APPENDIX A
ANSWERS TO REVIEW QUESTIONS

SECTION ONE – GENERAL PEST MANAGEMENT INFORMATION

Chapter 1
Legalities of General Pest Management

(1) False, (2) B, (3) D, (4) B, (5) D, (6) C, (7) A, (8) False, (9) C, (10) D

(11) Definition, general description, why pesticide is used, general toxicity information (i.e, compound type, where applied, exposure information, amount/rate applied, label compliance), precautionary measures, and instructions to customer on site preparation, precautions, etc.

(12) True, (13) False, (14) D

(15) Unless otherwise specified by the product label, applicators must wear long pants, protective footwear, long-sleeved clothing (short-sleeved allowed if wash or waterless soap is immediately available), and gloves impervious to the pesticide.

(16) False

(17) Site evaluation, description, inspection and monitoring; the concept of threshold levels; the relationship between pest biology and pest management methods; pest population reduction and pest prevention; development and implementation of an IPM program that reduces the possible impact of pesticides; evaluation of an IPM program to determine effectiveness; record-keeping requirements of an IPM program.

(18) D

Chapter 2
Using Equipment in General Pest Management

(1) B, (2) A, (3) C, (4) F, (5) D, (6) E, (7) False, (8) A, (9) C, (10) B, (11) A, (12) B, (13) B, (14) A, (15) False, (16) False, (17) C, (18) A, (19) B, (20) C, (21) D, (22) C, (23) A, (24) D, (25) True, (26) E

(27) Measure a suitable test area similar to that which you will be spraying. A minimum test area of 10 feet by 25 feet (250 square feet) is suggested.

Fill the sprayer with water to a level that is easily recognized.

Spray the premeasured area using the same pressure and technique that you will use when applying the pesticide.

Refill the tank (with water) to the original water level. Be sure to note how much water you added to refill the tank.

Multiply the volume used for the test area by the appropriate number to get the volume of spray mixture you will need to spray 1,000 square feet. Change nozzles or adjust speed or pressure and recalibrate, if necessary.

Determine the amount of pesticide needed for each gallon of water and the amount of spray mixture needed to cover the intended spray area.

(28) How many ounces of insecticide are needed per gallon of water?

$$\text{Amount needed per gallon} = \frac{\text{amount needed per 1,000 square feet}}{\text{volume sprayed per 1,000 square feet}}$$

$$= 3 \text{ ounces}/2 \text{ gallons}$$

$$= 1.5 \text{ ounces/gallon}$$

How many ounces of insecticide per tankful of water?

$$\text{Amount per tank} = \text{tank capacity} \times \text{amount needed per gallon}$$

$$= 5 \text{ gallons} \times 1.5 \text{ ounces per gallon}$$

$$= 7.5 \text{ ounces/tank}$$

(29) How many square feet per tankful?

$$\text{Square feet per tank} = \frac{1{,}000 \text{ square feet feet}}{\text{gallons needed per 1,000 square feet}} \times \text{gallons per tank}$$

$$= \frac{1{,}000 \text{ square feet}}{2 \text{ gallons}} \times 5$$

$$= 2500 \text{ square feet per 5-gallon tank}$$

(30) True, (31) B, (32) C, (33) A, (34) True

Chapter 3
Pest Management and Control

(1) Any unwanted organism.

(2) The reduction of pest populations to tolerable numbers by changing practices, making habitat or structural alterations, and carefully using pesticides to kill pests only when indicated.

(3) A community with its physical and biological supports.

(4) False, (5) C, (6) B, (7) D, (8) C, (9) A, (10) A

(11) The level of pest density that can be tolerated. Advantages: eliminates preventive spraying, curtails excessive pesticide application, and encourages good inspection.

(12) B, (13) C

(14) Pests develop genetic resistance to the pesticide; use a multicomponent approach such as integrated pest management and/or alternate pesticides with different modes of action.

Chapter 4
Pest Management in Food-Handling and Other Specialized Facilities

(1) D, (2) A, (3) True, (4) D, (5) True, (6) False, (7) B

(8) The maximum levels for defects, such as the presence of insect fragments, mold, or rodent hairs in food products allowed by the Food and Drug Administration (FDA).

