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MULTIPLE CHOICE

1. A 78-year-old man is being prepared for discharge following abdominal surgery, which he underwent several days ago. The nurse notices that the patient has a temperature of 101.5°F and has some tan secretions in his suture area. A specimen is sent to the laboratory. The results show the presence of Gram-positive cocci. The statement that might explain this condition is which of the following?
   a. The antibiotic was ineffective.
   b. The patient was not compliant with therapy.
   c. It is normal to have secretions at the suture site.
   d. A health care–associated infection should be considered.

   ANS: D
   No antibiotic was mentioned in the scenario. There is no history of the patient receiving any medication for this problem, so compliance is not an issue with this situation. It is not normal to have secretions at a suture site.

2. A nosocomial infection is best defined as a
   a. respiratory system–borne pathogen.
   b. hospital-acquired pathogen.
   c. bacterial or viral organism.
   d. blood-borne pathogen.

   ANS: B
   A nosocomial infection is one that is acquired in a hospital setting.

3. A prokaryotic, unicellular organism that ranges in size from 0.5 to 50 μm is usually classified as which of the following?
   a. Virus
   b. Protozoan
   c. Bacterium
   d. Retrovirus

   ANS: C
   This is the definition of a bacterium.

4. When speaking about the morphology of bacteria, one is referring to its
   a. size.
   b. shape.
   c. function.
   d. movement.

   ANS: B
   There are three ways to classify bacteria: by its shape, by staining, and by its metabolic characteristics. Size, function, and movement are not characteristics used to classify bacteria.

5. Which of the following is a bacterium?

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a. Herpes simplex
b. *Pneumocystis jiroveci*
c. *Pseudomonas aeruginosa*
d. *Candida albicans*

ANS: C
Herpes is a virus; *Pneumocystis carinii* is a protozoan; and *Candida albicans* is a fungus.

6. A sputum specimen is received in the microbiology laboratory. Gram staining and a microscopic examination reveal a paired, spherical, purple-stained organism. It can be reasonably assumed that this organism is which of the following?
a. Gram-negative bacilli
b. Gram-negative staphylococci
c. Gram-positive diplococci
d. Gram-positive bacilli

ANS: C
Diplococci are spherically shaped bacteria that occur in pairs; Gram-positive organisms appear blue or violet. Gram-negative organisms have a red appearance from the counterstain. Staphylococci are cocci that occur in irregular clusters. Bacilli are rodlike organisms.

7. An organism that appears blue or violet after staining is usually called
a. Gram negative.
b. Gram positive.
c. Ziehl–Neelsen.
d. acid fast.

ANS: B
Gram-positive organisms stain blue or violet, whereas Gram-negative organisms appear red from a counterstain of red dye safranin. Acid-fast stains (also called *Ziehl–Neelsen stains*) are different tests.

8. Which of the following is a Gram-negative pathogen?
a. *Bacillus anthracis*
b. *Staphylococcus aureus*
c. *Pseudomonas aeruginosa*
d. *Clostridium botulinum*

ANS: C
Bacillus anthracis, Staphylococcus aureus, and *Clostridium botulinum* are Gram-positive pathogens.

9. Which of the following is spread by direct contact?
a. Measles
b. Hepatitis B
c. Staphylococcus
d. Histoplasmosis

ANS: C
Staphylococcus is spread by direct contact. Measles are spread by droplets; hepatitis B, by indirect contact; and histoplasmosis, by airborne dust.

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10. The Ziehl–Neelsen stain is useful in identifying which family of microorganisms?
    a. Streptococci
    b. *Mycobacterium*
    c. Staphylococci
    d. *Pseudomonas*

    ANS: B
    The Ziehl–Neelsen stain is also called the acid-fast stain and is used to identify *Mycobacterium* species such as *Mycobacterium tuberculosis*. This stain is not used to identify streptococci, staphylococci, or *Pseudomonas*.

