

Lesson 1-1: Introduction to the Clinical Laboratory

TRUE/FALSE

1. A laboratory that performs chemical and microscopic tests on blood, other body fluids, and tissues is called a clinical laboratory.

ANS: T PTS: 1

2. In 2005 more than 189,000 clinical laboratories were listed with Department of Health and Human Service (DHHS) as providing services to humans in the United States.

ANS: T PTS: 1

3. Clinical laboratories are found only in university teaching hospitals.

ANS: F PTS: 1

4. Epidemiology is an important function of the Centers for Disease Control and Prevention (CDC).

ANS: T PTS: 1

5. A phlebotomist is a health care worker trained in blood collection.

ANS: T PTS: 1

MULTIPLE CHOICE

1. An international, nonprofit organization that establishes standards of best current practice for clinical laboratories is:
- a. Centers for Disease Control and Prevention (CDC)
 - b. Commission on Office Laboratory Accreditation (COLA)
 - c. Clinical Laboratory Standards Institute (CLSI)
 - d. the Joint Commission

ANS: C PTS: 1

2. The branch of biology dealing with microbes is called:
- a. virology
 - b. mycology
 - c. microbiology
 - d. epidemiology

ANS: C PTS: 1

3. The governmental agency that oversees public health care matters in the United States is:
- a. Centers for Disease Control and Prevention (CDC)
 - b. Department of Health and Human Services (DHHS)
 - c. Food and Drug Administration (FDA)
 - d. Clinical and Laboratory Standards Institute (CLSI)

ANS: B PTS: 1

4. The division of Department of Health and Human Services (DHHS) responsible for protecting public health by ensuring the safety and efficacy of foods, drugs, biological products, medical devices, and cosmetics is:
- Health Insurance Portability and Accountability Act (HIPAA)
 - the Joint Commission
 - Food and Drug Administration (FDA)
 - Clinical and Laboratory Standards Institute (CLSI)

ANS: C PTS: 1

5. The agency within Department of Health and Human Services (DHHS) responsible for implementing CLIA '88 is:
- Clinical and Laboratory Standards Institute (CLSI)
 - Commission on Office Laboratory Accreditation (COLA)
 - Centers for Medicare & Medicaid Services (CMS)
 - Health Insurance Portability and Accountability Act (HIPAA)

ANS: C PTS: 1

COMPLETION

1. The study of human blood groups is called _____.

ANS:
immunohematology
blood banking

PTS: 1

2. The central laboratory for the national public health system is the _____.

ANS:
CDC
Centers for Disease Control and Prevention

PTS: 1

3. A health care worker trained in blood collection is a(n) _____.

ANS: phlebotomist

PTS: 1

4. The liquid portion of the blood in which the blood cells are suspended is called _____.

ANS: plasma

PTS: 1

5. The liquid obtained from blood that has been allowed to clot is called _____.

ANS: serum

PTS: 1

6. A physician specially trained in the nature and cause of disease is a(n) _____.

ANS: pathologist

PTS: 1

7. Mycology is the study of _____.

ANS: fungi

PTS: 1

8. Performing testing near the patient rather than in the traditional laboratory setting is called _____ testing.

ANS:
point-of-care
point of care
POC
near-patient
alternate site

PTS: 1

9. The person who is responsible for the day-to-day operation of a laboratory and works directly under the authority of the laboratory director is the _____.

ANS:
technical supervisor
chief technologist
laboratory manager

PTS: 1

10. Programs in which laboratories are sent blind samples that are analyzed, reported, and compared to the results from other laboratories are called _____ programs.

ANS:
proficiency testing
PT

PTS: 1

11. The Health Insurance Portability and Accountability Act of 1996 protects _____.

ANS:
personal health information
patient privacy
patient health information

PTS: 1

12. The voluntary process by which an independent agency grants recognition to entities that meet or exceed established standards of quality is _____.

ANS: accreditation

PTS: 1

MATCHING

Choose the best match for each item. Use an answer only once.

