Microbiology Fundamentals Clinical Approach 4th edition Cowan Test Bank

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CORRECT ANSWERS ARE LOCATED IN THE 2ND HALF OF THIS DOC.

TRUE/FALSE - Write 'T' if the statement is true and 'F' if the statement is false.

1) The procedures for culturing a microorganism require the use of a microscope.
   - ◎ true
   - ◎ false

2) Some microbes are not capable of growing on artificial media.
   - ◎ true
   - ◎ false

3) A selective medium contains one or more substances that inhibit growth of certain microbes in order to facilitate the growth of other microbes.
   - ◎ true
   - ◎ false

4) One colony typically develops from the growth of several parent bacterial cells.
   - ◎ true
   - ◎ false

5) Mixed cultures are also referred to as contaminated cultures.
   - ◎ true
   - ◎ false

6) Bacterial cultures are easily identified from their microscopic appearance.
   - ◎ true
   - ◎ false

7) Normal incubation temperatures range from 30°C to 60°C.
   - ◎ true
   - ◎ false

8) The bending of light rays as they pass from one medium to another is called refraction.
   - ◎ true
   - ◎ false

9) The real image is the reverse of the actual specimen.
   - ◎ true
   - ◎ false

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10) A confocal microscope uses visible light as its source of illumination.
- ◎ true
- ◎ false

11) Fixed smears of specimens are required in order to perform the Gram stain and endospore stain on the specimens.
- ◎ true
- ◎ false

12) At the end of the Gram stain, gram-positive bacteria will be seen as red/pink cells.
- ◎ true
- ◎ false

13) In the absence of immersion oil when using the 100x objective lens, some light would be lost to scatter resulting in a blurry image.
- ◎ true
- ◎ false

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CHECK ALL THE APPLY. Choose all options that best completes the statement or answers the question.

14) Select the correct answers that identify the Five I's of culturing microorganisms.
- A) Identification
- B) Inspection
- C) Inhibition
- D) Inoculation
- E) Isolation
- F) Infection
- G) Incubation

15) Select the methods below that enable the isolation of bacteria.
- A) Quadrant streak plate
- B) Bright-field microscopy
- C) Loop dilution
- D) Use of selective media
- E) Spread plate
- F) Gram stain

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16) Choose the three basic ways that media are classified.
- A) Chemical composition
- B) Purpose
- C) Temperature of incubation
- D) Physical state
- E) Ease of preparation

17) Select the elements necessary for good microscopy.
- A) Adequate magnification
- B) Ability to observe cells in the living state
- C) Use of wavelengths other than the visible spectrum
- D) Contrast
- E) Resolution
- F) Specimen holder

MULTIPLE CHOICE - Choose the one alternative that best completes the statement or answers the question.

18) The Five I's of studying microorganisms include all of the following except _____.
- A) inoculation
- B) incubation
- C) infection
- D) isolation
- E) identification

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19) The term that refers to the purposeful addition of microorganisms into a laboratory nutrient medium is _____.
- A) isolation
- B) inoculation
- C) immunization
- D) infection
- E) contamination

20) A pure culture contains _____.
- A) only one species of microorganism
- B) only bacteria
- C) a variety of microbes from one source
- D) a variety of species from the same genus
- E) None of the choices are correct.

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21) The correct microbiological term for the tiny sample of specimen that is put into a nutrient medium in order to produce a culture is the _____.
A) colony
B) inoculum
C) streak
D) loop
E) incubator

22) Which of the following is essential for development of discrete, isolated colonies?
A) Broth medium
B) Differential medium
C) Selective medium
D) Solid medium
E) Assay medium

23) Which method often results in colonies developing down throughout the agar along with some colonies on the surface?
A) Streak plate
B) Spread plate
C) Pour plate
D) All of the choices are correct.
E) None of the choices are correct.

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24) What type of isolation technique is most effective for the majority of applications?
A) Pour plate
B) Streak plate
C) Spread plate
D) Loop dilution
E) Culture plate

25) Which of the following will result when 1% to 5% agar is added to nutrient broth, boiled, and cooled?
A) A pure culture
B) A mixed culture
C) A solid medium
D) A liquid medium
E) A contaminated medium

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26) Agar is an important component of media because _____.
- A) bacteria require agar to grow
- B) agar inhibits mold growth
- C) agar provides a solid surface for bacterial growth
- D) agar prevents contamination
- E) All of the choices are correct.

