

Biomedical Sciences and Technology Exam Questions

1. A chemical agent used to inhibit the growth of microorganisms on skin and mucous membranes is a(n)
 - A. sporicide
 - B. disinfectant
 - C. antihistamine
 - D. antiseptic

Rationale: **D.** Antiseptics are chemical agents that are used to inhibit the growth of microorganisms on animate (live) objects. A sporicide kills bacteria and is capable of killing spores. A disinfectant kills microorganisms on inanimate objects. An antihistamine is a medication that inhibits histamine release by the body.

2. The process of destroying microorganisms on inanimate (nonliving) objects is
 - A. sanitation
 - B. sterilization
 - C. Disinfection
 - D. Decontamination

Rationale: **C.** Disinfections is the process of destroying microorganisms on inanimate (nonliving) objects except for spores. Sanitation is cleaning of an object. Sterilization destroys all microorganisms. Decontamination is the cleaning and disinfecting or sterilizing of items to render them safe.

3. The procedure for destroying pathogens at the end of the procedure is
 - A. surgical asepsis
 - B. surgical conscience
 - C. terminal sterilization
 - D. sterilization

Rationale: **C.** Terminal sterilization is the procedure for destroying pathogens at the end of the procedure to protect the healthcare worker from exposure to those pathogens. Surgical conscience is willingness to be held liable for each one's own actions in providing health care to the patient and not hesitating to admit a break in aseptic technique in order to prevent the patient from acquiring a surgical wound infection. Sterilization is the process by which all microorganisms and spores are destroyed.

4. The safest, most practical means for sterilizing heat- and moisture-stable items is
 - A. saturated steam under pressure
 - B. ethylene oxide gas
 - C. activated glutaraldehyde
 - D. boiling water

Rationale: **A.** Saturated steam under pressure is considered the safest, most practical method for sterilizing fabric, metal, and fluid – anything that is not damaged by heat or moisture. Ethylene

oxide (ETO or EO) gas sterilization uses flammable gas to sterilize heat- and moisture-sensitive items. It requires careful monitoring and proper aeration of items to prevent exposure to the carcinogenic gas. Activated glutaraldehyde is a solution used for sterilizing endoscopes, plastic, and rubber items; items must soak for 30 minutes to achieve high level disinfection and for 10 hours to achieve sterilization and be rinsed thoroughly with sterile water after soaking. Boiling water is not an effective and feasible sterilization method for the OR.

5. The minimal temperature required to kill bacterial spores is
- A. 212° F (100° C)
 - B. 250° F (121° C)
 - C. 270° F (132° C)
 - D. 32° F (0° C)

Rationale: **B.** The minimal temperature required to kill bacterial spores is 250° F (121° C)

6. The Bowie-Dick test must be run daily in which of the following types of sterilizers?
- A. Ethylene oxide (EO or ETO) gas
 - B. Hydrogen peroxide plasma
 - C. Peracetic acid
 - D. Prevacuum

Rationale: **D.** The Bowie-Dick test must be run daily in the prevacuum sterilizer to assure complete removal of air. Air and steam cannot occupy the same space at the same time, and sterilization cannot occur if air is present. ET/ETO gas sterilizers utilize *bacillus subtilis* in every load to ensure that sterilization has occurred and has no test to check for air removal. Peracetic acid (STERIS) uses a commercially prepared spore strip containing either *bacillus stearothermophilus* or *bacillus subtilis* daily to ensure sterilization and has no test to check for air removal.

7. Which of the following types of sterilizers would require a drying cycle?
- A. Peracetic acid
 - B. Gravity displacement
 - C. Ethylene oxide
 - D. Ionizing radiation

Rationale: **B.** A gravity displacement sterilizer would require a drying cycle, as there is no vacuum present for the rapid withdrawal of steam, and sterile items would be wet with steam. Peracetic acid (STERIS®) has no drying cycle. Ethylene oxide (EO/ETO) has a long aeration cycle and does not require drying as objects are sterilized by a gas. Ionizing radiation is done commercially and does not require a drying cycle.

