7 PERSONAL PROTECTIVE EQUIPMENT

ANSWERS—QUIZ 1

1. a
2. b
3. b
4. a
5. a
6. b
7. b
8. d
9. a
10. c
11. a
12. It helps to absorb the shock of a blow.
13. The questions that must be asked include the following:
    - Is there an actual hazard?
    - Does wearing contacts place eyes at greater risk than naked eyes?
    - Does removing the contacts increase risk to the eye, the wearer, or co-workers?
    - Is the risk different for different contact materials and designs?
    - Are there other risks to the wearer or co-workers?
    - Do contacts decrease the efficacy of other safety strategies?

14. It is a sudden change in hearing as a result of a single exposure to a sudden burst of sound, such as an explosive blast.
15. The following information must be shown: name of the manufacturer, identification of the material, date of manufacture, date of prototype test, and name of testing agency.
16. It is designed to supply enough air to maintain a slight positive pressure inside the respirator in relation to the outside environment.
17. They are classified according to the method used to supply breathing gas and the method used to regulate the gas supply. The three main classifications are self-contained breathing apparatus, supplied-air respirators, and combination self-contained and supplied-air.
18. The three levels of filter efficiency are 95%, 99%, and 99.97%.
19. Conductive footwear is classified into two categories: type 1 and type 2.
    - Type 1 footwear dissipates static electricity harmlessly to the ground. It is commonly used to prevent the ignition of sensitive explosive mixtures due to static discharge. Type 1 conductive footwear has a resistance rating of up to 500,000 ohms.
    - Type 2 footwear is designed for use by employees who work on Faraday-type shielded aerial lifts around high-voltage power transmission equipment and where induced voltage is a problem. It has a resistance rating of not more than 10,000 ohms and helps equalize the electrical potential between the wearer and the high-voltage source.
    - All the exposed external metal parts on Type 1 and Type 2 conductive footwear are nonferrous. The design and materials of the soles and heels used on both types of shoes are constructed to create a path through them to ground. Personnel working near open electrical circuits should not use conductive footwear.

20. The first two limitations of supplied-air or air-line respirators are related to location. These respirators may be used only in non-IDLH atmospheres or those atmospheres from which the wearer can escape without the use of a respirator. These limitations are necessary because the supplied-air respirator is entirely dependent on an air supply not carried by the wearer. If the air supply fails, the wearer might not be able to escape immediately from a hazardous atmosphere. Another limitation of a supplied-air respirator is that the air hose limits the wearer to a fixed distance from the air-supply source.

ANSWERS—QUIZ 2

1. a
2. b
3. a
4. a
5. b
6. c
7. d
8. a
9. c

10. b
11. d
12. The three factors are level of protection, level of comfort, and ease of repair.
13. The three types are headgear without crown protectors, headgear with crown protectors, and headgear with crown and chin protectors
14. Chemical composition provides the filtering effect for lenses used as PPE.
15. They should be made of wool, terry, or glass fiber. Leather can be used, but it will not withstand temperatures above 150 F (65 C).
16. The first method is to use cartridges with end-of-service life indicators (ESLI); the second is to use an established and enforced cartridge/ canister change schedule that is based on objective information or data.
17. The service life of an air-purifying respirator is limited by the concentration of the air contaminant, the breathing demand of the wearer, and the removal capacity of the air-purifying medium, either a cartridge or filter.
18. Inspectors should check for cracks or holes, missing or loose hose clamps, and the canister's service-life indicator.
19. Fall arrest is a means of preventing workers from falling from elevations. There are two kinds of fall arrest systems: passive and active. A passive system does not require any action from the worker. If properly designed and installed, it will protect the individual 100% of the time. An active system requires some manipulation by the worker. Examples include harnesses, lanyards and their attachments, and component parts such as rope-grabbing devices, lifelines, etc. This type of system will not work on its own and must be used connected or used by the individual to be protected.

    To determine when fall arrest systems are needed, the first factor to consider is the height at which the worker will be performing his or her job. The second factor is the work site and the specific task to be done. Finally other factors need to be examined, including rescue methods, backup systems, length of time spent at workstations, dry or wet conditions, the number of workers needed, and environmental factors.
20. Before PPE is removed, it should be thoroughly washed with a hose stream, whether or not it has come into contact with corrosive materials. The worker's coat should have been put on with the sleeves outside the cuffs of the gloves. If this procedure was followed, logical order for removing equipment is boots, coats, hats, and then gloves. Workers should wash their hands thoroughly before removing face shields and goggles. Then they should wash their hands again. Ideally the worker should take a complete shower and change all clothes.

ANSWERS—CASE STUDY

1. The steps Tomson should take to implement the PPE program include writing out its PPE policy, training and education, and supervisory follow-up.
2. Its written PPE policy should clearly state the need for and use of the PPE. In some cases, it may contain exceptions or limitations on the use of PPE or give the specific work conditions expected. It should also include a hazard assessment or PPE needs assessment and explain the selection of the PPE to be used, worker training and motivation in the use of PPE, and how the company will enforce the rules. It should be communicated to employees and, if needed, visitors.
3. After selecting the proper equipment, Tomson must train its employees in the use of the PPE. Training programs should cover the following: describing the hazard and/or condition; telling what has/can be/cannot be done about it; explaining why a certain type of PPE has been chosen; discussing the capabilities and/or limitations of the PPE; demonstrating how to use, adjust, or fit the PPE; practicing PPE use; explaining company policy and its enforcement; discussing how to deal with emergencies; discussing how PPE will be paid for, maintained, repaired, cleaned, etc.
4. The following factors influence employee compliance in wearing PPE: how well workers understand the need for the equipment; how easy, comfortable, and convenient the equipment is to wear; how effectively economic, social, and disciplinary sanctions can be used to influence the attitudes of workers; and employee involvement in the decision-making process. When a group of workers is issued PPE for the

first time or when new devices are used, compliance may be a problem. Management and the safety and health professional need to give employees a clear and reasonable explanation as to why PPE must be worn. If employees are required to change their work procedures, they may resist the change. Management cannot ignore the fact that employees may not want to wear the PPE for reasons of bravado or vanity. Having supervisors first try out new protective equipment and devices before actual adoption and asking for their feedback usually makes them more willing to persuade workers to use the equipment. Sometimes problems with new devices can be overcome if employees are allowed to participate in the selection process.

5. APFs or assigned protection factors are used to indicate the level of effectiveness a respirator provides to the wearer. Tomson should ensure that the APF for an assigned respirator is adequate to provide protection for the identified hazardous contaminant. OSHA has not yet addressed APFs; therefore, Tomson should rely on APFs published by NIOSH and ANSI. Where there are conflicts between NIOSH and ANSI, the company should apply the more protective APF.