

APM Essentials 1st Edition—Answers to Review Questions

CHAPTER 1—SAFETY CULTURE

1. The 10 elements of the Safety Culture Maturity model include: management commitment, communication, productivity-vs.-safety; a learning organization; safety resources; participation; shared perceptions about safety; trust; job satisfaction; and training.

2. Three fundamental levels at which culture manifests itself are: observable artifacts, espoused values, and basic underlying assumptions.

3. *Safety culture* includes underlying assumptions, values, norms, and expectations of an organization; *safety climate* is a reflection of culture based on individual perceptions, attitudes, and beliefs.

4. Surveys, interviews, and focus groups can be used to measure safety climate in an organization.

5. Behavioral-based safety can be used as a change catalyst when managers and supervisors work with employees and trainers to provide better direction for safety functions.

6. *Leading indicators* focus on the upstream or future, while *lagging indicators* are by-products of accidents and injuries that are observed after the events.

CHAPTER 2—REGULATORY FRAMEWORK FOR SAFETY

1. The purpose of the Williams-Steiger Act or the OSH Act was “to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources.”

2. The other legislation was applicable to only a limited number of employers.

3. Labor’s position was based on the following:

- In general, states had inadequate safety and health standards, inadequate enforcement procedures, inadequate staff with respect to quality and quantity, and inadequate budgets.
- In the late 1960s, approximately 14,300 were killed annually on or in connection with their job and more than 2.2 million employees suffered a disabling injury each year as a result of work-related accidents. The injury/death toll was considered by most to be unacceptably high.
- The nation’s work-injury rates in most industries were increasing throughout the 1960s. Because the trend was moving in the wrong direction, proponents of federal intervention felt that national legislation would help to reverse this trend.

4. Secretary of Labor, the Assistant Secretary of Labor for OSHA; Occupational Safety and Health Review Commission (OSHRC), as an appellate agency.

5. Occupational Safety & Health Review Commission

6. The primary functions of NIOSH are:

- to develop and establish recommended occupational safety and health standards
- to conduct research experiments and demonstrations related to occupational safety and health
- to develop educational programs to provide an adequate supply of qualified personnel to carry out the purposes of the OSH Act

7. Hazard evaluation; technical information; incident prevention; industrial hygiene; medical service

8. employer

9. OSHA Merit program; OSHA Star program

10. The Federal Register

11. Temporary; permanent

12. 8 hours

13. No, it is not required, but it is often suggested that CSHOs present solutions.

14. Willful; serious; repeat; other than serious; de minimis (very minor)

15. The four steps a compliance safety and health officer must take to determine that a violation is serious are to evaluate:

- The type of accident or health hazard exposure which the violated standard or the general duty clause is designed to prevent.
- The type of injury or illness which could reasonably be expected to result from the type of accident or health hazard exposure identified in Step 1.
- Whether the types of injury or illness identified in Step 2 could include death or a form of serious physical harm.
- Whether the employer knew, or with the exercise of reasonable diligence, could have known of the presence of the hazardous condition.

16. Within 15 working days after an employer receives a citation, an employer may submit a written objection to the citation to OSHA. The OSHA Area Director then forwards the objection to OSHRC. Employees may request an informal conference with OSHA to discuss any issues

raised by an inspection, citation, notice of proposed penalty, or employer's notice of intention to contest.

17. Employee medical records should be retained by employers for 30 years from the termination date of the employee.

18. The basic purpose of the Hazard Communication Standard is to inform employees about the risks, precautions, and safe use of substances.

19. The quality of a hazard communication program depends on the accuracy of the initial hazard assessment.

20. Employers are responsible for providing MSDSs and must ensure that all sheets are up to date.

21. With some exceptions, OSHA applies to every employer in all 50 states and U.S. possessions who has one or more employees and who is engaged in a business affecting commerce. Specifically excluded from coverage are all federal, state, and local government employees.