8. Aeration is essential following sterilization by
- A. ionizing radiation
 - B. hydrogen peroxide plasma

- C. activated glutaraldehyde
- D. ethylene oxide gas

Rationale: **D.** Ethylene oxide is a toxic, carcinogenic, gas that requires removal (aeration) prior to use of articles sterilized by this method. Ionizing radiation, hydrogen peroxide plasma (Sterrad®), and activated glutaraldehyde do not require aeration

9. In the middle of the surgical procedure, a critical stainless steel instrument is contaminated and there is no sterile replacement. Which time setting would be selected for the flash autoclave?
- A. 3 minutes
 - B. 10 minutes
 - C. 15 minutes
 - D. 30 minutes

Rationale: **A.** Three (3) minutes is the time required to flash sterilize a small number of instruments at 270° F (132° C)

10. The most reliable means of monitoring the effectiveness of the sterilizer that ensures sterilization parameters have been met is
- A. biological
 - B. mechanical
 - C. chemical
 - D. none, monitoring is not required

Rationale: **A.** Biological monitors (spore tests) are the most reliable means of monitoring sterilizer effectiveness. Live agent-sensitive spores of nonpathogenic organisms are placed in a test pack, run through the proper cycle, and then tested for viability. *Bacillus stearothermophilus* spores are used to monitor the effectiveness of steam sterilizers and *bacillus subtilis* spores are used to monitor the effectiveness of ethylene oxide (EO or ETO) sterilizers. Both spores can be used to monitor the effectiveness of STERIS® or Sterrad®.

11. When packaging instruments for sterilization, instruments should be
- A. fully assembled
 - B. lubricated
 - C. placed in closely nested sections
 - D. left open and placed on a rack

Rationale: **D.** When instruments are packaged for sterilization, they must be left open and placed on a rack or “stringer” to ensure that they stay open so that the sterilant can reach all areas of the instruments

12. When storing sterile packs, you should place them
- A. in open cabinets near a vent
 - B. behind packs with older dates
 - C. on their sides

D. in areas of high humidity

Rationale: **B.** When sterile packs are stored, they should be placed behind packs with older dates (stock rotation), away from vents, and in closed cabinets

13. Items that contact sterile tissue and must be sterilized are considered
- A. critical
 - B. semicritical
 - C. noncritical
 - D. restricted

Rationale: **A.** Critical items are those which, if not properly sterilized, would present a high risk of infection (i.e., those used for dissection of tissue or any time the body's first line of defense is broken). Semicritical items come in contact with non intact skin or mucous membranes and require high-level disinfection (e.g., respiratory therapy and anesthesia equipment and GI endoscopes). Noncritical items come in contact with intact skin; intermediate or low-level disinfection is adequate (i.e., BP cuffs, furniture). Restricted is an AREA, not a classification.

14. When disinfecting instruments for use, you would do all the following except
- A. rinse immediately before putting in the germicide
 - B. clean to reduce bioburden
 - C. ensure that all surfaces are exposed to the germicidal agent
 - D. rinse thoroughly with sterile distilled water following contact with the germicide

Rationale: **A.** When instruments are disinfected for use, they should be clean to reduce the bioburden, be dry to avoid diluting the solution, have all surface areas exposed to the germicidal agent, and be rinsed thoroughly after removal from the germicide to ensure the removal of toxic residue before being used on a patient.

15. The disinfectant that should not be used on lensed instruments due to the potential for loosening the "cement" around the lens is
- A. glutaraldehyde
 - B. isopropyl alcohol
 - C. chlorine compound
 - D. phenolic compound

Rationale: **B.** The Lensed instruments must never be left to soak in isopropyl alcohol, as that could dissolve the "cement" holding the lens in place

16. Spillage of blood that occurs during surgery should be

- A. covered with an impervious drape
- B. sectioned off from traffic
- C. cleaned up at the end of the procedure
- D. cleaned up immediately

Rationale: **D.** Spillage of blood or body fluids that occurs during surgery should be cleaned up immediately by the circulator wearing proper protection and using a high-powered germicidal agent. This is referred to as concurrent disinfection