(9) False, (10) True, (11) B, (12) E, (13) A, (14) B, (15) C, (16) D, (17) F, (18) E, (19) D, (20) C, (21) A, (22) E, (23) B, (24) B, (25) D, (26) E, (27) E, (28) B, (29) E, (30) E, (31) E

SECTION TWO - STRUCTURE-INFESTING PESTS

Chapter 5
Insects and Their Relatives

(1) B, (2) C, (3) A, (4) B, (5) D, (6) A, (7) D, (8) C, (9) A, (10) B, (11) D, (12) D, (13) B

(14) Each stage of insect development may have different habitat requirements. It is important to understand the habits and habitats of each stage so that the appropriate pest control method(s) is (are) selected.

Chapter 6
Cockroaches

(1) A, (2) A, (3) C, (4) B, (5) D, (6) E, (7) E, (8) C, (9) A, (10) B, (11) E, (12) E

(13) Serves to keep cockroaches together in a group in areas of favorable harborage; facilitates mating by keeping adults of both sexes together.

(14) C, (15) B, (16) A, (17) A, (18) A, (19) B, (20) A, (21) A, (22) C, B, A, E, D, (23) E, (24) D

(25) Sanitation (intensive cleaning, remove food source, clean gutters and window wells, etc.)

Habitat alteration (reduce temperature and humidity—i.e., fix leaky sinks, ventilate etc., caulking/painting cracks and crevices, block entry points, remove woodpiles, etc.)

(26) E

Chapter 7
Ants

(1) False, (2) False, (3) False, (4) C, (5) A, A, B, A, B, B, B, A, (6) A, (7) B

(8) Caulk wall penetrations, tighten door and window frames, Repair window leaks, Trim shrubbery away from house, remove firewood/stones, etc. near house, control ant-tended aphids and mealybugs.

(9) B, (10) E, (11) B, (12) D, (13) D, (14) A, (15) B, (16) C, (17) B, (18) B, (19) E, (20) C, (21) A, (22) D, (23) B, (24) E, (25) False, (26) True

Chapter 8
Stored-product and Fabric Pests

(1) A, (2) B, (3) C, (4) A, (5) E, (6) B, (7) C, (8) D, (9) A, (10) E, (11) B, (12) D, (13) C, (14) E, (15) F, (16) D, (17) A, (18) D, (19) D, (20) E, (21) D, (22) C, (23) A, (24) False, (25) D, (26) C, (27) B, (28) A, (29) C, (30) True, (31) D, (32) E, (33) E, (34) B, (35) B, (36) D, (37) A, (38) E, (39) C

Chapter 9
Silverfish and Firebrats

(1) True, (2) C, (3) False, (4) B, (5) C, (6) B, (7) C, (8) D, (9) C, (10) B, (11) C, (12) E

(13) Locate moisture sources, mend leaky pipes, ventilate, dehumidify, eliminate standing water, make grade and guttering changes, dispose of infested materials, relocate stored materials to dry spaces, etc.

(14) Crack and crevice treatment in infested areas (to kill newly hatched); dusts as spot treatments (where there is no drift) or crack and crevice; napthalene flakes in sealed textile storage; and, fogs to eliminate heavy populations

Chapter 10
Fleas

(1) B, (2) A, (3) True, (4) C, (5) E, (6) True, (7) True, (8) A, (9) B, (10) A, (11) C, (12) E, (13) True

SECTION THREE - INVADING PESTS

Chapter 11
Houseflies and Their Relatives

(1) One group of flies is mosquito- or gnat-like with obvious, even somewhat long antennae. Their larvae have a head capsule and usually live in water (examples: midges, fungus gnats, etc.). The rest of the flies, the majority of the species, are usually not mosquito-like but are more robust with very small antennae. The larvae of this group are often maggot-like (examples, houseflies, blowflies, etc.).

(2) C, (3) B, (4) A, (5) A, (6) B, (7) A, (8) B, (9) B, (10) A, (11) A, (12) B, (13) B, (14) A, (15) D, (16) E, (17) C, (18) E, (19) F, (20) F, (21) B , (22) True, (23) True

(24) Caulk cracks and crevices (especially around windows); tighten up around windows and screen vents under roof; liquid pressurized sprays or dusts in wall voids; crack & crevice pesticides around windows and door frames; aerosols or space sprays with large infestations; sticky fly strips in front of windows; residual pesticides only on surfaces not used by people.

(25) Begin by locating the breeding sites: garbage cans, dumpsters, animal manure, etc., and inspect for fly entry points (open doors, etc.). Recommend sanitation methods such as removing garbage twice a week and removing all breeding and food materials: clean spills, drain wet areas, keep loading docks clean, etc. Exclusion can be achieved by caulking and tightening around doors, windows, ventilators, etc., screening entry points, and/or using air curtains or automatic door closers. Pesticide application might include fly strips, baits, aerosol contact sprays, and/or crack and crevice applications in areas where flies hide or enter.