11. Which of the following is typically associated with tuberculosis (TB)?
    a. *Mycobacterium*
    b. *Pseudomonas*
    c. *Clostridium*
    d. *Bordetella*

    ANS: A
    Mycobacterium tuberculosis is the organism responsible for pulmonary, spinal, and miliary TB.

12. Bacteria that require oxygen for growth are typically known as
    a. aerobes.
    b. airborne.
    c. anaerobes.
    d. autotrophs.

    ANS: A
    Aerobes require oxygen for life. Airborne refers to the method of transmission of infectious diseases. Anaerobes can grow and live without oxygen, and autotrophs require simple inorganic nutrients to sustain themselves.

13. Ventilator-associated pneumonia is commonly caused by which of the following?
    a. *Escherichia coli*
    b. *Bacillus anthracis*
    c. *Haemophilus pneumoniae*
    d. *Corynebacterium diphtheriae*

    ANS: C
    Ventilator-associated pneumonia is most commonly caused by *Pseudomonas aeruginosa, Klebsiella pneumoniae, Escherichia spp., Serratia marcescens, Acinetobacter calcoaceticus-baumannii, Proteus mirabilis, Haemophilus pneumonia e*spp.

14. Viruses are usually described as nonliving because they
    a. do not have a cell wall.
    b. are unable to self-replicate.
    c. must create endospores to survive.
    d. cannot live without another living organism.

    ANS: B

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Viruses must invade a living organism to replicate. This is the reason that they are described as nonliving. They do have a wall-like structure that is made of protein. They do not create endospores and are able to live outside a host; however, they cannot replicate outside of a host.

15. Which of the following is a virus that has a respiratory route of transmission?
    a. Polio virus
    b. Hepatitis
    c. Coronavirus
    d. Herpes simplex virus

    ANS: C
    Coronavirus has a respiratory route of transmission; for polio, the route of transmission is through the gut. Hepatitis is transmitted through body fluids and blood, and herpes simplex has several routes of transmission, including oral, genital, and ocular.

16. Which of the following is the organism that is associated with pneumonia in immune-compromised patients in the United States?
    a. *Schistosoma*
    b. *Shigella*
    c. *Pneumocystis*
    d. *Rickettsiae*

    ANS: C
    Pneumocystis pneumonia is common in immunocompromised patients—particularly those infected with human immunodeficiency virus. *Pneumocystis* is a fungal infection. *Schistosoma* is a blood fluke. *Shigella* is a Gram-negative, non–spore-forming, rod-shaped bacteria. *Rickettsiae* are intracellular parasites that resemble bacteria.

17. Airborne droplet nuclei are responsible for the transmission of
    a. legionellosis.
    b. histoplasmosis.
    c. staphylococcus.
    d. TB.

    ANS: D
    TB is transmitted by droplet nuclei. Legionellosis is transmitted by airborne aerosols; histoplasmosis, by airborne dust; and staphylococcus, by direct contact.

18. Which of the following organisms can be transmitted via the respiratory tract?
    1. Hepatitis
    2. Influenza
    3. Varicella
    4. Parainfluenza
    a. 1 and 4
    b. 2, 3, and 4
    c. 1 and 2
    d. 2 and 3

    ANS: B
    Hepatitis is transmitted through blood and body fluids.

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19. The spread of diseases requires which of the following?
    1. A pathogen source
    2. Immunosuppression
    3. Mode of transmission
    4. A susceptible host
    a. 1 and 4
    b. 1, 3, and 4
    c. 2 and 3
    d. 1, 2, and 4

    ANS: B
    Immunosuppression is not a requirement for the transmission of an infectious disease. However, a pathogen source, mode of transmission, and susceptible host must be present. A susceptible host does not have to be immunosuppressed to be considered susceptible. The host could have had surgery, be intubated, or have an indwelling catheter to be susceptible.