- a. CLIA '88
 - b. the Joint Commission
 - c. accreditation
 - d. COLA
 - e. pathologist
 - f. accessioning
 - g. CLSI (formerly NCCLS)
 - h. CDC
 - i. epidemiology
 - j. CMS
-
- 1. central laboratory for the national public health system
 - 2. voluntary process to obtain recognition for institutions meeting certain standards
 - 3. agency within DHHS responsible for implementing CLIA '88
 - 4. federal act that specifies minimum performance standards for clinical labs
 - 5. process by which specimens are logged in and assigned an ID code
 - 6. agency that offers accreditation to physician office laboratories
 - 7. study of factors that determine disease frequency
 - 8. independent agency that accredits hospitals and large health care facilities
 - 9. international, nonprofit organization that establishes standards of best current practice for laboratories
 - 10. physician specially trained in the nature and cause of disease

- | | |
|------------|--------|
| 1. ANS: H | PTS: 1 |
| 2. ANS: C | PTS: 1 |
| 3. ANS: J | PTS: 1 |
| 4. ANS: A | PTS: 1 |
| 5. ANS: F | PTS: 1 |
| 6. ANS: D | PTS: 1 |
| 7. ANS: I | PTS: 1 |
| 8. ANS: B | PTS: 1 |
| 9. ANS: G | PTS: 1 |
| 10. ANS: E | PTS: 1 |

Lesson 1-2: The Clinical Laboratory Professional

TRUE/FALSE

1. Laboratory testing has become increasingly sophisticated.
ANS: T PTS: 1
2. The term *clinical laboratory science* largely replaced medical technology for several years.
ANS: T PTS: 1
3. The field of medical technology began 50 years ago.
ANS: F PTS: 1
4. Early laboratories were staffed mostly by doctors.
ANS: T PTS: 1
5. Clinical laboratory personnel work as “medical detectives.”
ANS: T PTS: 1
6. As long as health care workers are competent, their manner of dress at work does not matter.
ANS: F PTS: 1

MULTIPLE CHOICE

1. The professional society and credentialing agency for medical assistants is the:
 - a. American Medical Technologists (AMT)
 - b. American Society for Clinical Laboratory Science (ASCLS)
 - c. American Association of Medical Assistants (AAMA)
 - d. American Society for Clinical Pathology (ASCP)ANS: C PTS: 1
2. One agency that accredits educational programs for clinical laboratory personnel is the:
 - a. North Central Association (NCA)
 - b. American Society for Clinical Laboratory Science (ASCLS)
 - c. National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
 - d. American Society for Clinical Pathology (ASCP)ANS: C PTS: 1
3. One professional society and credentialing agency for phlebotomists is the:
 - a. American Society of Phlebotomy Technicians (ASPT)
 - b. American Society for Clinical Laboratory Science (ASCLS)
 - c. American Society for Clinical Pathology (ASCP)
 - d. North Central AssociationANS: A PTS: 1

4. All of the following are current trends in health care EXCEPT:
- a. emphasis on wellness
 - b. longer hospital stays
 - c. geriatric medicine
 - d. home health care

ANS: B PTS: 1

5. Medical assistants have been trained in:
- a. administrative skills
 - b. nursing skills
 - c. laboratory skills
 - d. all of the above

ANS: D PTS: 1

COMPLETION

1. The Privacy Rule that describes the patient's rights to privacy developed from _____.

ANS:
HIPAA
Health Insurance Portability and Accountability Act

PTS: 1

2. The health profession concerned with performing laboratory analyses is _____.

ANS:
clinical laboratory science
medical technology

PTS: 1

3. A 1996 act of Congress that includes a guarantee of protection of privacy of an individual's health information is _____.

ANS:
HIPAA
Health Insurance Portability and Accountability Act

PTS: 1

4. The ASPT is a professional and credentialing agency for _____.

ANS: phlebotomists

PTS: 1

5. The AAMA is a professional society and credentialing agency for _____.

ANS: medical assistants

PTS: 1

6. Risk of patient information being improperly accessed has increased due to the use of _____ for storing patient records.

ANS:
computers
electronic medical records
EMRs

PTS: 1

7. Educational programs for laboratory personnel consist of an academic component and a _____ component.

ANS:
clinical
practical

PTS: 1

8. Personnel qualifications for clinical laboratory workers are defined by _____ and are based on the job functions of the position.

ANS:
CLIA '88
Clinical Laboratory Improvement Amendments of 1988

PTS: 1

9. To become a certified laboratory professional, one must complete an approved course of study and successfully complete a national _____.