27) The three physical forms of laboratory media are _____.
- A) solid, liquid, and gas
- B) solid, semisolid, and liquid
- C) streak plate, pour plate, and broth
- D) aerobic, anaerobic, and micro aerobic
- E) None of the choices are correct.

28) Which of the following is not an inoculating tool?
- A) Petri dish
- B) Loop
- C) Needle
- D) Pipette
- E) Swab

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29) Agar is a complex polysaccharide that comes from a(n) _____.
- A) green plant
- B) fungus
- C) mold
- D) algae
- E) euglena

30) Which of the following is not a benefit of agar as a solid medium?
- A) Has flexibility
- B) Holds moisture
- C) Can be inoculated and poured at a temperature that is not harmful
- D) Is solid at room temperature
- E) Is digested by most microbes

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31) A nutrient medium that has all of its chemical components identified, and their precise concentrations known and reproducible, would be termed _____.
   A) a complex media
   B) a reducing media
   C) an enriched media
   D) a chemically defined media
   E) None of the choices are correct.

32) A nutrient medium that contains at least one ingredient that is NOT chemically definable would be termed _____.
   A) complex
   B) reducing
   C) enriched
   D) synthetic
   E) minimal

33) All of the following are examples of different types of microbiological media except _____.
   A) broth
   B) enriched
   C) agar
   D) petri dish
   E) selective

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34) Which type of media would be the best choice when shipping a sample of bacteria to a laboratory to be tested from a satellite office site?
   A) Transport
   B) EMB
   C) Blood
   D) Thioglycollate
   E) General purpose

35) A microbiologist inoculates *Staphylococcus epidermidis* and *Escherichia coli* into a culture medium. Following incubation, only the *E. coli* grows in the culture. What is the most likely explanation?
   A) The microbiologist used too much inoculum.
   B) The culture is contaminated.
   C) The incubation temperature was incorrect.
   D) The culture medium must be selective.
   E) The culture medium must be differential.

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36) A common medium used for growing fastidious bacteria is _____.
- A) blood agar
- B) trypticase soy agar
- C) mannitol salt agar
- D) MacConkey medium
- E) a reducing medium

37) A reducing medium contains _____.
- A) sugars that can be fermented
- B) extra oxygen
- C) hemoglobin, vitamins, or other growth factors
- D) substances that remove oxygen
- E) inhibiting agents

38) Which type of medium is able to distinguish different species or types of microorganisms based on an observable change in the colonies or in the medium?
- A) Differential
- B) Selective
- C) Enumeration
- D) Enriched
- E) Reducing

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39) Differential media results in which of the following growth characteristics?
- A) Different color colonies
- B) Different media color post incubation
- C) Precipitates
- D) Gas bubbles
- E) All of the choices are correct.

40) A reducing media is used to culture _____.
- A) fastidious organisms
- B) aerobic organisms
- C) anaerobic organisms
- D) any pathogenic organisms
- E) None of the choices are correct.

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41) For which bacterial genus does mannitol salt agar differentiate between species?
A) *Salmonella*
B) *Streptococcus*
C) *Neisseria*
D) *Staphylococcus*
E) *Escherichia*

42) A microbiologist must culture a patient's feces for intestinal pathogens. Which of the following would likely be present in selective media for analyzing this fecal specimen?
A) NaCl
B) Sheep red blood cells
C) Bile salts
D) Thioglycollic acid
E) Peptone

43) Bacteria that require special growth factors and complex nutrients are termed _____.
A) aerobic
B) anaerobic
C) fastidious
D) microaerophilic
E) autotrophic

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44) 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 microbiologist used too much inoculum.
B) The culture is contaminated.
C) The incubation temperature was incorrect.
D) The culture medium must be selective.
E) The culture medium must be differential.

45) Newly inoculated cultures must be _____ at a specific temperature to encourage growth.
A) streaked
B) poured
C) incubated
D) contaminated
E) All of the choices are correct.

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46) A rod-shaped bacterium is measured as 0.3 micrometers (µm) in length using an ocular micrometer. Your instructor wants you to report the length in millimeters (mm) to test your understanding of metric conversions. What is the length of the organism in millimeters?
A) 0.0003 mm
B) 300 mm
C) 0.03 mm
D) 3 mm

47) An enveloped virus measures 0.02 micrometers (µm) in diameter. What is the diameter of this virus in nanometers (nm)?
A) 20 nm
B) 0.00002 nm
C) 2 nm
D) 0.2 nm

48) The _____ of the microscope holds and allows selection of the objective lenses.
A) stage
B) condenser
C) objective
D) ocular
E) nosepiece