20. You are visiting a country that has been plagued by heavy rains and flooding. The population is suffering from widespread disease. Which of the following is the most likely cause of the disease?
    a. Cholera
    b. Influenza
    c. Legionella
    d. Salmonellosis

    ANS: A
    Cholera is a waterborne infectious disease. With excessive rains and flooding, this waterborne bacterium might flourish. Legionella is spread by aerosols. Salmonellosis is a foodborne infectious disease. Influenza is spread through the respiratory tract.

21. Which of the following is a common pathogen that could cause a disruption of normal flora in a patient receiving antibiotic therapy?
    a. *Clostridium difficile*
    b. *Pneumocystis carinii*
    c. *Enterobacteriaceae* spp.
    d. *Pseudomonas aeruginosa*

    ANS: A
    Clostridium difficile are the bacteria that cause the disruption of normal flora in the gastrointestinal tract caused by antibiotic therapy. *Pneumocystis carinii* are the protozoa that cause pneumonia in immunocompromised patients with human immunodeficiency virus. *Enterobacteriaceae* spp. are the bacteria that can cause hypogammaglobulinemia in patients with multiple myeloma.

22. Transmission of an infectious agent by flies would fall into which mode of disease transfer?
    a. Vector-borne
    b. Airborne
    c. Contact
    d. Indirect

    ANS: A

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Insects are the transmission agents in vector-borne infectious diseases. Airborne, indirect, and contact transmission are not accomplished via insects.

23. An agent that destroys pathogenic microorganisms on inanimate objects only is best described as a
    a. virucide.
    b. germicide.
    c. bactericide.
    d. disinfectant.

    ANS: D
    A disinfectant describes agents that destroy pathogenic microorganisms on inanimate objects only. Germicide is a general term used to describe agents that destroy pathogenic microorganisms on living tissue and inanimate objects. A bactericide destroys all pathogenic bacteria. A virucide destroys viruses only.

24. Sterilization differs from pasteurization in that sterilization destroys
    a. bacteria and fungi only.
    b. only bacteria.
    c. all microbes.
    d. only viruses.

    ANS: C
    Bactericides destroy only pathogenic bacteria. Fungicides kill fungi, and virucides kill viruses. Sterilization kills all microbes including spores, whereas pasteurization is a disinfection process that removes most pathogenic microorganisms *except* bacterial endospores.

25. Which of the following are factors that affect disinfection and sterilization?
    1. Shape of the pathogen
    2. Number of organisms
    3. Resistance of the pathogen
    4. Strength of the germicide
    a. 2, 3, and 4
    b. 3 and 4
    c. 1 and 3
    d. 2 and 3

    ANS: A
    The shape of the organism does not make a difference in how disinfection and sterilization work. The number, location, and innate resistance of the microorganisms; the concentration and potency of the germicide; the duration of exposure; and the physical and chemical environment in which the germicide is used are all factors that affect disinfection and sterilization.

26. Which of the following are true about the amount of time required to kill microbes?
    1. Time decreases as the strength of the germicide decreases.
    2. Time is directly proportional to the number of pathogens.
    3. Time increases as the microbial population increases.
    4. Time varies with the resistance of the organism.
    a. 2, 3, and 4
    b. 3 and 4

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c. 1 and 3
d. 2 and 3

ANS: A
The number of pathogens and their resistance affect the amount of time it takes to kill microbes. Increased strength of a germicide will decrease the amount of time to kill the microbes.

27. After a ventilator is cleaned and ready for use, it should be stored in
a. the hallway near the freight elevators.
b. the back of the preparation area.
c. the back of the clean-up area.
d. a separate “clean room”.

ANS: D
A separate “clean room” is necessary so that dirty and clean equipment remain separate. Hallways, prep areas, and clean-up areas are not ideal places to store clean equipment.

28. In general, germicides are most effective in which of the following environments?
a. Lower acidity
b. Lower alkalinity
c. Lower temperatures
d. Higher temperatures

ANS: D
Higher temperatures increase the activity of most germicides. Higher alkalinity also improves the antimicrobial activity of some disinfectants. Lower temperatures and acidity do not improve the action of germicides.

