesize all its required organic components from CO₂ using the energy from the sun is _____.

- a. Chemoautotroph
- b. Chemoheterotroph
- c. Photoautotroph
- d. Photoheterotroph

183. The most active stage in the sigmoid curve of bacteria in which maximum growth is attained known as _____.

- a. Lag phase
- b. Stationary phase
- c. Decline phase
- d. Log phase

184. An example of halophilic bacterium is _____.

- a. *Vibrio cholera*
- b. *Salmonella paratyphi A*
- c. *Salmonella paratyphi B*
- d. *Halobacterium*

185. Select the disease that is NOT caused by a virus

- a. Smallpox
- b. Parainfluenza
- c. Diphtheria
- d. Lassa fever
- e. Influenza

186. Which of the following dyes is not a basic dye

- a. Crystal violet
- b. Methylene blue
- c. Safranin
- d. Basic fuschin
- e. Giemsa stain

187. A microbiologist inoculates *Staphylococcus aureus* into a culture medium. Following incubation, both *Staphylococcus aureus* and *Staphylococcus epidermidis* are determined to be growing in this culture. What is the most likely explanation?

- a. The incubation temperature was not correct
- b. The microbiologist used too much inoculum
- c. The culture is contaminated
- d. The culture medium must be selective
- e. The culture medium must be differential

188. The counter-stain for the acid-fast stain is _____.

- a. Carbolfuchsin
- b. Gentian violet
- c. Methylene blue
- d. Nigrosin
- e. Safranin

189. A substance is added to a bacteriophage sample. The substance destroys the activity of the lysozymes in the viruses. This prevents their ability to _____.

- a. Change their nucleic acid genetically
- b. Decrease their metabolism
- c. Dissolve the bacterial cell wall
- d. Increase their metabolism
- e. Penetrate the bacterial cell wall

190. Which of the following is not true about capsules and slime layers?

- a. They consist of secreted material lying outside of the bacterial cell wall.
- b. They can prevent desiccation of bacteria cells.
- c. They are required for bacteria to grow normally in culture.
- d. They help bacteria resist phagocytosis by macrophages.

191. The viruses that live as parasites on bacteria are _____.

- a. Fungi
- b. Commensals
- c. Bacteriophages
- d. Cyanobacteria

192. The Human immunodeficiency virus is believed to have evolved from

- a. Human immunodeficiency virus (HIV-1)
- b. Simian viruses (SIVs)
- c. Herpes Simplex virus (HSV)
- d. Human immunodeficiency virus (HIV-2)
- e. Feline immunodeficiency virus (FIV)

193. Microbes are involved in the production of all these food items except

- a. Marmite,
- b. Yoghurt
- c. Sauerkraut
- d. Bread
- e. Jam

194. When bacteria cells are observed to be colorless against a colored background the staining technique is called _____.

- a. simple staining
- b. capsule staining
- c. negative staining
- d. Indian ink
- e. Endospore staining

195. Filtration may be preferred before a bacteria suspension is cultured. Under what circumstances would this be required?

- a. when the source of the bacteria suspension is too contaminated
- b. when the source of bacteria suspension is already too diluted
- c. when the bacteria suspension is too concentrated
- d. this is done only when bacteria suspension is pathogenic
- e. when the bacteria suspension is from the hospital

196. _____ is a test to assess a bacteria's ability to hydrolyze proteins

- a. Indole test
- b. Oxidase test
- c. Proteolysis
- d. Catalase test
- e. Hydrogen Sulphide test

197. An example of an anaerobic medium is _____.

- a. Wilson Blair medium
- b. MacConkey medium
- c. Robertson's cooked meat medium
- d. Eosin Methylene Blue agar

198. In bacteria, the increase in population is in the manner _____.

- a. Geometric
- b. Multiplication
- c. Doubling
- d. None of the above

199. An outbreak of sepsis caused by *Staphylococcus aureus* has occurred in the newborn nursery. You are called upon to investigate. According to your knowledge of the normal flora, what is the most likely source of the organism?