(26) Seek out infested materials that are producing yeast: overripe fruit and vegetables, open or broken cans of fruit and vegetables, sour mops and rags, moist pet food and bedding. Use traps baited with ripe banana to locate the main infested area. Eliminate yeast-producing materials.

(27) B, (28) A, (29) C, (30) A, (31) A, (32) C, (33) False

Chapter 12
Stinging Pests

(1) C

(2) Aerial and underground. Several species of yellow jackets make suspended aerial nests. They attach a paper comb of cells to a structure or plant limb and construct a paper envelope around it. These combs are enlarged, and tiers are added as the colony grows. The envelope is also enlarged to accommodate growth. Many other species nest in the ground and start the first paper comb of cells in an existing hole; later, they add combs and enlarge the hole.

(3) B, (4) C, (5) D, (6) A, (7) F, (8) F, (9) B, (10) A, (11) E, (12) D, (13) D

(14) Remove old nest and scrape the point of attachment to discourage selection by a queen for a new comb; remove ripe fallen fruit; caulk openings in attics, window frames and wall penetrations to discourage overwintering by females; use pressurized sprays that propel spray 8 to 12 feet or use aerosols on extension poles.

(15) When people step on or disturb a colony; when they infest wall voids or attics; when workers swarm around ripe fallen fruit, beer, soft drinks etc. in backyards, at picnics, sporting events, and other gatherings.

(16) False

(17) Clean garbage cans and fit with tight lids; empty cans and dumpsters daily at public places; remove attractive refuse several times a day when yellow jacket activity is high; locate food facilities strategically at public events to avoid luring yellow jackets; clean drink-dispensing machines, screen food-dispensing stations, and locate trash cans away from food-dispensing areas; caulk holes and entry spaces in siding to limit infestations in wall voids and attics, and screen ventilation openings.

(18) A

(19) Insert plastic extension tube from a pressurized liquid spray or aerosol generator in the entrance hole and release the pesticides for 10 to 30 seconds. Plug the entrance hole with dusted steel wool or copper gauze, dust the plug and area around the entrance, cut nest down after yellow jackets are dead.

(20) Pesticide-dusted steel wool can be used to plug holes in wall voids, in aerial and ground nests, and in carpenter-bee tunnels.

(21) C, (22) B, (23) D, (24) A, (25) D, (26) A, (27) A

(28) Dust tunnels or inject with pressurized liquid insecticide. Insert a dusted plug of steel wool or copper gauze into the tunnel; fill the opening with caulk, wood filler, or a wooden dowel.

Chapter 13
Spiders

(1) A, (2) B, (3) A, (4) A, (5) B, (6) B, (7) A, (8) C, (9) C, (10) A, (11) A

(12) Inspect accumulations of logs, wood, bricks, construction materials, as well as stacks of baskets and equipment that have not been moved for some time. Privies, sheds, and inside such things as groundwater meters are potential nesting places. Black widows move into secluded spaces and remain if they are not disturbed. Be careful when reaching into potential black widow nesting places.

(13) Inspect rooms and spaces in a home that are little used by occupants. Examples are guest rooms and furniture, little-used closets, behind heavy furniture, clothes hanging from past seasons without being disturbed or worn. When spiders live outside in the southern portion of its range, look in window wells and accumulations of undisturbed materials near the structure.

(14) Inspect rooms where people have been bitten (often bedrooms); webbing sites in fall; angles of walls and ceilings, door and window facings, in furniture joints, in larger cracks and crevices, in thermostats, and other protected places; look for webs inside jets and burner trains of gas appliances that are inactive during the summer-winter transition period. Other sites are gas stoves and refrigerators in recreational vehicles, gas air conditioners and through-the-wall gas furnaces. The silken obstructions interfere with gas flow; operational failure can be an indication of their presence.

(15) True, (16) E, (17) A, (18) B, (19) D, (20) B, (21) False, (22) True

(23) Wolf spiders, jumping spiders and crab spiders.

Control measures:

Caulk and tighten structures to keep spiders from wandering in.

Remove vegetation and litter from foundation, doorways and window wells.

Modify lighting arrangements that attract flying insects that become spider prey.

Inspect flower arrangements brought inside.

Assure clients that they can swat or vacuum spiders without harm.

Pesticides effective only when used directly on spider habitat.

Use barrier spray around buildings where spiders are an obvious and threatening problem, but follow with other pest management procedures also.

Chapter 14 Ticks, Mites, Bedbugs, and Lice

(1) E, (2) A,C,B,A , (3) D, (4) False, (5) True , (6) A, (7) E, (8) True, (9) A, (10) C, (11) C, (12) D, (13) B, (14) A, (15) D, (16) C, (17) A

(18) The dog can be treated with pesticidal dips, washes, or dusts. The dog's bedding should be washed frequently and the pet should be checked regularly for ticks. The owner may also want to look into flea and tick collars. Keeping the grass cut short around buildings and fences and keeping stray animals out of the yard may also help. Advise pet owner that children should not play with the dog after it has been recently treated. Pesticide sprays or dusts may be used outside on the dog's kennel or resting area; inside, crack and crevice applications can be made where ticks hide. In both cases, warn pet owner that children and pets must stay out of the area until it is dry. Assure clients that brown dog ticks do not transmit disease.

(19) Dab the ticks with alcohol. If the ticks do not release within a few minutes, take some tweezers and grasp the tick at the skin level (not the back end) and pull steadily until the tick is removed. Place the tick in alcohol and keep it for identification. Treat the area with an antiseptic (mouthparts left in the skin will not transmit disease). Note the time and date of removal to calculate possible onset of symptoms. If the tick identified is a deer tick, see a physician. If it is an RMSF carrier, look for symptoms within a week after exposure; see a physician if symptoms develop.

(20) Drag a flannel rectangle across a field or path to collect ticks and take them in for identification at a university Extension Service office. Visit deer-checking stations during hunting season to arrange trapping of mice and counting of ticks. Consult local veterinarians—positive diagnoses of Lyme disease in dogs is a signal that human cases will follow. Interview game conservation agents to learn of host (mice, deer) prevalence and prevalence of disease in hunters and hunting dogs.

(21) Reduce rodent habitat to reduce hosts for larval and nymphal ticks (i.e., keep vegetation short, clean up corn left in edge rows of fields and grain spills, etc.). Make recommendations to conservation personnel such as encouraging deer hunting and the opening-up of woodland edges to encourage hawk and owl predation of mice. Other recommendations might include widening paths in camps and parks, denying public access to areas with high tick populations, etc. Herbicides and mowing may also be used to keep weeds down and reduce rodent habitat.

(22) Permethrin-treated cotton balls in cardboard cylinders must be placed outdoors in places close enough to reach female white-footed mice. The mice will take the cotton balls for use as nesting material. The tick parasites will be killed by permethrin while mice are in the nest. The device must be placed outdoors early enough in the season to kill larval and early nymphal stages of the ticks, which are the stages that parasitize white-footed mice.

(23) Wear long pants tucked into socks. Use insect repellents. Use permethirin formulations labeled for use on clothes. Sulfur powder dusted on socks may help. Schedule regular body inspections for ticks at noon and at bedtime.

(24) False, (25) False, (26) False, (27) A, (28) C, (29) B, (30) B, (31) C, (32) B, (33) True, (34) False

(35) Tighten, caulk, and screen entry routes. Store mattresses in protected areas. Open protective harborage inside (to allow predation) or tighten them up completely. Move woodpiles and keep weeds and shrubs away from the foundation. Eliminate garbage. Use labeled insecticides such as crack and crevice methods for treating harborage, furniture joints, etc. Treated mattresses should be dry before use.

(36) A

(37) First, establish that pesticides should not be used in the school for these pests. Close inspections of pupils and siblings should be made in their homes, especially homes of students where the teacher has observed louse nits in their hair. Emphasize how head lice can be transmitted and that safe preparations to control head lice can be obtained and should be used according to label directions.

(38) D, (39) C, (40) B, (41) B, (42) A, (43) C, (44) A, (45) B, (46) B, (47) E

Chapter 15 Miscellaneous Invaders

(1) B, (2) C, (3) E, (4) D, (5) A, (6) E, (7) True, (8) E, (9) False, (10) E, (11) E, (12) C, (13) A, (14) B, (15) D, (16) D, (17) A, (18) C, (19) B, (20) D, (21) D, (22) C, (23) E, (24) C, (25) B, (26) C, (27) B, (28) E, (29) E, (30) False, (31) E, (32) False

(28) Outside: Dust or spray gravel-covered plastic barrier and/or the mowed grass adjacent to it. Place pesticides near the building (sulfur is a possible miticide). Treat under sheathing, where possible.