17. The purpose of keeping doors to the OR closed is to
- A. decrease noise level
 - B. maintain negative pressure
 - C. maintain positive pressure
 - D. maintain proper room temperature

Rationale: **C.** Doors to the OR should remain closed to maintain positive air pressure. Filtered air enters from above the OR table and exits through a vent near the floor, forcing dirty air out

18. The purpose of washing hands prior to the surgical scrub is to
- A. render them sterile
 - B. remove gross soil and transient microorganisms
 - C. protect personnel from contracting disease from the patient
 - D. remove resident microorganisms

Rationale: **B.** Gross soil and transient organisms are removed by washing the hands prior to the surgical scrub. When performed properly, the surgical scrub renders the hands surgically clean

19. When draping a sterile field, the scrubbed person would do all the following except
- A. drape from the periphery to the operative site
 - B. protect the gloved hand with a cuff
 - C. drape the patient and all furniture and equipment to be included in the sterile field
 - D. hold drapes in a compact position above the waist level

Rationale: **A.** When draping sterile fields, the scrubbed person always protects the gloved hands with a cuff, holds the drapes in a compact position above the waist level to avoid contamination (by drapes falling below the table level), and drapes all furniture and equipment to be included in the sterile field (from the nearest to farthest away to avoid inadvertent contamination). When the patient is draped, the drapes are first placed at the operative site and then extended outward toward the periphery.

20. When dispensing sterile items to a sterile field, the circulator would
- A. open the far side of the package last

- B. stand as close to the sterile field as possible
- C. ensure that wrapper tails are properly secured
- D. recap the remaining portion of the sterile saline for dispensing later during the procedure

Rationale: **C.** When dispensing sterile items, the circulator would stand at least one (1) foot from the sterile field, open the far side of the package first to avoid reaching over the sterile contents, and secure the wrapper tails to prevent the unsterile wrapper edges from touching sterile areas. Sterile solution bottles are not to be recapped for later use because of possible inadvertent contamination while opening, pouring, and recapping the bottle.

21. The scrub has completed the sterile setup when notified that the surgeon will be 30 minutes late. He or she would
- A. remain with the sterile field until further notified
 - B. cover the sterile items and take a break
 - C. break scrub and get directions from the supervisor
 - D. find a comfortable stool and wait for further instruction

Rationale: **A.** Sterile tables are not to be covered because of the difficulty in uncovering them without contamination. To break scrub for further instruction would not be cost-effective. Once prepared, sterile fields cannot be left unguarded. Sitting on stools is not recommended as gown areas below table levels are considered contaminated and the hands should not rest in the “lap.”

22. Bioburden refers to
- A. an agent that kills microorganisms on inanimate objects
 - B. the process of destroying all microorganisms, including spores
 - C. inhibition of microbial growth
 - D. sanitation

Rationale: **D.** Bioburden refers to the degree of microbial contamination on an object; a disinfectant is an agent that kills microorganisms on inanimate objects; sterilization is the process of destroying all microorganisms (including spores); bacteriostasis is the inhibition of bacterial growth.

23. Procedures performed at the end of a surgical case to protect the health care worker who will be handling the surgical instruments in the sterile processing department (SPD) are known as
- A. terminal disinfection and sterilization
 - B. surgical conscience
 - C. strike-through contamination
 - D. sanitation

Rationale: **A.** Terminal disinfection and sterilization are the procedures performed after the surgical procedure to protect the health care worker in the sterile processing department (SPD) who will

handle the surgical instruments (this includes placing all instruments used during the case in the washer sterilizer).

24. Which of the following is not an acceptable method of transporting contaminated instruments down the hall from a surgical procedure?
- in a closed case cart
 - covered in a plastic bag
 - in an open-mesh bottom tray
 - any of the above are acceptable methods

Rationale: C. Instruments should be covered for safe transport to the decontamination area and not in an open tray

25. If the temperature on the steam sterilizer reads 270°, what should the pressure reading be?
- 15 to 17 psi
 - 20 to 25 psi
 - 27 psi
 - 30 to 35 psi

Rationale: C. The addition of 27 pounds per square inch (psi) is required to raise the temperature in the chamber to 270° F; 15 to 17 psi is required to raise the temperature to 250° F.