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49) Which of the following magnifies the specimen to produce its real image?
A) Condenser
B) Objective lens
C) Ocular lens
D) Body
E) Nosepiece

50) Which of the following magnifies the specimen to produce its virtual image?
A) Objective lens
B) Ocular lens
C) Condenser
D) Body
E) Iris diaphragm

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51) Which of the following controls the amount of light entering the specimen?
- A) Objective lens
- B) Ocular lens
- C) Condenser
- D) Body
- E) Iris diaphragm

52) If a microbiologist is studying a specimen at a total magnification of 950x, what is the magnifying power of the objective lens if the ocular lens is 10x?
- A) 100x
- B) 950x
- C) 85x
- D) 850x
- E) 95x

53) Magnification is achieved in a compound microscope through the initial magnification of the specimen by the _____ lens. This image is then projected to the _____ lens that will further magnify the specimen to form a virtual image received by the eye.
- A) ocular; objective
- B) scanning; objective
- C) objective; ocular
- D) ocular; oil
- E) None of the choices are correct.

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54) Which of the following characteristics refers to the microscope's ability to show two separate entities as separate and distinct?
- A) Resolving power
- B) Magnification
- C) Refraction
- D) All of the choices are correct.
- E) None of the choices are correct.

55) All of the following are diameters of cells that would be resolved in a microscope with a 0.2 µm limit of resolution except _____.
- A) 0.2 µm
- B) 0.2 mm
- C) 0.1 µm
- D) 0.3 µm
- E) 2.0 µm

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56) The type of microscope in which you would see brightly illuminated specimens against a black background is _____.
A) bright field
B) dark field
C) phase contrast
D) fluorescence
E) electron

57) Which type of microscope shows cells against a bright background but also differentiates intracellular structures of unstained cells based on their varying densities?
A) Bright field
B) Dark field
C) Phase contrast
D) Differential interference
E) Electron

58) Which type of microscope is the most widely used and shows cells against a bright background?
A) Bright field
B) Dark field
C) Phase contrast
D) Fluorescence
E) Electron

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59) All of the following pertain to the fluorescence microscope except _____.
A) it uses electrons to produce a specimen image
B) it is a type of compound microscope
C) it requires the use of dyes like acridine and fluorescein
D) it is commonly used to diagnose certain infections
E) it requires an ultraviolet radiation source

60) A confocal scanning microscope _____.
A) uses visible light to form a specimen image
B) shows three-dimensional cell images from the cell surface to the middle of the cell
C) produces specimen images on electron micrographs
D) uses dyes that emit visible light when bombarded by electrons
E) requires specimens to be stained

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61) Which type of microscope does not use light in forming the specimen image?
A) Bright field
B) Dark field
C) Phase contrast
D) Fluorescence
E) Electron

62) Which type of microscope achieves the greatest resolution and highest magnification?
A) Bright field
B) Dark field
C) Phase contrast
D) Fluorescence
E) Electron

63) Which type of microscope bombards a whole, metal-coated specimen with electrons moving back and forth over it?
A) Differential interference contrast
B) Scanning electron
C) Transmission electron
D) Phase contrast
E) Fluorescence

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64) The specimen preparation that is best for viewing cell motility is _____.
A) hanging drop
B) fixed stained smear
C) Gram stain
D) negative stain
E) flagellar stain

65) The purpose of staining cells on a microscope slide is to _____.
A) kill them
B) secure them to the slide
C) enlarge the cells
D) add contrast in order to see them better
E) see motility

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66) What do the Gram stain, acid-fast stain, and endospore stain have in common?
A) They are used on a wet mount of the specimen.
B) They use heat to force the dye into cell structures.
C) The outcome is based on cell differences.
D) They use a negative stain technique.
E) They are simple stains.

67) Basic dyes are _____.
A) attracted to the negatively charged acidic substances of bacterial cells
B) anionic
C) used in negative staining
D) repelled by cells
E) dyes such as India ink and nigrosin

68) A microbiologist makes a fixed smear of bacterial cells and stains them with Loeffler's methylene blue. All the cells appear blue under the oil lens. This is an example of _____.
A) negative staining
B) using an acidic dye
C) simple staining
D) using the acid-fast stain
E) capsule staining

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69) The Gram staining procedure is best described as a(n) _____ staining technique.
A) acid-fast or Ziehl-Neelson
B) differential
C) capsule
D) flagellar
E) simple