- a. Nose
- b. Colon
- c. Hand
- d. Throat

200. What is the full scientific name of the bug that causes gonorrhoea is _____.

- a. *Vibro gonorrhoeae*
- b. *Neisseria bacillus*
- c. *Corynebacterium gonorrhoeae*
- d. *Neisseria gonorrhoeae*

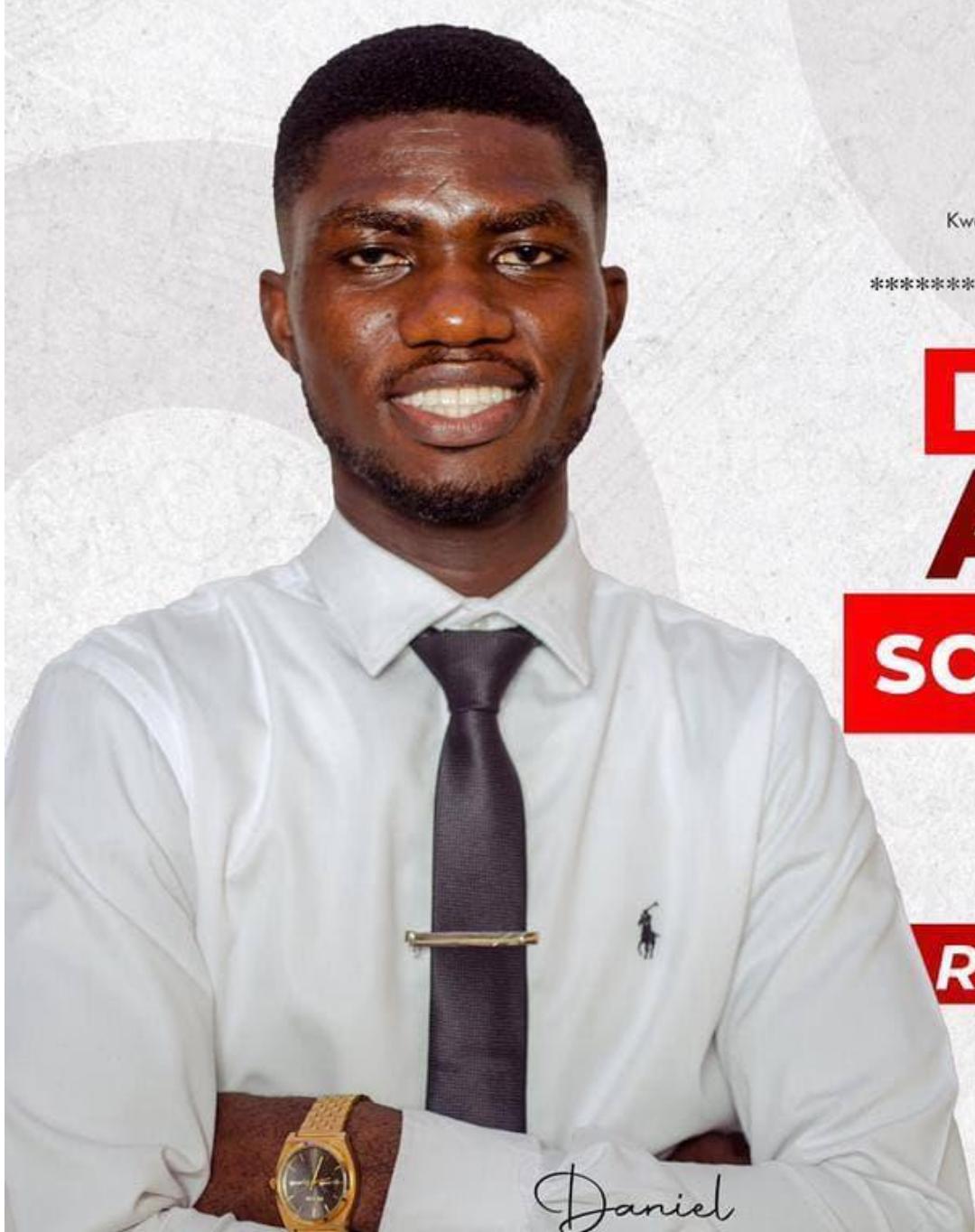
201. Which of the following bacteria lack a cell wall and are therefore resistant to penicillin?

- a. Cyanobacteria
- b. Mycoplasmas
- c. Bdellovibrio
- d. Spirochetes

202. In estimating turbidity,
- a. The amount of light absorbed by the cells in the tube is proportional to the bacteria population
 - b. The amount of light transmitted through the tube is proportional to the bacteria concentration
 - c. The amount of light absorbed is inversely proportional to the bacteria population
 - d. The amount of light transmitted through the sample has no relationship with the bacteria growth

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