ANS:
examination
exam
test

PTS: 1

MATCHING

Choose the best match for each item. Use an example only once.

- a. medical technology
 - b. new trends in the health care fields
 - c. micro- and nano-technology
 - d. laboratory instruments
 - e. AAMA
 - f. clinical laboratory science
 - g. CAAHEP, accrediting agency for educational programs for clinical laboratory personnel
 - h. ethics
 - i. clinical laboratory personnel
 - j. MLT or CLT
1. commission on Accreditation of Allied Health Education Programs

2. accrediting agency and professional society for medical assistants
3. 2 years of specific training and successful completion of the national certifying exam
4. the profession concerned with performing laboratory analyses
5. medical detectives
6. system of conduct or behavior
7. the field of medical laboratory technology
8. micro- and nano-technology components
9. geriatric medicine and home health care
10. technology that allows rapid testing and portable testing

- | | |
|------------|--------|
| 1. ANS: G | PTS: 1 |
| 2. ANS: E | PTS: 1 |
| 3. ANS: J | PTS: 1 |
| 4. ANS: A | PTS: 1 |
| 5. ANS: I | PTS: 1 |
| 6. ANS: H | PTS: 1 |
| 7. ANS: F | PTS: 1 |
| 8. ANS: D | PTS: 1 |
| 9. ANS: B | PTS: 1 |
| 10. ANS: C | PTS: 1 |

- a. mm
- b. μm
- c. mmol
- d. mEq

ANS: C PTS: 1

5. Which of the following is true of the prefix *mal* in the term *malpractice*?
- a. It is a suffix.
 - b. It refers to “middle.”
 - c. It refers to “bad.”
 - d. It is the stem word.

ANS: C PTS: 1

6. The prefix *peri-* is defined as:
- a. around
 - b. many
 - c. beside
 - d. through

ANS: A PTS: 1

7. The prefix that means under is:
- a. retro-
 - b. sub-
 - c. supra-
 - d. syn-

ANS: B PTS: 1

8. The stem that means skin is:
- a. cyto-
 - b. cut-
 - c. caud-
 - d. cyan-

ANS: B PTS: 1

9. The meaning of the suffix *-itis* is:
- a. state or condition
 - b. process
 - c. small
 - d. inflammation

ANS: D PTS: 1

10. The meaning of the suffix *-opathy* is:
- a. state or condition
 - b. disease
 - c. cut into
 - d. create an opening

ANS: B PTS: 1

11. The suffix meaning tumor is:
- a. -oma
 - b. -oid
 - c. -osis
 - d. -(o)logy

ANS: A PTS: 1

12. The abbreviation for *oral glucose tolerance test* is:
- a. OGGT
 - b. OGC
 - c. OGTT
 - d. OGTO

ANS: C PTS: 1

13. *Coronary care unit* is abbreviated as:
- a. CGL
 - b. CUU
 - c. CC
 - d. CCU

ANS: D PTS: 1

14. *Fever of unknown origin* is abbreviated by using the letters:

- a. FO
- b. FBS
- c. FUO
- d. FU

ANS: C PTS: 1

15. The abbreviation *FBS* is commonly used for:

- a. fever of unknown origin
- b. fasting blood sugar
- c. fibrinogen degradation products
- d. first blood sugar

ANS: B PTS: 1

COMPLETION

1. The combination of the first letters, syllables, or group of words to form a new group of letters that can be pronounced as a word is called a(n) _____.

ANS: acronym

PTS: 1

2. *Diff* is the abbreviation for _____.

ANS:
differential
differential count
white blood cell differential count

PTS: 1

3. *Staph* is the abbreviation for _____.

ANS: staphylococcus

PTS: 1

4. The stem word *morph* means _____.

ANS:
shape
form

PTS: 1

5. The stem word *card* refers to the _____.

ANS: heart

PTS: 1

6. The suffix *-ostomy* means to _____.

ANS: cut into

PTS: 1

7. The abbreviation for *cerebrospinal fluid* is _____.

ANS: CSF

PTS: 1

8. *Hct* is the abbreviation used for _____.