70) The all-purpose media Tryptic Soy Agar (TSA) contains the following four ingredients; pancreatic digest of casein, digest of soybean meal, NaCl and agar. TSA is best described as _____.
A) a differential media
B) a complex media
C) a selective media
D) a defined media
E) a reducing media

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71) Comparing defined vs. complex media is analogous to comparing _____.
- A) baby formula to breast milk
- B) Coca-cola® to Pepsi®
- C) the generic version of the drug Lipitor® to the brand name produced by Pfizer Pharmaceuticals
- D) a strawberry-banana smoothie to a mixed berry smoothie

72) The diameter of field for a 4x lens is measured at 4.6 mm. How many bacterial cells, each measuring 4 µm, could be lined up along the diameter?
- A) 1,150 cells
- B) 1.15 cells
- C) 18.4 cells
- D) 115 cells
- E) 1840 cells

73) The relationship between a micrometer and a millimeter is _____.
- A) a millimeter is 10 times larger than a micrometer
- B) a micrometer is 1,000 times smaller than a millimeter
- C) a millimeter is 100 times smaller than a micrometer
- D) a micrometer is 1,000 times larger than a millimeter
- E) a millimeter is 10 times smaller than a micrometer

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74) Resolution differs from contrast in microscopy in that _____.
- A) resolution refers to the ability to distinguish two cells from one another, whereas contrast refers to the ability to distinguish a cell from its surroundings
- B) contrast refers to the ability to distinguish two cells from one another, whereas resolution refers to the ability to distinguish a cell from its surroundings
- C) resolution is measured by the refractive index of light whereas contrast depends on the use of oil
- D) contrast is improved by adding oil to the specimen with the 100x objective lens and resolution is improved by adjusting the iris diaphragm control lever

75) Choose the media categorization that includes enriched, selective, and differential media.
- A) Media categorized by its physical state
- B) Media categorized by its chemical composition
- C) Media categorized by its purpose
- D) Media categorized by its temperature of incubation

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76) What type of medium contains blood, serum, or other special growth factors, and what type of bacterial growth is supported by this medium?
A) Selective; gram-negative bacteria
B) Differential; fastidious bacteria
C) Enriched; fastidious bacteria
D) Enriched; gram-negative bacteria

77) Choose the term that describes motility media.
A) Solid, but can liquefy
B) Solid
C) Semisolid
D) Liquid
E) Synthetic

78) Choose the description that best fits a medium that has been designed to support the growth of MRSA (methicillin-resistant *Staphylococcus aureus*) while inhibiting all species and strains of other bacteria.
A) Differential
B) Selective
C) Reducing
D) Enriched
E) Anaerobic

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79) A bacterial cell that measures 2.5 µm (micrometers) would measure _____ nm (nanometers).
A) 2,500 nm
B) 25 nm
C) 0.0025 nm
D) 0.25 nm

80) A virus that is 150 nm (nanometers) in diameter would be _____ µm (micrometers) in diameter.
A) 0.150 µm
B) 15 µm
C) 150,000 µm
D) 0.0150 µm

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81) A human squamous epithelial cell measures 75 µm in diameter. The size of this cell represented in millimeters (mm) would be _____ mm.
A) 0.075
B) 0.75
C) 75,000
D) 750

82) Reducing the intensity of light using the iris diaphragm or staining a specimen can improve _____.
A) contrast
B) magnification
C) resolving power
D) reflection

83) The resolving power of electron microscopes is much better than the resolving power of light microscopes because the wavelength of electron beams is _____ than the wavelength of visible light.
A) shorter
B) longer
C) faster
D) slower

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84) In a ____ stain, the dye stains the background, forming a silhouette around the unstained organism.
A) negative
B) differential
C) positive
D) fluorescent

85) Choose the differential stain that is most important in the diagnosis of tuberculosis.
A) Acid-fast stain
B) India ink stain
C) Gram stain
D) Endospore stain
E) Flagellar stain

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SECTION BREAK. Answer all the part questions.

86) NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

An RN is working at an urban low-income medical clinic when a young woman enters crying. She is 19 years old and 28 weeks pregnant with her second child. The woman reports that she woke this morning to find she was leaking milky-colored fluid vaginally. Her first child was born 6 weeks early due to premature rupture of membranes and she is worried this is happening again. You reassure the patient, explain that a vaginal speculum exam will be performed, and educate her about specimens that will be collected. Once the proper specimens are obtained and appropriately labeled, the wet mount and culturette are sent to the laboratory for processing.

86.1) The RN understands that along with a pH test, a microscopic view is needed to perform the ferning test to detect an amniotic fluid leak. The patient sample is prepared on a glass slide and examined under 10x magnification. Which type of microscope will be used to make this observation of the patient sample?