22. Employers have the general duty to furnish each employee with employment and places of employment free from recognized hazards causing or likely to cause death or serious physical harm and the specific duty of complying with safety and health standards promulgated under the OSH Act. Each employee has the duty to comply with the safety and health standards and with all rules, regulations, and orders that apply to employee actions and conduct on the job.

23. The purpose of the OSHA Voluntary Protection Programs is to emphasize the importance of, encourage the improvement of, and recognize excellence in employer-provided, site-specific occupational safety and health programs.

24. To qualify as exemplary, an organization must have management commitment and accountability, hazard assessment, safety rules and enforcement, employee training, and self-evaluation.

25. Both the employer and employee representatives are afforded the opportunity to participate fully and discuss the issues raised.

26. State plans are submitted, reviewed, published for public comment, and adopted under OSHA regulations. The regulations pertaining to state plans for the development and enforcement of state standards are codified in Title 29 CFR, Chapter XVII, Part 1902. The basic criterion for approval of state plans is that the plan must be at least as effective as the federal program.

27. The OSH Act has given employees a significant role to play in occupational safety and health matters. It has

raised occupational safety and health issues to a higher priority in business management. It has given new status and responsibility to professionals working in the occupational safety and health field. And, the Act has bestowed a new status to nationally recognized organizations that develop industry standards. The OSH Act has encouraged greater training for professionals in occupational safety and health. The OSH Act also gave new emphasis to the product safety discipline.

CHAPTER 3—LEGAL IMPLICATIONS FOR SAFETY

1. The top five violations include: fall protection; hazard communication; scaffolding; respiratory protection; and electrical, wiring methods.

2. OSHA looks at the following when evaluating whether the General Duty Clause is applicable:

- There is no applicable OSHA standard for an identified hazard.
- The employer failed to keep the workplace free of a hazard to which employees of that employer were exposed.
- The hazard was recognized or should have been recognized.
- The hazard was causing or was likely to cause death or serious physical harm.
- There was a feasible and useful method to correct the hazard.

3. A *confined space* is characterized by restricted means of entry/exit, size sufficient to contain a worker, and not specifically designed for worker occupancy. A confined space also has limited or restricted means for entry or exit and is not designed for continuous occupancy.

4. A *permit-required confined space* (permit space) is a confined space that has one or more of the following characteristics: contains, or has the potential to contain, a hazardous atmosphere; contains a material that has the potential to engulf an entrant; has walls that converge inward or floors that slope downward and taper into a smaller area that could trap or asphyxiate an entrant; or contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stress. A *permit-required space* is a confined space that has a potential hazard to health or life associated with it.

5. A *routine job function* is defined as work activities the employee regularly performs at least once per week.

6. Common examples of regulations requiring written plans are 29 CFR 1910.1030(c)(1)(i) and 1910.1030(c)(1)(iii) (bloodborne pathogens), 29 CFR 1910.1200(e)(1) and 1910.1200(e)(4) (hazard

communication), and 29 CFR 1910.146(c)(4) (permit-required confined spaces).

7. As of June 1, 2015, all labels are required to have pictograms, a signal word, hazard and precautionary statements, the product identifier, and supplier identification.

8. True

CHAPTER 4—INJURY AND ILLNESS RECORD KEEPING, INCIDENCE RATES, AND ANALYSIS

1. Safety personnel must maintain records because it is required to do so by law and by management, and it improves safety programs.

2. The seven ways a good record-keeping system can help the safety professional are:

- a. It provides the means to evaluate accident problems objectively and measures overall progress and effectiveness of the company safety program.
- b. It identifies high incident rate units, plants, or departments and problem areas so extra effort can be made in those areas.
- c. It provides data for an analysis of incidents pointing to specific causes or circumstances.
- d. It creates interest in safety among supervisors by providing them with information about their department's incident experience.
- e. It provides supervisors and safety committees with hard facts about their safety problems so their efforts can be concentrated.
- f. It measures the effectiveness of individual countermeasures and determines if specific programs are doing the job they were designed to do.
- g. It assists management in performance evaluation.