SURGICAL SCHEDULE:

Rm.#	Time	Surgeon	Procedure	Anest.	Rm.#	Time	Surgeon	Procedure	Anest.
Rm00					Rm07				
OC		Dr.Z	Rt Knee Arthroscopy	Gen	7:00	Dr.M	Rhinoplasty		Gen
OC		Dr.C	Craniotomy	Gen					
OC		Dr.Z	Angioplasty	Gen	TF	Dr. M	Lipoma Removal		MAC
Rm01					Rm08				
7:00		DrX	Lobectomy	Gen	11:00	Dr.E	Bovine Thrombecomy		MAC
TF		DrX	Thoracotomy	Gen					
TF		DrX	Tracheostomy	Gen					
Rm02					Rm09				
7:00		DrB	Splenectomy	Gen	8:30	Dr.T	Cholecystectomy		Gen
TF		DrB	Gastrectomy	Gen	TF		Palatoplasty		Gen
Rm03					Rm10				
7:00		Dr.A	Cystoscopy	MAC	7:00	Dr.K	Nephrectomy		Gen
TF		DrA	Cystoplasty	Gen	TF	Dr.K	Choledocholithotripsy		Gen
TF		DrF	Pyelogram	MAC	TF	Dr.K	Hepatic Resection		Gen
TF		DrF	Cystocele repair	Gen					

Rm04	7:00 Dr.Y	Carpal Tunnel	MAC	Rm11	7:00 Dr.L	Cervical Cone Biopsy	Gen
	TF Dr.Y	Fasciotomy	Gen		TF Dr.L	Mastectomy	Gen
Rm05	7:00 Dr.G	Trans-sphenoidal Adenoidectomy	Gen	Rm12	7:00 Dr.W	Transmetatarsal amputation	Gen
	TF Dr.G	Transurethral resection of the prostate	Gen		TF Dr.W	Osteotomy	Gen
	TF Dr.G	Blepharoplasty	Gen		TF Dr.W	Rt Knee Arthroplasty	Gen
Rm06	7:00 Dr.R	Lumbar laminectomy	Gen	Rm13	7:00 Dr.O	Hysterectomy	Gen

The following questions should be answered using the surgery schedule above

26. An implant for use in the knee arthroscopy needed to be processed. What indicator should be used to ensure that there are no living microbes or spores on this?
- Chemical indicator
 - Bowie dick
 - Biologic indicator
 - Julian date

C. Rationale: The only way to ensure sterility is the use of biologic indicators. The result of this test should be known before an implant is inserted. The use of other monitors will guarantee that the sterilizer has reached the appropriate temperature, humidity, or length of time. This cannot, however, ensure that the item is sterile. It is only through the use of biologic indicators that sterility is confirmed.

27. The splenectomy in Room 2 became more complicated than expected. Many of the instruments in the case have significant bioburden. How should this be handled?
- Instruments should be placed directly into the ultrasonic cleaner to remove bioburden
 - Instruments should be run through the washer sterilizer and then hand washed
 - Instruments should be disassembled and washed, then placed in the washer sterilizer
 - Instruments should be rinsed with saline, then run through the washer sterilizer

C. Rationale: Instruments with a lot of bioburden must be washed manually before they are processed through the washer sterilizer. Generally, the ST will rinse instruments in sterile water throughout the procedure to reduce the amount of bioburden dried onto the surfaces. However, occasionally, this cannot be done. When the instruments are being prepared for processing, it may be necessary for them to be cleaned manually. STs should never use saline to wash instruments as this may pit the surface.

28. The Surgical Technologist in Room 5 is in a hurry and needs an instrument that is peel packed and stored in the instrument room. When she obtains the instrument, the expiration date shows that the package needs to be reprocessed. What should she do?
- Repackage the item and set it aside for reprocessing
 - Unpackage the instrument and use the flash sterilizer
 - Use the instrument if the integrity of the package is intact

D. Wrap the instrument and use the flash sterilizer

B. Rationale: If the instrument is needed immediately, the ST will not have the time to have the instrument reprocessed. The use of flash sterilization should only be utilized when other options are not viable. If flash is used, the instrument should be unwrapped and placed in a special pan or a closed flash sterilization tray.