29. Flash pasteurization exposes equipment to which of the following?
a. Water bath at 72°C for 15 minutes
b. Water bath at 63°C for 30 minutes
c. Moist heat at 72°C for 15 minutes
d. Moist heat at 72°C for 15 seconds

ANS: D
There are only two methods for pasteurization: the flash process and the batch process. The flash process requires moist heat at 72°C for 15 seconds, and the batch process requires a water bath at 63°C for 30 minutes.

30. Alcohols such as ethyl and isopropyl are unable to kill
a. fungi.
b. viruses.
c. bacteria.
d. bacterial spore.

ANS: D
Ethyl and isopropyl alcohols are bactericides, fungicides, and virucides, but they do not kill bacterial spores.

31. The ability of alcohols to act as an effective disinfectant decreases significantly when their concentration drops below

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a. 30%.
b. 50%.
c. 70%.
d. 90%.

ANS: B
Below 50% concentration, the ability of alcohols to disinfect decreases significantly.

32. The respiratory therapist is in a contact isolation room with a patient. The stethoscope for use with this patient is located within the patient's room. Which of the following is the most appropriate solution for disinfecting this stethoscope?
a. Acetic acid
b. Ethylene oxide
c. Glutaraldehyde
d. Isopropyl alcohol

ANS: D
Alcohols are used to disinfect rubber stoppers of multiple-use medication vials, oral and rectal thermometers, and stethoscopes.

33. A residue will remain on equipment exposed to
a. formaldehyde.
b. isopropyl alcohol.
c. hydrogen peroxide.
d. quaternary ammonium compounds.

ANS: A
Formaldehyde will leave a residue on equipment. The other agents listed in these choices will not.

34. Which of the following is the most common physical method of disinfection?
a. Quaternary ammonium compounds
b. Alcohols
c. Pasteurization
d. Autoclaving

ANS: C
Formaldehyde is a respiratory irritant. The other agents listed are not.

35. In batch pasteurization, equipment is placed in a water bath heated to ____ for 30 minutes.
a. 63°C
b. 72°C
c. 163°C
d. 175°C

ANS: A
Batch pasteurization requires the equipment to be exposed to a water bath at 63°C for 30 minutes. Flash pasteurization requires equipment to be exposed to moist heat at 72°C for 15 seconds.

36. Acid glutaraldehyde is tuberculocidal with a minimum exposure time of _____ minutes.
a. 10

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b. 20
c. 30
d. 40

ANS: B
Acid glutaraldehyde is bactericidal, fungicidal, and virucidal with a 10-minute exposure time. However, exposure time must be extended to 20 minutes for it to become tuberculocidal.

37. The statement "A disinfectant's potency increases as its concentration increases" is true for which of the following?
1. Phenols
2. Alcohols
3. Iodophors
4. Glutaraldehydes
a. 1 and 3
b. 2 and 4
c. 1, 2, and 4
d. 1, 3, and 4

ANS: C
Iodophors are the only exception to this statement.

38. During a home care visit, the respiratory therapist is instructing the patient and family member on the use of the patient's equipment. Which of the following household items should the respiratory therapist inform the patient to use to decontaminate the equipment?
a. Alcohol
b. Vinegar
c. Bleach
d. Lye

ANS: B
White household vinegar is used extensively as a method for decontaminating home care respiratory equipment. One part 5% white household vinegar and three parts water should be used. Bleach and lye are too dangerous for the patient to use and are respiratory irritants. Prolonged and repeated use of alcohol can cause swelling and hardening of rubber and plastic tubes.

39. The Centers for Disease Control and Prevention recommends that blood spills be cleaned with
a. ethanol.
b. peracetic acid.
c. sodium hypochlorite.
d. alkaline glutaraldehyde.

