

Certified Beekeeper Test Bank

Study Questions with Accompanying Answers and Rationale

Companion to the Certified Beekeeper Written Study Guide · October 2026

This test bank contains 334 questions across 12 chapters, one section for each chapter of the companion Certified Beekeeper Study Guide and in the same order, in three formats:

- (MC) Multiple Choice – select the single best answer
- (TF) True/False
- (SA) Short Answer – answer in a short paragraph; some items require more than one element for full credit

Questions are numbered continuously 1–334. A separate answer key follows each chapter's questions, providing the correct answer and an explanatory rationale for every item. Good luck.

Each answer in the answer keys is tagged with a Study Guide reference (chapter and section) to the companion Certified Beekeeper Study Guide, so you can review the material behind any question you miss. Section numbers in this test bank match the Study Guide chapter numbers. Where this test bank and the Study Guide differ in detail, the Study Guide wording is the more current.

Overview: 246 Multiple Choice · 50 True/False · 38 Short Answer

Contents

[Section 1: Chapter 1: History of Beekeeping \(Q1–27\) *answer key*](#)

[Section 2: Chapter 2: Honey Bee Biology and Behavior \(Q28–60\) *answer key*](#)

[Section 3: Chapter 3: Safety in the Bee Yard \(Q61–86\) *answer key*](#)

[Section 4: Chapter 4: Allergic Reactions and Anaphylaxis \(Q87–108\) *answer key*](#)

[Section 5: Chapter 5: Selecting an Apiary Site \(Q109–131\) *answer key*](#)

[Section 6: Chapter 6: Beekeeping Equipment and Getting Started \(Q132–158\) *answer key*](#)

[Section 7: Chapter 7: Hive Management \(Q159–179\) *answer key*](#)

[Section 8: Chapter 8: Seasonal Management \(Q180–199\) *answer key*](#)

[Section 9: Chapter 9: Queens and Colony Increase \(Q200–222\) *answer key*](#)

[Section 10: Chapter 10: Forage, Nutrition, and Pollinator Protection \(Q223–245\) *answer key*](#)

[Section 11: Chapter 11: Predators, Pests, and Diseases of Honey Bee Colonies \(Q246–291\) *answer key*](#)

[Section 12: Chapter 12: Honey Bee Products \(Q292–334\) *answer key*](#)

Section 1: Chapter 1: History of Beekeeping (Q1–27)

1. (MC) Spain's Cuevas de la Araña rock art, which depicts people raiding wild bee colonies for honey, is roughly how old?
 - A) About 800 years
 - B) About 8,000 years
 - C) About 80,000 years
 - D) About 800,000 years
2. (MC) The earliest known picture of hives, from the sun temple of King Nyuserre (about 2400 BCE), shows hives made of:
 - A) Coiled straw
 - B) Hollow logs
 - C) Stacked horizontal clay or mud tubes
 - D) Wooden frames in a top-opening box
3. (MC) Where did the coiled-straw skep develop and remain the dominant hive for many centuries?
 - A) Ancient Egypt and the Nile valley
 - B) Northwestern Europe and Britain
 - C) Central America
 - D) Southern Africa
4. (MC) Hollowed sections of black gum (tupelo) logs stood on end were used by early beekeepers in Appalachia and the Southeast. Log hives in America are still called:
 - A) Skeps
 - B) Gums
 - C) Bee boles
 - D) Nucs
5. (MC) What limitation did every early hive design (Egyptian clay, skeps, log gums, and African bark hives) share?
 - A) They were too small to hold a colony through winter
 - B) They could be used only in warm climates
 - C) The comb could not be removed and inspected without cutting it out, which usually destroyed it
 - D) They could be opened only with smoke
6. (MC) Which beekeeper is credited with a genuine movable-frame hive in 1814?
 - A) François Huber
 - B) Petro Prokopovych
 - C) Lorenzo Langstroth
 - D) Johannes Mehring
7. (MC) Who built a movable-comb hive in 1838 and by 1848 had worked out the propolis-free spacing (about 8 mm) that Langstroth later applied?
 - A) Johann (Jan) Dzierzon
 - B) Moses Quinby
 - C) Amos Root
 - D) Franz von Hruschka
8. (MC) Langstroth's most important contribution to hive design was:
 - A) Discovering bee space for the first time
 - B) Building the first movable-frame hive

- C) Applying bee space on every side of frames hung in a single top-opening box, producing the first widely practical movable-frame hive
 - D) Inventing wax foundation
9. (MC) Langstroth patented his hive on October 5 of which year?
- A) 1822
 - B) 1852
 - C) 1878
 - D) 1922
10. (MC) In what year did the Virginia Company ship the first honey bee colonies to the Jamestown colony?
- A) 1492
 - B) 1700
 - C) 1622
 - D) 1859
11. (MC) Who invented the wax foundation sheet in 1857, giving bees a template to draw straight comb?
- A) Johannes Mehring
 - B) Franz von Hruschka
 - C) T.F. Bingham
 - D) Harry Laidlaw
12. (MC) The centrifugal honey extractor, which spins honey out of comb without destroying it, was invented in 1865 by:
- A) Moses Quinby
 - B) Amos Root
 - C) C.C. Miller
 - D) Franz von Hruschka
13. (MC) Who built the first bellows smoker in 1873?
- A) Lorenzo Langstroth
 - B) Moses Quinby
 - C) Amos Root
 - D) Stephen Taber III
14. (MC) The Federal Honey Bee Act, which restricts honey bee imports to help keep out foreign pests and diseases, was passed in:
- A) 1857
 - B) 1922
 - C) 1987
 - D) 1990
15. (MC) Karl von Frisch received the 1973 Nobel Prize in Physiology or Medicine for decoding the honey bee's:
- A) Queen pheromones
 - B) Waggle dance
 - C) Varroa mite reproduction
 - D) Instrumental insemination
16. (MC) Africanized honey bees established a permanent breeding presence in the United States in 1990 by crossing from Mexico into:
- A) Florida
 - B) Georgia

- C) California
- D) Texas

17. (MC) Which beekeeper developed practical instrumental insemination techniques for queens and is often called the "Father of Honey Bee Genetics"?

- A) Amos Root
- B) C.C. Miller
- C) Harry H. Laidlaw Jr.
- D) Moses Quinby

18. (MC) Brother Adam of Buckfast Abbey is best known for developing which honey bee strain?

- A) Russian
- B) Carniolan
- C) Buckfast
- D) Minnesota Hygienic

19. (MC) What did C.L. Farrar's USDA research in Wisconsin show about colony size?

- A) Large, populous colonies produce far more honey per bee than small ones
- B) