

Appendix J

Answers to Review Questions

Chapter 2

1. c. carcinogen
2. c. below 38 °C (100 °F)
3. d. pyrophoric
4. a. kidney
5. b. pregnant women
6. b. where the chemical contacts the body
7. c. more toxic
8. d. all of the above
9. d. acute toxicity
10. c. sensitized
11. b. inhalation
12. e. all of the above
13. d. nitrites
14. a. true
15. b. false
16. a. true
17. c. chronic
18. a. true
19. a. true
20. d. all of the above

Chapter 3

1. c. protect individuals who work with laboratory chemicals.
2. a. keeping waste solvent collection carboys capped.
3. b. using the sanitary sewer for disposal of items only listed in Appendix A or Chapter 7 of this *Guide*.
4. c. releases to the environment of any quantity are to be reported to the Safety Department.
5. a. do research or field studies that may have an impact on the environment.

Chapter 4

1. e. All of the above. Keep your lab neat and clean, stock only the chemicals that you need, have the proper safety equipment and everyone is trained in safe lab procedures.
2. e. Horseplay and practical jokes in a laboratory are very dangerous, strictly forbidden, unprofessional, and should never be condoned.
3. e. Before opening any reagents, they should be dated, and you should find out all that you can about the chemical's properties, and have plans for both the proper use and disposal of it.
4. b. Proper lab attire includes closed-toe shoes, safety glasses with side-shields, a lab coat, and gloves that have been selected on the basis of what chemicals are in use.
5. e. Flammable liquids must never be stored in paper cups or any open containers, on a lab bench top, in refrigerators that are not designed for flammable storage, or in large quantities outside of an approved storage cabinet or safety can.
6. a. "Always add acid to water, like you oughta"
7. e. Corrosives, according to the OSHA definition, include acids with a $\text{pH} \leq 2$, and bases with a $\text{pH} \geq 12$.

8. e. Anyone using corrosives in a laboratory, must, according to OSHA regulations, wear goggles that form a seal completely around the eyes, and gloves appropriate for the particular chemicals in use.
9. c. The maximum number of large oxygen, flammable, or health hazard gas cylinders allowed per 500 square foot laboratory area is three.
10. e. Formaldehyde is a potent irritant, a skin sensitizer, a carcinogen, and something you should only use under carefully controlled conditions, in a properly operating fume hood.
11. e. A chemical fume hood's purpose is to assist in the safe handling of hazardous materials that represent an inhalation hazard, and to contain small explosions that may occur in certain laboratory operations.
12. d. Students, employees, faculty, staff and the Safety Department all have a part in laboratory safety.
13. c. Employees and students are responsible for reading MSDSs for the chemicals that they work with.
14. b. Call the Safety Department for information on the safety and legal aspects of transporting hazardous chemicals.
15. d. Use boiling chips or stirbars to prevent bumping.
16. d. A refrigerator that is used to store flammable chemicals should have no spark sources on the inside. The Physical Plant Electrical Shop can modify an ordinary refrigerator to safely store flammable chemicals, but the refrigerator cannot be a frost free type.
17. d. Chemicals should not be stored above eye level, on the floor where they can be kicked or where they can restrict the flow of the sprinkler system.
18. b. An approved flammable storage cabinet is a safe way to store flammable liquids. Cabinets under fume hoods and biosafety cabinets should never be used to store flammables.
19. c. Wisconsin law requires everyone to wear eye protection in a laboratory.
20. b. A piece of tissue paper taped to the hood sash is a good qualitative indicator of hood function. Call the Safety Department to get a accurate assessment of your hood's function.
21. f. When working with a particularly hazardous substance, establish a designated area, use an effective containment device (e.g., glovebox, hood) and always double glove. Never use a brush to dry-sweep spilled powders.
22. d. All of the above, autoclaves can produce high temperatures which can also boil liquids.
23. b. "For food only." Make it plain and simple.
24. c. Cuts from broken glass.
25. d. All of the above, cold temperatures and hot temperatures can be hazardous.
26. h. All of the above.
27. d. a and c.

Chapter 5

1. b. UW Police and Security will make sure all the responders are notified.
2. c. High Hazard Emergencies are responded to by the Madison Fire Department's Hazardous Incident Team, with assistance from whomever is responsible for the incident, the building manager, Safety Department personnel, and UW Police and Security officers.
3. d. All of the above. Don't think of it as, "Just a fire alarm."
4. e. a and d. Class BC fire extinguishers are appropriate for flammable liquids and electrical fires.
5. d. Go to the eyewash station in your lab, and flush your eye for at least 15 minutes, then go to an emergency room for medical attention. Never wash your eyes with anything but water or a saline solution.
6. If you suspect that the spill has generated toxic vapors, the answer is a.. If not, the answer is b..
7. b. is the best answer. a. and c. are acceptable in certain situations.
8. d. Close off the room, post warning signs and call Safety.
9. e. All of the above.
10. e. A simple spill should be cleaned up by whomever caused it.