29. When the splenectomy experienced complications, there was blood spilled on the OR floor. The circulating nurse needed to decontaminate the area. What type of agent would most likely be used?
- A. Bleach
 - B. Glutaraldehyde
 - C. Sterile water
 - D. Hospital Grade Disinfectant

D. Rationale: While several of these are commonly used disinfectants, the most commonly used type of disinfectants used during surgery to clean spills are Phenolic compounds or quats, depending on the hospital. While chlorine bleaches are sometimes used for this purpose, their use is discouraged due to the possibility of damage to certain equipment, as well as its corrosive effects. Glutaraldehyde is not routinely used in cleaning of floors or surfaces, and sterile water has no germicidal properties.

30. The scrub scheduled to assist in the Cystoscopies in Room 3 has retrieved an item from the Cidex solution. This item has a lumen. What precautions does the scrub need to take?
- A. The item needs to be flushed and rinsed well with sterile 0.5% alcohol solution
 - B. The item needs to be rinsed and the lumen flushed with sterile water
 - C. The item is safe for patient use after aeration has occurred
 - D. The item must be reprocessed in STERIS solution before use

B. Rationale: Instruments processed with Cidex must be rinsed with sterile water before use as the chemical is toxic to tissues. This rinse must also include a flushing of any lumens to ensure that the chemical residue has been removed. This is done with sterile distilled water prior to the use of the object.

31. The same item must be reprocessed after use. What does the scrub need to remember?
- A. The item should be damp, with water in the lumen before being processed
 - B. The item should be cleaned and dried before placing in solution
 - C. The item must be processed in a closed unventilated room
 - D. The solution can be used indefinitely

B. Rationale: Items processed in Cidex must be clean and dry before processing. Any moisture may dilute the solution, causing it to be ineffective. Gross bioburden should always be removed before processing any instrument or equipment. Glutaraldehyde must be used in a well ventilated area, and the expiration date should always be checked before use.

32. The scrub tech in Room 11 will need to process an item using Sterrad. How long will this process take?
- A. One hour
 - B. 20–30 minutes
 - C. 10 hours
 - D. 16 hours

Rationale: The actual processing time for Sterrad is one hour. There is no aeration time needed for items processed with Sterrad.

33. The Surgical Technologist in Room 11 has set up the scope when the surgery is postponed. The scope has been processed with STERIS. What is important for the ST to remember?
- The item processed with STERIS cannot be stored
 - The item processed with STERIS must be placed into a rigid container for storage until surgery is rescheduled
 - The item processed with STERIS must be peel packed for storage
 - The item processed with STERIS must be wrapped in muslin for safe storage

A. Rationale: Items processed with STERIS cannot be stored. They are processed for immediate use. Therefore, the ST will need to reprocess the item.

34. The ST who scrubbed in the On Call arthroscopy needs to process the instruments after the surgery. There are several instruments that have multiple parts. How should this be handled?
- The instruments should remain assembled throughout the process
 - The parts should be disassembled, washed by hand and reassembled for processing
 - The parts should be disassembled and processed
 - The parts should be separated into multiple trays for processing

C. Rationale: Instruments and items with pieces that are detachable should be disassembled before the processing begins. All of the items should be kept together while they are being processed, to avoid losing pieces.

35. The Surgical Technologist in Room 4 is finished with cases, and is helping the turn over team process rooms. What must he remember when helping this team?
- It is not necessary to wipe down the surgical table after every surgery, new linen, however, must be placed on the table.
 - You must use a clean mop-head for each room
 - ORs are terminally cleaned every other day
 - OR tables should not be moved during the cleaning process

B. Rational: Mop heads should be changed to new for every room. Tables should be wiped down after every case, and tables should be moved, and rolled through a disinfectant. Terminal cleaning will be performed daily with a rotation schedule for deeper cleaning of walls, vents, ceilings, and other areas.