3. c

4. d

5. c

CHAPTER 5—IDENTIFYING HAZARDS

1. *Hazard analysis* is an analysis performed to identify and evaluate hazards in order to eliminate or control them.

2. Inductive method; deductive method

3. The hazard control specialist will need to answer the following five questions:

- a. What is the quantity and quality of information desired?
- b. What information already is available?
- c. What is the cost of setting up and conducting analyses?
- d. How much time is available before decisions must be made and action taken?
- e. How many people are available to assist in the hazard analysis, and what are their qualifications?

4. The factors that need to be analyzed are:

- a. Frequency of accidents
- b. Potential for injury
- c. Severity of injury
- d. New jobs, or altered equipment, processes, and operations
- e. Excessive material waste or damage to equipment.

5. *Job safety analysis* (JSA) is a procedure used to review job methods and uncover hazards that (1) may have been overlooked in the layout of the facility or building and in the design of the machinery, equipment, tools, workstations, and processes; (2) may have developed after production started; or (3) resulted from changes in work procedures or personnel.

6. After the job has been selected, the three basic steps in making a JSA are:

- a. Break the job down into successive steps or activities and observe how these actions are performed.
- b. Identify the hazards and potential injuries.
- c. Develop safe job procedures to eliminate the hazards and prevent the potential injuries.

7. The primary purpose of inspection is to detect potential hazards so they can be corrected before an unintentional injury or illness occurs.

8. a. Continuous inspections—informal inspections that do not conform to a set schedule, plan, or checklist, and are conducted by employees, supervisors, and maintenance personnel as part of their job responsibilities

- b. Interval inspections—planned inspections at specific intervals that are deliberate, thorough, and systematic, and are conducted by safety professionals, certified or licensed inspectors, outside investigators, and government inspectors

9. c

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10. Monitoring checklists are useful in identifying which standards and regulations apply. The Centers for Disease Control of the U.S. Department of Health and Human Services (DHHS) have a suggested checklist, and the National Safety Council's website has sample checklists from various companies.

11. Loss severity potential; injury potential to employees; how quickly it can become unsafe; and past history of failures

12. a. Personal monitoring—measures the airborne concentrations of contaminants by placing the measuring device as closely as possible to the site at which the contaminant enters the human body.
b. Environmental monitoring—measures contaminant concentrations in the workroom in the general area adjacent to the worker's usual workstation.
c. Biological monitoring—measures changes in composition of body fluid, tissues, or expired air to detect the level of contaminant absorption.
d. Medical monitoring—medical personnel examine workers to see their physiological and psychological response to a contaminant.

13. b

14. *Threshold limit values* (TLVs) are the quantitative measurement of exposure limits.

15. *Permissible exposure limits* (PELs) are the legal maximum level of contaminants in the workplace air.

16. Incident investigations are conducted to determine direct causes, uncover contributing causes, prevent similar incidents, document facts, provide cost information, and promote safety.

17. Incidents must be investigated immediately to ensure accurate details and to preserve evidence.

CHAPTER 6—LOSS CONTROL AND PREVENTION

1. The benefits of hazard analysis are:

- It forces the conductors of the analysis to view each operation as a part of a system.
- It identifies hazardous conditions and potential accidents.
- It provides information so effective control measures can be established.
- It can determine the level of knowledge, skill, and physical requirements workers need to perform specific tasks.
- It can discover and eliminate unsafe procedures, techniques, motions, positions, and actions.

2. The purpose of ranking hazards by risk is to figure out which hazards are the worst. By doing so, a consistent guide for corrective action will be established. The ranking will specify which hazardous conditions warrant immediate action, which have secondary priority, and which ones can be addressed in the future.