Inside: General spot treatment on surfaces. Crack and crevice in structural joints and spaces from which mites emerge. Dust voids. Emulsifiable concentrates, wettable powders, dusts, and pressurized canned pesticides labeled for mite control are effective.

SECTION FOUR - RODENTS AND OTHER VERTEBRATE PESTS

Chapter 16
Rats

(1) B, (2) False, (3) False, (4) E, (5) A, (6) D, (7) B, (8) F, (9) C, (10) B, (11) E, (12) B, (13) D, (14) True

(15) Rats may be moving toxic bait into a location where the label does not permit it to be. Also rats may be hoarding poison bait while feeding on their regular food. Thus, a bait program becomes ineffective.

(16) A, (17) True, (18) A, C, B, D (19) A

(20) Sanitation (clean food spills, close or repair dumpsters, etc.); eliminate hiding places(remove plant ground covers such as ivy near buildings, reduce clutter in rarely used rooms, etc.); rat-proofing (seal cracks and holes in foundations, block openings around water and sewer pipes, screen air vents, caulk and seal doors, etc.).

(21) E, (22) True, (23) False, (24) C, (25) E, (26) False, (27) False, (28) A, (29) False, (30) True

(31) Bait box should be made of metal or heavy plastic; can be secured to floor, wall, or ground; should be clearly labeled with precautionary statements; should be placed in locations inaccessible to pets, children, etc.

Chapter 17
House Mice

(1) D, (2) True, (3) False, (4) D, (5) E, (6) C, (7) A, (8) B, (9) D, (10) B, (11) True, (12) False, (13) A, (14) D, (15) D, (16) E, (17) B, (18) False, (19) True, (20) C, (21) True, (22) A, (23) True, (24) False, (25) C, (26) E

(27) Mice can be living above their main food supply in suspended ceilings, attics, inside vertical pipe runs, and on top of walk-in coolers. Or they can be below, in floor voids, crawl spaces, or under coolers and/or processing equipment.

(28) Store bulk food in mouse-proof containers or rooms; stack packaged food in orderly rows on pallets for easy inspection; keep stored materials away from walls and off the floor; paint a 12- to 18-inch yellow band nest to the wall to detect mouse droppings, sweep often.

(29) Seal large holes in buildings; plug holes in foundation walls with steel wool or copper mesh; caulk and fit doors and windows tightly; seal holes around pipes, utility lines, vents, etc.

Chapter 18
Birds

(1) B, (2) D, (3) D, (4) A, (5) D, (6) C, (7) B, (8) C, (9) D, (10) True, (11) B, (12) E, (13) B, (14) A, (15) A, (16) B, (17) C, (18) A, (19) B, (20) B, (21) A, (22) C, (23) C, (24) True, (25) C, (26) E, (27) A, (28) C, (29) D, (30) B, (31) F, (32) False, (33) D, (34) False, (35) D, (36) C, (37) B, (38) D, (39) C, (40) D, (41) False, (42) False, (43) False, (44) True, (45) False

(46) (1) Identify non-targets in the area. (2) Use low risk tactics. (3) Modify tactics to minimize risk. (4) Monitor operations to be sure that non-targets are not being adversely affected

Chapter 19
Other Vertebrate Pests

(1) D, (2) A, (3) B

(4) Look for loose flashing, vents, shingles, or siding that bats can squeeze through or under. Look for damage and openings under eaves and soffits, at cornices, louvers, and doors, by chimneys and windows, and places where pipes and wiring enter. Remember that twilight is the best time to observe bats leaving a building to feed.

(5) B, (6) False, (7) E, (8) True, (9) B

(10) Quarter-inch hardware cloth for bats (1/2-inch hardware cloth for squirrels), screening, sheet metal, caulking, expanding polyurethane foam, steel wool, and duct tape.

(11) True, (12) True, (13) C, (14) C, (15) E, (16) A, (17) A

(18) Tramp down mole tunnels in several places over the yard. Mark tramped-down sections with a peg or wire flag. If the tunnel has been pushed back up in the next day or so, a trap should be set in that place. Place a plastic pail with a warning sign over each trap. Three to five traps per acre are required. Check the traps every couple of days. If there are no results after 3 to 4 days, move the traps to new locations.

(19) D, (20) E, (21) True, (22) E, (23) B

(24) Seal all openings under the building except one. Sprinkle a tracking patch of talc at the opening. Examine the area after dark. If tracks show that the animal has left, close this last opening immediately.

(25) A, (26) False