ANS: C
The Centers for Disease Control and Prevention recommends that a 1:10 dilution of sodium hypochlorite be used to clean blood spills.

40. A 1.25% solution of acetic acid has been shown to be an effective bactericidal agent against
a. *Staphylococcus aureus.*
b. *Pseudomonas aeruginosa.*
c. *Mycobacterium tuberculosis.*

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d. *Streptococcus pneumoniae.*

ANS: B
The optimum concentration of acetic acid is 1.25%, which is the equivalent of one part 5% white household vinegar and three parts water. It has been shown to be an effective bactericidal agent (particularly against P. aeruginosa), but its sporicidal and virucidal activity has not been documented.

41. Which of the following indicates the minimum time a tracheostomy inner cannula should be soaked in 3% hydrogen peroxide to be an effective disinfectant during a patient's tracheostomy care?
a. 1 minute
b. 5 minutes
c. 10 minutes
d. 15 minutes

ANS: C
Commercially available 3% solutions of hydrogen peroxide are effective disinfectants of bacteria (including *Mycobacteria* sp.), fungi, and viruses and are active within 10 minutes at room temperature. To be effective against spores, the solution would need to be at 50°C and the equipment would need to be soaked for at least 20 minutes.

42. Commercial-grade hydrogen peroxide is an effective disinfectant at room temperature after how many minutes?
a. 5
b. 10
c. 30
d. 60

ANS: B
Commercially available 3% solutions of hydrogen peroxide are effective disinfectants of bacteria (including *Mycobacteria* sp.), fungi, and viruses and are active within 10 minutes at room temperature.

43. At high altitudes, sterilization by boiling must be prolonged primarily because of which of the following?
a. Increased oxygen content
b. Reduced oxygen content
c. Increased normal boiling point
d. Reduced normal boiling point

ANS: D
Because water boils at a lower temperature at high altitudes, exposure time must be prolonged during this form of sterilization at high elevations.

44. Which of the following should routinely be used to ensure proper function and quality control of an autoclave?
1. Pressure-sensitive tape
2. Biologic indicators
3. Chemical indicators
4. Heat-sensitive tape

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a. 2 and 3
b. 2 and 4
c. 1, 2, and 3
d. 1, 2, and 4

ANS: B
Because the process of autoclaving depends on several factors, heat-sensitive tape and biologic indicators are routinely used to ensure quality control during the process. Heat-sensitive tape that is used for packaging materials for autoclaving changes color when it is exposed to a given temperature for a prescribed amount of time. The most common biologic indicators for autoclaving are strips of paper that are impregnated with *Bacillus stearothermophilus* spores. These strips should be used weekly (at a minimum) to ensure that the autoclave is working properly. Biologic indicators are also used for ethylene oxide sterilization.

45. According to the classification of infection-risk devices described by Spaulding, ventilator tubing is considered
a. critical.
b. noncritical.
c. semicritical.
d. highly critical.

ANS: C
Ventilator tubing comes in contact with intact mucous membranes and is considered semicritical. Critical items are those that are introduced into sterile tissue or the vascular system. Noncritical items come in contact with intact skin. Noncritical items include face masks, ventilators, stethoscopes, and blood pressure cuffs. Highly critical is not a descriptor that Spaulding used.

46. Which of these precautions must be followed in the treatment of a patient with an influenza infection?
1. Contact
2. Droplet
3. Airborne
4. Standard
a. 1 and 3
b. 2 and 4
c. 1, 2, and 4
d. 2, 3, and 4

ANS: B
Standard precautions need to be used for all patients. Droplet precautions are used for patients known or suspected to have serious illnesses transmitted by large-particle droplets. Influenza is a serious viral infection spread by droplet transmission. Contact isolation is used for patients known or suspected to have serious illnesses easily transmitted by direct patient contact or by contact with items in the patient's environment. Airborne precautions should be used for patients who are known or suspected to have illnesses transmitted by airborne droplet nuclei, such as measles, varicella, or TB.