ANS: hematocrit

PTS: 1

Lesson 1-4: Biological Safety

TRUE/FALSE

1. In 1991 Occupational Safety and Health Administration (OSHA) issued the Bloodborne Pathogen Standard with the primary purpose of reducing or eliminating occupational exposure to HIV, HCV, and HBV.

ANS: T PTS: 1

2. An aerosol is a liquid in the form of a very fine mist.

ANS: T PTS: 1

3. A special cabinet that provides protection while working with infectious microorganisms is called a fume hood.

ANS: F PTS: 1

4. Hepatitis B virus can be transmitted by contact with infected blood or other body fluids.

ANS: T PTS: 1

5. A disinfectant is used to kill or inactivate microbes on the skin.

ANS: F PTS: 1

6. Universal Precautions are more comprehensive than Standard Precautions.

ANS: F PTS: 1

7. Under Standard Precautions, protective barriers must be used to protect eyes and mucous membranes.

ANS: T PTS: 1

8. Hands should be washed before donning gloves and after removal of gloves.

ANS: T PTS: 1

COMPLETION

1. The digestive tube from the mouth to the anus is called the _____.

ANS: alimentary tract

PTS: 1

2. A special work cabinet that provides protection while working with infectious materials is a(n) _____.

ANS:
biological safety cabinet

safety cabinet

PTS: 1

3. A very fine mist that forms when a liquid is spilled or poured is called a(n) _____.

ANS: aerosol

PTS: 1

4. A chemical used on living tissue to inhibit the growth of microbes is called a(n) _____.

ANS: antiseptic

PTS: 1

5. A risk or hazard to health or the environment from biological agents is a(n) _____.

ANS:
biohazard
biological hazard

PTS: 1

6. A situation, such as a needlestick, in which an individual is exposed to possible infection through contact with body substances from another individual is a(n) _____ incident.

ANS: exposure

PTS: 1

7. The use of available technology and equipment to protect workers from hazards is _____.

ANS:
engineering
engineering controls

PTS: 1

8. The abbreviation used for other potentially infectious materials is _____.

ANS: OPIM

PTS: 1

9. The responsibility for identifying employees at risk of exposure to blood or OPIM lies with the _____.

ANS: employer

PTS: 1

MATCHING

Select the best match for each item. Use an answer only once.

- | | |
|---------------------------------|-----------------------------------|
| a. isolation | f. sterilization |
| b. pathogenic | g. Transmission Based Precautions |
| c. human immunodeficiency virus | h. CLIA '88 |
| d. Universal Precautions | i. Standard Precautions |
| e. nosocomial | j. HCV |

1. virus that causes hepatitis C
2. capable of causing damage or injury to the host
3. hospital-acquired infection
4. retrovirus that has been identified as the cause of AIDS
5. method of preventing the spread of disease by separating a person with a contagious or infectious disease from the healthy population
6. set of comprehensive safety guidelines designed to protect patients and health care workers
7. killing or inactivation of living organisms and viruses
8. specific safety practices used in addition to Standard Precautions
9. 1988 act of U.S. Congress
10. limited to only blood and body fluids visibly contaminated with blood

- | | |
|------------|--------|
| 1. ANS: J | PTS: 1 |
| 2. ANS: B | PTS: 1 |
| 3. ANS: E | PTS: 1 |
| 4. ANS: C | PTS: 1 |
| 5. ANS: A | PTS: 1 |
| 6. ANS: I | PTS: 1 |
| 7. ANS: F | PTS: 1 |
| 8. ANS: G | PTS: 1 |
| 9. ANS: H | PTS: 1 |
| 10. ANS: D | PTS: 1 |

Lesson 1-5: Chemical, Fire, and Electrical Safety

TRUE/FALSE

1. Technicians can wear to work whatever jewelry that suits their mood that day.

ANS: F PTS: 1

2. If a worker is careful, it is not necessary to wear a mask and gloves when weighing caustic chemicals.

ANS: F PTS: 1

3. If the instrument cord is out of sight, it does not matter if it is frayed.

ANS: F PTS: 1

4. OSHA is the federal agency that creates workplace safety regulations.

ANS: T PTS: 1

5. The National Institute for Occupational Safety and Health (NIOSH) is involved in overseeing clinical laboratory operations and enforcing safety regulations.