3. Once a vendor takes on a responsibility within a work place, the vendor is legally accountable for harm caused by its negligence, and the vendor can be sued either by the facility owner or by the worker who is injured. Types of negligence include the usual mistakes that allow accidental injuries; omissions of care that should have been taken such as loading containers properly; and negligence that results from the violation of an applicable law or rule.

4. The employer responsible for an injury may, in extreme cases, face lawsuits by injured workers or their families, asserting that the danger was so severe and obvious that the company intended that workers be vulnerable to injury. These *intentional tort* cases are an exception to workers' compensation in states where they have been allowed.

5. Workplace safety is predominantly regulated by the Labor Department's Occupational Safety and Health Administration (OSHA) and the several states that administer OSHA "state plans." Other federal programs include the Mine Safety and Health Administration, Environmental Protection Agency (EPA), Department of Transportation (DOT), Federal Aviation Administration (FAA), Consumer Product Safety Commission (CPSC), Nuclear Regulatory Commission, and Food and Drug Administration (FDA).

6. no

7. The contract can be cancelled; the individual can be debarred from any future involvement with government contracts; and the company or organization can be disqualified from bidding on any future government contracts.

8. Hazardous conditions can be either eliminated or controlled:

- At the source (substitute a less harmful agent for the one causing the problem, e.g., toxic to nontoxic, flammable to nonflammable).
- Along its path (e.g., install machine guards to prevent unwanted contact by workers; put up protective curtains to prevent sparks and welding arc flash; install an exhaust system to remove toxic vapors from breathing zones of workers).
- At the worker (e.g., employ automated or remote control options; provide a system of worker rotation or reschedule operations when there are

few workers in the plant; provide personal protective equipment).

CHAPTER 7—SAFETY AND HEALTH TRAINING

1. Answers may vary. Examples include increased awareness, increased skill level, reduced complacency, increased employee satisfaction, improved performance, reduced employee turnover, decreased severity rate, improved productivity.

2. Any seven of the following may be nontraining solutions:

- a. Task procedures
- b. Safety data sheets (SDSs)
- c. Flowcharts
- d. Checklists
- e. Diagrams
- f. Troubleshooting guides
- g. Decision tables
- h. Reference manuals
- i. Help desks or hotlines
- j. Employee incentives
- k. Improved physical work environments
- l. Improved work processes/workflow redesign

3. *Performance-based training* is a learning experience (training) that is implemented to encourage a specific behavioral change or to solve a specific on-the-job problem. Performance-based training can be measured or evaluated by analyzing a worker's performance.

4. As shown in Figure 7–1, the five phases are analysis/identify, design, develop, implement, and evaluate/maintain.

5. d

6. The principles are:

- a. Need to know why (WIFM): Adults need to know why they are learning a particular topic or skill because they need to apply learning to immediate, real-life challenges. This is also known as the WIFM statement, or “What’s in it for me?”
- b. Need to apply experience: Adults have experience that they apply to all new learning.
- c. Need to be in control: Adults need to be in control of their learning.
- d. Need for success: Adults want to learn things that will make them more effective and successful.

7. On-the-job training, group methods, and individual methods

8. e

9. *Computer-based training (CBT)* or *web-based training (WBT)* use interactive computer programs that enable workers to receive information by reading and/or watching a video presentation and then responding to situations and questions via a computer-based device.

10. Analysis, design, development, implementation, evaluation

CHAPTER 8—THE COMPUTER AND INTERNET AS SAFETY INFORMATION TOOLS

1. Pros of using Internet-based tools include:

- a. Computer networks provide convenient access to a wide variety of information resources of value to the safety professional
- b. Topics can be searched quickly with multiple results
- c. Searches can be refined on most search sites to narrow margin of error for results
- d. Large library of books on specific topics not required
- e. Reduction of time in libraries or searching books for information

Cons include:

- a. Information provided may fall short of professional quality.
- b. It is time-consuming to check out a long list of links unless in an exploratory mode.
- c. A search provides numerous results which are not always related to the topic being searched.
- d. It is possible that a search engine's weighting of the search results is at odds with identifying the subject of one's concerns. The order of results from some search engines is based on sponsorship deals with specific vendors, rather than the value of the information the site contains
- e. It can be difficult to determine whether information provided is valid (e.g., Wikipedia).