47. Which of the following is the most important infection control procedure for anyone who has direct patient contact?

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a. Sterile latex gloves
b. Disposal of sharps
c. Hand hygiene
d. Face masks

ANS: C
Handwashing is the most important prevention strategy to protect health care workers from being infected through contact with infected patients. It also reduces the risk of health care workers transmitting infectious microorganisms from one patient to another or from a contaminated site to a clean site on the same patient. Sterile gloves are worn during invasive procedures. Disposal of sharps is important when any sharps (e.g., needles) are used. Face masks need to be worn when there is a possibility of blood or body fluid being splashed or sprayed, such as during an arterial blood gas stick.

48. In preparation for an arterial blood gas puncture on a noninfectious patient in the pulmonary laboratory, which of the following items of protective apparel should be used?
1. Gown
2. Gloves
3. Shoe covers
4. Eye protection
a. 1 and 2
b. 2 and 4
c. 2, 3, and 4
d. 1, 2, 3, and 4

ANS: B
The least amount of protective apparel that should be worn when drawing an arterial blood gas includes gloves and eye protection. In the case of a patient in isolation, a gown should be worn if there is a chance of splashing blood. Shoe covers are not necessary in areas outside of the operating rooms.

49. Which of the following is a commonly encountered Gram-negative, facultative anaerobic bacillus bacterium?
a. *Escherichia coli*
b. *Clostridium tetani*
c. *Neisseria meningitidis*
d. *Haemophilus parainfluenzae*

ANS: A
Escherichia coli are Gram-negative, rod-shaped facultative anaerobes. *Clostridium* are Gram-positive, rod-shaped anaerobes. *Neisseria meningitidis* are Gram-positive aerobes that occur in chains. *Haemophilus parainfluenzae* are Gram-negative, rod-shaped aerobes.

50. Which of the following viruses will cause bronchiolitis?
a. Influenza
b. Rhinovirus
c. Herpes zoster
d. Respiratory syncytial

ANS: D

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Respiratory syncytial virus causes bronchiolitis. Influenza virus can cause tracheobronchitis and pneumonia. Rhinovirus causes rhinitis and pharyngitis. Herpes zoster causes vesicles on ectodermal tissues.

51. Legionellosis is transmitted by which of the following mode?
    a. Mosquitoes
    b. Airborne dust
    c. Airborne aerosol
    d. Waterborne vehicle

    ANS: C
    The transmission mode for legionellosis is through airborne aerosols. Mosquitoes transmit malaria. Airborne dust transmits histoplasmosis. Water transmits shigellosis and cholera.

52. Opportunistic fungal infections are typically caused by which of the following?
    a. *Pneumocystis carinii*
    b. *Aspergillus fumigatus*
    c. *Histoplasma capsulatum*
    d. *Haemophilus haemolyticus*

    ANS: B
    Aspergillus fumigatus causes opportunistic fungal infections. *Pneumocystis carinii* is an opportunistic protozoan that causes pneumonia in immunocompromised patients. *Histoplasma capsulatum* can cause fungal infections in otherwise healthy individuals. *Haemophilus haemolyticus* is usually nonpathogenic, but on rare occasions it can cause subacute endocarditis.

53. Human immunodeficiency virus is transmitted by which of the following routes?
    a. Direct contact
    b. Droplet contact
    c. Indirect contact
    d. Airborne aerosol

    ANS: A
    Human immunodeficiency virus is transmitted by direct contact. TB and diphtheria are spread by droplet nuclei. Hepatitis B is spread by indirect contact. Legionellosis is spread by airborne aerosols.

54. Safe needle practice calls for which of the following?
    a. Needles should not be recapped.
    b. Recap the needle with two hands.
    c. Sterile glove are necessary when drawing blood.
    d. Dispose of the needle in a hazardous waste bag.