11. d. All of the above

Chapter 6

1. c. Recycling
2. d. Lauryl peroxide
3. c. Detergents, ultrasonic baths, oxidizing agents not containing heavy metals and biodegradable surfactants
4. d. An incubator
5. c. Off-site recycling and beneficial reuse
6. c. Open burning
7. d. All of the above
8. b. Precipitate heavy metals out of solution

Chapter 7

1. c. Set aside for the Safety Department's On-Site Hazardous Materials Management service. Barium compounds are regulated under the Toxicity Characteristic Rule.
2. c. via the sanitary sewer to the Madison Metropolitan Sewerage District's Treatment Plant. There the solution is diluted and subject to physical and biological degradation.
3. d. Ethylenediamine. Hydroxide solutions are preferred for neutralization of all acids and ethylenediamine is only weakly basic.
4. d. All of the above. Acids and bases can cause tissue destruction on contact, are extremely damaging to the skin and especially harmful to the eyes. Don't take any chances; protect yourself.
5. b. Call the Safety Department for removal of mercury batteries. Mercury containing components cannot be disposed in the normal trash.
6. b. Collection of waste organic solvents and their solutes produced in your lab. Phosphate buffer solutions and some aqueous heavy metal solutions can generally be disposed of in the sanitary sewer. If something cannot be disposed of in the sanitary sewer it doesn't necessarily mean that it is suitable for disposal in an incinerator.
7. d. Collected in non-leaking containers that you provide, and labeled properly. Many types of oil used on campus are recycled, including vacuum pump oil.
8. c. Bag or otherwise contain the wet gel and dispose following procedure On-Site Service 1. Chloroform and methylene chloride are toxicity characteristic chemicals. Allowing solvents to evaporate for the purposes of disposal is illegal. Placing solid materials, such as silica gel, into carboys will damage the Safety Department's solvent transfer equipment.
9. d. a and c. Recover the spilled mercury following the spill procedure in Chapter 4 of this *Guide*. Replacing the thermometer with one that contains alcohol, or better yet, a thermocouple, will eliminate the need to ever dispose of another broken mercury thermometer.
10. a. Contact the Safety Department for evaluation. Heavy and older electrical equipment may contain PCBs. Asbestos insulation would not be the primary risk, nor would metals contained in the wiring. Ignoring the equipment may end up causing serious problems if the equipment was involved in a fire or began to leak.
11. b. In special sharps containers as described in Chapter 9.
12. a. True
13. b. Appropriate disposal procedures for waste laboratory chemicals.
14. a. True
15. c. Fuming nitric acid
16. a. True

Chapter 8

1. e. List on the pink form any infectious agents or toxic chemicals that may be in the waste animal tissue. Disposal of radioactive waste does not use a pink form
2. b. Consult the University *Radiation Safety Regulations* binder
3. c. In a fume hood, drain the solution into the sanitary sewer, rinse tissue thoroughly with water, then dispose of the tissue according to the Safety Department's Animal Tissue Disposal Service
4. a. Agents assigned to Biosafety Level 2 or 3 according to *Biosafety in Microbiological and Biomedical Laboratories*
5. d. All of the above
6. a. Bagged, boxed, frozen solidly with the proper disposal form attached and set out on the loading dock on the proper morning
7. d. All of the above
8. c. Only the Madison Energy Recovery, Incorporated facility

Chapter 9

1. d. Is safe, effective, and available free of charge to all at risk employees.
2. c. HBV
3. b. false
4. b. false
5. a. true
6. b. hepatitis following transfusion of blood or blood products.
7. e. all of the above.
8. d. blood contact with an open cut or wound on your hand.
9. d. HBV
10. b. vomitus
11. d. Do not remove, cut or bend your syringe needles before disposal. Recap your syringe needles only if a specially designed recapping device is used.
12. d. A puncture resistant sharps container is the only safe way to contain needles, syringes with needles, razor blades and scalpel blades for disposal.
13. d. All of the above; it is important to use a strong cardboard box, put packing tape on the edges and corners of the box and label the box as glass for disposal.
14. c. A strong cardboard box, custodians have been injured by plastic pipette tips disposed of in wastebaskets
15. a. true
16. a. true
17. b. false

Appendix B

1. c. To all UW laboratories that use hazardous chemicals.
2. b. If there is reason to believe that someone is routinely exposed to a hazardous chemical.
3. c. Should have a Chemical Hygiene Plan that covers the chemical hazards that they work with.
4. d. All of the above.
5. c. If they exhibit signs or symptoms associated with a hazardous chemical they may have been exposed to.
6. b. Should be readily accessible to everyone who works in the laboratory.
7. d. Require an appropriate physical and fit test before they can be used safely.