2. The process for conducting an effective search is:

- a. Refine the question.
- b. Select keywords.
- c. Select a website.
- d. Ask a discussion group.
- e. Check the information.

3. List-serv participants engage in the following roles:

- a. E-mail lists or list-servs are populated by groups of individuals involved in the same or similar professions or have information concerning these

areas. The use of these group increases the chances of finding information concerning the question or topic that is being investigated.

- b. The user should follow the policy or etiquette of the list-serv group being used and should join as an observer until they understand the groups process and procedure as well as the topic or expertise of the group
- c. A review of the list-serv's discussion archives should be reviewed to assure that the list -serv is the right group of which to ask the question. Also be sure that the question has not been previously asked and answered. When framing the question, be as specific as possible in asking the question, so those who read it can determine what type of answers are appropriate (i.e., general pointers to the professional literature versus specific interpretations of your information).
- d. It is most helpful, if possible, to monitor the traffic on the list for about a week before asking a question to see what sorts of questions are appropriate for the list.
- e. Always remember that the information being provided is specific to the list-serv's being visited and may not be applicable to the visitor's needs.

4. Issues to be considered include:

- a. the type of presentations to be made (text documents versus animated sequences versus interactive games)
- b. the comfort level with computer use of the population in question
- c. how specific the information to be provided must be
- d. how often refresher training must be provided
- e. pilot group to test and evaluate the system
- f. follow-up plan for determining whether the training was successful

5. Areas where the Internet can be used to support safety program management elements include:

- a. Data Collection—data gathered from specific environmental sampling instruments/audits/ inspections can be collected and organized more effectively and at lower costs to enable safety professionals to provide a more accurate and meaningful assessment of workplace hazards than could be previously considered
- b. Data management—there are several Internet-based software packages commercially available for maintaining safety management systems for quality or environmental management aspects of an organization.
- c. Connecting to other management information systems—the development of a safety management system will greatly benefit from being connected to other management systems

within an organization, such as those containing facility information, financial information, and human resources data. Implementing these connections can be more challenging than first anticipated because the software involved is designed for other purposes.

CHAPTER 9—FIRE PROTECTION

1. The four components of a comprehensive fire protection program are:

- a. preventing fires
- b. detecting and responding to fires
- c. controlling, suppressing, and extinguishing fires
- d. recovering from fires

2. Three nongovernmental organizations where information can be obtained on all aspects of fire protection and building codes are:

- a. National Fire Protection Association (NFPA)
- b. Society of Fire Protection Engineers
- c. Fire Detection and Suppression System Manufacturers Page 2

3. The fire risk assessment steps are:

- Step 1: Define risk assessment objectives
- Step 2: Identify hazards
- Step 3: Develop scenarios
- Step 4: Analyze severity
- Step 5: Analyze probability
- Step 6: Presentation of risk
- Step 7: Analyze risk reduction

4. The activities should occur during the early design and construction of a building

5. Answers may vary. Here are some examples of fire prevention considerations:

- a. Site planning; building easily accessible to fire fighters, traffic patterns, etc.
- b. Adequate doors and exits, plan for orderly emergency evacuations
- c. Sophisticated fire suppression system, e.g., automatic sprinkler system with fire department connection
- d. Adequate water mains available; hydrants properly located?
- e. Confining fire with structurally sound fire doors and fire walls

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6. The major cause of occupant injury and death in structural fires is asphyxiation from exposure to smoke and toxic gases.