A) Electron microscope
B) Light microscope
C) Confocal microscope
D) Fluorescent microscope

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86.2) When utilizing a light microscope, the specimen on the glass slide must be in proper position to ensure illumination of the specimen for visualization. The glass slide is placed in which of the following positions?

A) Between the condenser lens and the objective lens
B) Directly on top of the light source
C) Between the ocular lens and the objective lens
D) Between the light source and the condenser lens

86.3) The sterile vaginal fluid specimen is sent for culture. The RN educates the patient about the five basic techniques utilized by laboratory technicians to manipulate, grow, examine, and characterize any microorganisms present in the specimen. Which of the following is the correct order of steps for processing the specimen?

A) Isolation, incubation, inspection, identification, and inoculation
B) Inspection, identification, isolation, incubation, and inoculation
C) Identification, isolation, incubation, inspection, and inoculation
D) Inoculation, incubation, isolation, inspection, and identification

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86.4) The patient asks how microbes from her body can be grown in the lab. The RN explains that specimens are introduced to nutrient medium and that any growth of the microbe that appears after incubating the specimen is called the _____.

A) colony
B) culture
C) microorganism
D) infectious agent

86.5) The patient is diagnosed with a bacterial infection after gram-positive cocci are detected in the fluid sample. The Gram stain involves _____.

A) forcing a dye into resistant bodies with heat to distinguish between spores and cells
B) timed, sequential applications of crystal violet dye, iodine, an alcohol rinse, and a contrasting counterstain to the sample
C) application of the dye, carbol fuchsin, followed by an acid alcohol rinse
D) application of India ink to detect the presence of bacterial capsules

87) NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

An RN is working at a public health clinic that sees many patients with infectious disease. Ms. Hungh, a Burmese immigrant, presents to the clinic with an interpreter, complaining of fatigue, weight loss, persistent cough, and rust-colored sputum. The interpreter explains that Ms. Hungh has had this cough for many months in her home country and, now that she is in America, is seeking treatment for her condition.

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87.1) A sputum sample is ordered for microbial analysis in order to rule out the diagnosis of tuberculosis. Suspecting *Mycobacterium tuberculosi*s may be the pathogen, the RN knows the laboratory technicians will perform which stain on the sample?

A) Endospore stain
B) Negative stain
C) Flagellar stain
D) Acid-fast stain

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87.2) Ms. Hungh's acid-fast stain results resulted as inconclusive for the presence of acid-fast bacilli. Culturing of the sputum is performed in order to isolate microbial growth for further analysis. Lowenstein-Jensen medium is utilized to select for the growth of *Mycobacterium* species if present in the sample, while suppressing unwanted background organisms. What is the proper term for this type of medium?

A) Differential medium
B) Selective medium
C) Differential medium and selective medium
D) None of the choices are correct.

87.3) Culturing of the sputum resulted in the growth of distinct colonies and further isolation by subculturing is now needed. The RN understands that isolation is accomplished by taking a bit of growth from an individual colony and inoculating a separate medium, resulting in the production of a(n) _____.

A) simple culture
B) pure culture
C) isolated culture
D) mixed culture

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88) NCLEX Prep - Test Bank Question: Please read the clinical scenario, and then answer the questions that follow to become familiar with the traditional NCLEX question format.

A 65-year-old homeless male presents to an urgent care clinic with a deep laceration on his left arm. He states that he cut his arm on an old piece of scrap metal two days prior. His wound is red, tender, hot to the touch, and has yellow drainage. The RN collects a sample of the drainage and sends it to the laboratory for microbial analysis, per provider orders.

88.1) The patient's culture results positive for *Staphylococcus*. The RN understands that the culture most likely required growth on a complex medium, consisting of _____.

A) an exact chemical formula
B) chemical growth inhibitors
C) at least one ingredient that is not chemically defined
D) None of the choices are correct.

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88.2) Microscopic analysis revealed the presence of grapelike clusters of gram-positive cocci. The RN educates the patient that the species identification of the organism will require biochemical testing, which aids in microbial identification by providing information on cellular metabolism. Which of the following statements by the patient demonstrates understanding of the nurse's teaching?

A) Biochemical tests can determine the organism's nutrient requirements.
B) Biochemical tests can determine the presence of enzymes in the sample.
C) Biochemical tests can provide information about products given off during growth.
D) Biochemical tests can provide information about the microbe's mechanism for deriving energy.
E) All of these statements are correct.