ANS: F PTS: 1

MULTIPLE CHOICE

1. All of the following are appropriate safety measures to incorporate into laboratory procedures EXCEPT:

- a. Select procedures that minimize the use of hazardous chemicals.
- b. Select procedures that reduce the volume of chemicals that require special disposal.
- c. Label all chemicals with hazard information.
- d. Store chemicals in alphabetical order so they can be easily found.

ANS: D PTS: 1

2. Which of the following is true of nitrile gloves?

- a. They may cause allergenic reactions.
- b. They are not resistant to most chemicals.
- c. They are not suitable for routine laboratory work.
- d. They are a good substitute for latex gloves.

ANS: D PTS: 1

3. Which of the following is NOT an appropriate work practice control or exposure control method for working with strong acids?

- a. Wear a chemical-resistant apron.
- b. Wear acid-resistant gloves.
- c. Use a chemical fume hood.
- d. Wear latex gloves.
- e. Wear eye protection.

ANS: D PTS: 1

4. When performing laboratory work, all of the following are true concerning handwashing EXCEPT:

- a. Wash hands after any laboratory procedure.
- b. Hand antiseptic is not needed if gloves were worn.
- c. Wash hands before beginning a procedure.
- d. Wash hands after removing gloves.

ANS: B PTS: 1

5. Which of the following is a safety rule in the laboratory?
 - a. Wear safety goggles when working with strong chemicals.
 - b. Wipe up spills once at the end of each shift.
 - c. Leave the instrument on when performing repairs.
 - d. Sandals are permitted as long as hose or socks are also worn.

ANS: A PTS: 1

COMPLETION

1. The color red on a National Fire Protection Association (NFPA) chemical label indicates _____.

ANS:
fire hazard
flammability
flammable

PTS: 1

2. The National Fire Protection Association (NFPA) uses the number 4 to indicate _____.

ANS:
highest hazard level for that category
high hazard

PTS: 1

3. If a chemical produces harmful fumes, it should be used only in a(n) _____.

ANS:
fume hood
chemical hood

PTS: 1

4. Mercury is classified as a heavy _____.

ANS: metal

PTS: 1

5. Workers must complete special radiation training before working with _____.

ANS:
radioisotopes

radiation
radioactive materials

PTS: 1

MATCHING

Choose the best match for each item. Use an answer only once.

- a. chemical hygiene plan
 - b. centrifuge
 - c. Occupational Safety and Health Administration (OSHA)
 - d. SOP
 - e. MSDS
 - f. caustic
 - g. carcinogen
 - h. National Institute for Occupational Safety and Health (NIOSH)
 - i. autoclave
 - j. Occupational Safety and Health Act
-
- 1. pressurized steam for sterilization
 - 2. high-speed rotation in a closed chamber
 - 3. substance with the potential to produce cancer in humans or animals
 - 4. written information that must be supplied by manufacturers of chemicals and hazardous materials
 - 5. federal agency that monitors the Occupational Safety and Health Act
 - 6. agency involved in safety research
 - 7. chemical substance having the ability to burn or destroy tissue
 - 8. comprehensive written safety plan detailing the proper use and storage of hazardous chemicals in the workplace
 - 9. act that states that workers have the right to know about hazardous conditions in the workplace
 - 10. standard operating procedures
-
- 1. ANS: I PTS: 1
 - 2. ANS: B PTS: 1
 - 3. ANS: G PTS: 1
 - 4. ANS: E PTS: 1
 - 5. ANS: C PTS: 1
 - 6. ANS: H PTS: 1
 - 7. ANS: F PTS: 1
 - 8. ANS: A PTS: 1
 - 9. ANS: J PTS: 1
 - 10. ANS: D PTS: 1

Lesson 1-6: General Laboratory Equipment

MULTIPLE CHOICE

1. Which laboratory containers can be used to make critical measurements?
- a. bottles
 - b. beakers
 - c. volumetric flasks
 - d. Erlenmeyer flasks

ANS: C PTS: 1

2. All of the following are true of pipets EXCEPT:
- a. Micropipets measure and deliver in μL .
 - b. A TD pipet empties by gravity.
 - c. A TD pipet must be rinsed to ensure the correct volume is delivered.
 - d. Volumetric pipets are usually labeled "TD."