7. Four essential fire prevention practices that must occur continuously in existing buildings include:

- a. Perform routine fire safety inspection and follow up inspections to ensure findings are resolved.
- b. Maintain good housekeeping habits (reduce rubbish, reduce combustible loading).
- c. Maintain fire walls and fire doors (ensure fire wall penetrations are maintained, ensure fire doors are maintained and not blocked open)
- d. Maintain fire protection equipment (maintain fire detection and alarm systems, maintain fire extinguishers, maintain automatic sprinkler systems).

8. Fires can be controlled by:

- a. removing fuel
- b. cooling burning materials (water or chemical)
- c. removing oxygen from fire
- d. inhibiting chemical's chain reaction

9. An employee should abandon his or her attempts at fighting a fire with a portable fire extinguisher if the fire does not die down immediately or if smoke becomes a major problem.

10. ordinary materials such as wood, paper, and rubbish

11. vapor-air mixture over the surface of flammable and combustible liquids, such as gasoline, oil, grease, paints, and thinners

12. Class C fires involve energized electrical equipment. When the electrical equipment is de-energized, a Class C fire becomes a Class A or Class B fire (based on the materials that continue to burn after the electricity is turned off).

13. Class D fires are associated with fires involving combustible metals such as magnesium and titanium. Fire extinguishers not rated for Class D fires should not be used on them, as the wrong extinguishing agent on a Class D fire can make the fire more intense.

14. Class K fires involve vegetable and animal fat fires in commercial kitchens. These fires are different from Class B fires because of the presence of the very hot cooking surfaces facilitating the vaporization of the fuel.

15. Four comprehensive national consensus standards and codes related to general facility fire protection include:

- a. NFPA 1 (Uniform Fire Code)

- b. NFPA 101® (Life Safety Code®)
- c. NFPA 5000 (Building Construction and Safety Code®)
- d. ICC (International Building Code®)

CHAPTER 10—ELECTRICAL SAFETY

1. Skin surface

2. Low voltage is considered dangerous in regards to electrical shock because it often prevents the victim from breaking the contact with the circuit, often referred to as "locked" because the muscles in the hand will contract and lock the victim on the circuit. As the time of exposure is increased, the severity of the injury is increased.

3. The relationship between current, voltage, and resistance is like electricity flowing through a circuit is like the flow of water through a pipe. Current is the total volume of water flowing past a certain point in a given length of time; voltage is the pressure in a pipeline. Voltage is measured in volts of resistance as blockage or friction in the pipe. Resistance (R) is any condition that restricts current flow.

4. Resistance

5. Current flow, path, and time

6. Link, plug, and cartridge

7. An electrical system is grounded to prevent the occurrence of excessive voltages from such sources as lightning, line surges, or accidental contact with higher voltage lines.

8. Grounding is done by bonding the identified conductor to a grounding electrode by means of an unbroken wire called a grounding electrode conductor.

9. In general, high-voltage equipment is more carefully guarded than low-voltage equipment because of high-voltage equipment's greater inherent hazard.

10. The OSHA standard for the Control of Hazardous Energy (Lockout/Tagout) (29 CFR 1910.147) for general industry utilizes specific action and procedures for addressing and controlling hazardous energy during servicing and maintenance of machines and equipment and should be adhered to in all cases.

- All lockout and tagout procedures should safeguard workers from the release of hazardous energy.
- The area and equipment must be inspected for potential/real hazards.

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- Upon completion of the inspection, the inspector should remove any grounds and locks/lockout tags that were used.
- Before the equipment is returned to service, the chief electrician, supervisor, or operator—whomever is in charge—should give it clearance electrical inspections.
- All testing equipment must be checked before the inspection to function correctly.
- Avoid wearing metal jewelry such as rings, necklaces, etc.