88.3) Cultures and specimens pose a potential health hazard and require proper handling and disposal via specific medical waste policies. Some facilities are regulated to maintain living catalogs of specimens that may be subcultured into a fresh medium for research and educational purposes. Such collections are referred to as _____.

A) live microbes
B) stock cultures
C) reserved specimens
D) bacteriological reserve

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Answer Key

Test name: Chapter 02

1) FALSE
2) TRUE
3) TRUE
4) FALSE
5) FALSE
6) FALSE
7) FALSE
8) TRUE
9) FALSE
10) FALSE
11) TRUE
12) FALSE
13) TRUE
14) [A, B, D, E, G]
Culturing microorganisms in the laboratory generally involves the following five steps, also known as the Five I's: inoculation, incubation, isolation, inspection, and identification.

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15) [A, C, D, E]
Quadrant streak plates, loop dilution, selective media, and spread plates can all be used to isolate microbes in culture. While helpful in detecting and identifying bacteria, bright-field microscopy and Gram staining are not isolation techniques.

16) [A, B, D]
Media can be categorized by its chemical composition (synthetic, nonsynthetic), by its physical state (solid, liquid, semisolid), or by its purpose (enriched, differential, selective, etc.).

17) [A, D, E]
The three elements of good microscopy include magnification, resolution, and contrast.

18) C
19) B
20) A
21) B
22) D

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23) C
24) B
25) C
26) C
27) B
28) A
29) D
30) E
31) D
32) A
33) D
34) A
35) D
36) A
37) D
38) A
39) E
40) C
41) D
42) C
43) C
44) B
45) C
46) A
47) A
48) E
49) B
50) B
51) E
52) E
53) C
54) A
55) C
56) B
57) C
58) A
59) A
60) B
61) E
62) E

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63) B
64) A
65) D
66) C
67) A
68) C
69) B
70) B
71) A
72) A
73) B
74) A
75) C
Enriched, selective, and differential media are classified based on their function. Media categorized by chemical composition include synthetic and nonsynthetic media. Media categorized by physical state include liquid, semisolid, and solid media. Media are not categorized by the temperature of incubation or the type of microorganisms they will support.

76) C
Enriched media has added nutrients supplied by blood, serum, or other growth factors. It is designed to support the growth of **fastidious** microorganisms, which need extra nutrient supplementation for growth.

77) C
Motility medium is typically a semisolid consistency. It is inoculated by stabbing the specimen into it with an inoculating needle. Motile organisms will move away from the stab site, making the entire medium cloudy. Nonmotile organisms will stay and grow at the stab site and not turn the entire medium cloudy.

78) B
A medium that supports the growth of one type of bacterium while inhibiting the growth of others is a **selective** medium.

79) A
One micrometer is equal to 1,000 nm. To convert micrometers to nanometers, multiple the 2.5 µm by 1,000 to obtain 2,500 nm. An easy way to do this is to remember that when you make this conversion, you can simply move the decimal three places to the right.

80) A

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One micrometer is equal to 1,000 nm. To convert nanometers to micrometers, divide the 150 nm by 1,000 to obtain 0.150 µm. An easy way to do this is to remember that when you make this conversion, you can simply move the decimal three places to the left.

81) A
One millimeter is equal to 1,000 micrometers. To convert micrometers to millimeters, divide the 75 µm by 1,000 to obtain 0.075 µm. An easy way to do this is to remember that when you make this conversion, you can simply move the decimal three places to the left.

82) A
The contrast, or ability to distinguish between an object and the background when viewing through a microscope, can be improved by reducing light using the iris diaphragm or by staining.

83) A
Longer wavelengths are too large to penetrate the spaces between two adjacent objects, making an image appear fuzzy. Shorter wavelengths do a better job of distinguishing between objects, and therefore, shorter wavelengths result in higher resolution. Electron beams are shorter wavelengths so electron microscopes have a greater resolving power than light microscopes.

84) A
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Negative stains are repelled by cell surfaces. Instead, these dyes adhere to the slide producing a dark background around the unstained cells, thus increasing contrast.

85) A
The acid-fast stain is a differential stain that is useful in the diagnosis of tuberculosis. Tuberculosis is caused by the acid-fast bacterium, *Mycobacterium tuberculosis*.

86) Section Break
86.1) B
86.2) A
86.3) D
86.4) B
86.5) B
87) Section Break
87.1) D
87.2) B
87.3) B
88) Section Break
88.1) C
88.2) C

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88.3) B

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