ANS: C PTS: 1

3. Which statement is true of micropipets?
- a. Some have preset volumes.
 - b. Some are adjustable in a narrow range.
 - c. A one-use disposable plastic tip is used for each sampling.
 - d. all of the above

ANS: D PTS: 1

4. Graduated cylinders:
- a. are made only of plastic
 - b. are used by reading volume at meniscus
 - c. have a flared neck
 - d. range in size from 5–50 mL

ANS: B PTS: 1

5. A liquid in which substances can be dissolved is a:
- a. solvent
 - b. solution
 - c. solute
 - d. none of the above

ANS: A PTS: 1

6. A noncritical measurement can be:
- a. made using a volumetric pipet
 - b. made using an Erlenmeyer flask
 - c. used when making a standard
 - d. made using a volumetric flask

ANS: B PTS: 1

7. The plastic that can be heat sterilized is:
- a. Pyrex
 - b. polypropylene
 - c. polystyrene
 - d. polyethylene
 - e. none of the above

ANS: B PTS: 1

8. Glassware with chips or cracks:
- a. should be discarded

- b. should be used only for noncritical measurements
- c. is not a safety hazard
- d. can be repaired with Super Glue

ANS: A PTS: 1

9. Which of the following is true of a pH meter?
- a. measures the hydrogen ion concentration in a solution
 - b. needs no calibration
 - c. indicates only the alkalinity of solutions
 - d. indicates only the acidity of solutions

ANS: A PTS: 1

10. All of the following are true concerning laboratory balances EXCEPT:
- a. They should be checked with known weights at intervals.
 - b. They should be installed where they do not get bumped and jarred.
 - c. The weighing pan should be cleaned once a day.
 - d. They should not be installed in front of a window that can be opened.

ANS: C PTS: 1

COMPLETION

1. A wide-mouthed, straight-sided container with a pouring spout formed from the rim is called a(n) _____.

ANS: beaker

PTS: 1

2. An inexpensive type of glass with low resistance to heat and chemicals is _____.

ANS:
flint glass
flint

PTS: 1

3. A pipet that holds or measures less than one mL is called a(n) _____.

ANS: micropipet

PTS: 1

4. A(n) _____ is a slender tube used in the laboratory for measuring and transferring liquids.

ANS:
pipet
pipette

PTS: 1

5. A nonreactive glass with a high thermal resistance that is commonly used to make high-quality labware is _____.

ANS: borosilicate

PTS: 1

6. The agency that prescribes standards of glassware manufacture is _____.

ANS:
National Institute for Standards and Technology
NIST

PTS: 1

7. An autoclave usually operates at 121°C and _____ psi.

ANS:
15
fifteen

PTS: 1

8. The inside of a clinical centrifuge must be cleaned with a (an) _____.

ANS: surface disinfectant

PTS: 1

9. To prevent opening before the rotor stops turning, centrifuges are equipped with safety _____.

ANS:
latches
locks
interlocks

PTS: 1

10. Urinalysis samples are usually spun in a _____.

ANS:
clinical centrifuge
centrifuge

PTS: 1

MATCHING

Choose the best match for each item. Use an answer only once.

- a. pH meter
- b. KIMAX

- f. storage of light-sensitive reagents
- g. beakers or Erlenmeyer flasks

- c. balance
- d. borosilicate
- e. Type I water
- h. autoclave
- i. volumetric flasks
- j. TC

1. used to estimate volumes
2. type of heat-resistant glassware
3. final rinse for washed glassware
4. pipets calibrated to contain a certain volume
5. used to determine the alkalinity or acidity of a solution
6. used to weigh laboratory chemicals
7. high-quality type of glass
8. critical measurements read at meniscus in the neck
9. instrument used to sterilize contaminated supplies
10. plastic and glass brown bottles

- | | |
|------------|--------|
| 1. ANS: G | PTS: 1 |
| 2. ANS: B | PTS: 1 |
| 3. ANS: E | PTS: 1 |
| 4. ANS: J | PTS: 1 |
| 5. ANS: A | PTS: 1 |
| 6. ANS: C | PTS: 1 |
| 7. ANS: D | PTS: 1 |
| 8. ANS: I | PTS: 1 |
| 9. ANS: H | PTS: 1 |
| 10. ANS: F | PTS: 1 |