CHAPTER 11—CONSTRUCTION SAFETY

1. c
2. a
3. c
4. a
5. d
6. a
7. c
8. d
9. d
10. d
11. d
12. d

CHAPTER 12—BASICS OF INDUSTRIAL HYGIENE

1. Industrial hygiene is the science and art devoted to the recognition, evaluation, and control of environmental factors or stresses arising in and from the workplace. These factors or stresses may cause sickness, injury, or significant discomfort and inefficiency among workers or citizens in the community.
2. e
3. a. Substitution of harmful or toxic materials with less dangerous ones
b. Changing work processes to eliminate or minimize work exposure
c. Installation of exhaust ventilation systems
d. Good housekeeping/appropriate waste disposal methods

- e. Provision of proper personal protective equipment
4. a. Anticipating and recognizing health hazards that arise from work operations processes by the industrial hygiene professional
b. Evaluating and measuring the magnitude of the hazard by the industrial hygiene professional
c. Control of the hazard
d. Commitment and support of the industrial hygienist by management
e. Recognition and trust of the industrial hygienist by the workers in the facility
5. a. Chemical
b. Physical
c. Biological
d. Ergonomic
6. e
7. Any of the following:
 - a. Industrial hygienist
 - b. Safety professional
 - c. Occupational health nurse
 - d. Occupational health physician
 - e. Employees
 - f. Senior and line management

CHAPTER 13—PERSONAL PROTECTIVE EQUIPMENT (PPE)

1. a. Engineering controls
b. Administrative controls
c. Personal protective equipment (PPE)
2. *Personal protective equipment* is referred to as the use of respirators, special clothing, safety glasses, hard hats, or similar devices whose proper use reduces the risk of personal injury or illness resulting from occupational hazards.
3. e
4. a
5. The standard established for eye and face protection is ANSI Z87.1 1989, Practice for Occupational and Educational Eye and Face Protection.
6. b
7. a. Enclosure—completely surrounds the head, such as an astronaut's helmet
b. Aural insert—acts as a plug, commonly called earplug

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- c. Superaural—cap seals the external edge of the ear canal, also called canal cap
- d. Circumaural—cup covers the external ear, also called earmuff
8. a. Passive
b. Active
9. a. General all-purpose nets
b. Personnel nets
c. Debris nets
10. b
11. a. Safety belts
b. Fall arresters and shock absorbers
c. Harnesses
d. Lifelines
e. Fall-arresting systems
12. a. Identify the hazard.
b. Evaluate the hazard.
c. Select the appropriate, approved respiratory equipment.
13. a. Air-supplying respirators
b. Air-purifying respirators
14. c
15. a. Compression resistance
b. Impact resistance
- CHAPTER 14—BASICS OF INDUSTRIAL HYGIENE**
1. Emergency showers and eyewashes should be within 10 seconds of travel time from areas where hazardous chemicals are used.
2. The four stages of the management system approach to safety are:
- a. Plan
b. Do
c. Check
d. Act
3. The three key sources of chemical safety information are:
- a. Safety Data Sheets (SDSs)
b. Chemical labels
c. Laboratory chemical safety summaries (LCSSs) and other reference materials
4. c
5. Primary containment focuses on the protection of workers and the immediate laboratory environment from exposure to infectious agents. Secondary containment protects the environment outside the laboratory from contamination with infectious materials.
6. BSL-1: attained through standard microbiological practices
- BSL-2: attained through engineering controls such as biosafety cabinets
- BSL-3: attained through facility design beyond use of equipment in the lab
- BSL-4: requires use of high level personal protective equipment as well as facility design.
7. BSL-2
8. c
9. Four basic radiation protection methods are:
- a. Maintaining distance from the source
b. Minimizing time of exposure
c. Shielding from the source
d. Minimizing the quantity of the radioactive materials used
10. Laser is an acronym for light amplification by stimulated emission of radiation
11. d
12. d
13. Skin and eye irritation from dry environment, fatigue from ergonomic challenges, and psychological issues from unchanging environment
14. c
15. e