    ANS: A
    Needles should not be recapped. When it is necessary to recap a syringe, both hands should never be used; instead, use the one-hand “scoop” technique or a mechanical device to recap syringe needles safely. Gloves should always be worn when using a needle to draw blood. Needles must be disposed of in a biohazard sharps (i.e., hard plastic) container.

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55. Endotracheal intubation increases a patient's susceptibility to which of the following common pathogens?
    a. *Pneumocystis carinii*
    b. *Neisseria meningitidis*
    c. *Staphylococcus aureus*
    d. *Streptococcus pneumoniae*

    ANS: C
    Endotracheal intubation increases a patient's susceptibility to *Staphylococcus aureus,* as well as *Pseudomonas aeruginosa, Enterobacteriaceae* species, and *Candida*. *Pneumocystis carinii* is common in patients with acquired immunodeficiency syndrome. Patients with systemic lupus erythematosus, liver failure, or vasculitis are susceptible to *Neisseria meningitidis* and *Streptococcus pneumoniae*.

56. Patients undergoing corticosteroid therapy have an increased risk of nosocomial infection from which of the following common pathogens?
    a. *Candida albicans*
    b. *Enterobacteriaceae* sp.
    c. *Streptococcus pneumoniae*
    d. *Staphylococcus epidermidis*

    ANS: A
    Corticosteroid therapy disrupts the normal flora of the oral cavity, leaving the patient at risk for the development of *Candida albicans*, which is otherwise known as thrush.

57. An adult is brought to the emergency department with third-degree burns over 40% of his body. This patient now has an increased susceptibility to which of the following organisms?
    a. *Streptococcus pneumoniae*
    b. *Pseudomonas aeruginosa*
    c. *Candida albicans*
    d. *Clostridium difficile*

    ANS: B
    The skin and mucosal barrier have been disrupted by the burns; therefore, this patient is susceptible to *Pseudomonas aeruginosa*. *Pseudomonas aeruginosa* is one of several pathogens that can affect hospitalized patients. Patients with systemic lupus erythematosus, liver failure, or vasculitis are susceptible to *Streptococcus pneumoniae*. Oncochemotherapy and antibiotic therapy increase a patient's susceptibility to *Candida albicans* and *Clostridium difficile*.

58. A 65-year-old male is intubated and placed on a mechanical ventilator after a motor vehicle accident. Thirty-six hours later he develops infiltrates on the chest radiograph. Which of the following actions may have been able to prevent this from occurring?
    1. Elevation of the head of the bed 20 to 30 degrees
    2. Changing ventilator circuit every 24 hours
    3. Stress ulcer prophylaxis
    4. Avoid the use of sedatives.
    a. 1 and 2
    b. 1, 2, and 3
    c. 1, 3, and 4
    d. 3 and 4

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ANS: C
The information indicates that the patient has ventilator-associated pneumonia; ventilator-associated pneumonia must be suspected anytime intubation develops shortly after endotracheal intubation. There are many actions that can be taken to prevent its development. Current standards state that the ventilator circuit should be changed only when it is grossly contaminated.

59. A home care patient with COPD is being instructed on the use of a hand-held nebulizer. Which of the following would be the recommended method of disinfection for the nebulizer?
a. Alkaline glutaraldehyde
b. One part household vinegar and three parts water
c. Pasteurization
d. Autoclave

ANS: B
Acetic acid is the agent of choice to disinfect home care equipment due to its low cost and effectiveness. Alkaline glutaraldehyde requires a use of a hood for protection from fumes. Pasteurization and autoclave both require specialized equipment.

60. Which of the following conditions require the use of National Institute for Occupational Safety and Health (NIOSH)-approved respiratory protective devices?
1. *Pneumocystis jiroveci*
2. TB
3. Influenza
4. SARS-CoV-2
a. 1 only
b. 1 and 3
c. 1, 2, and 4
d. 2, 3, and 4

ANS: D
These conditions, TB, Influenza, and s SARS-CoV-2 are all associated with droplet nuclei and require the use of an N-95 respirator.

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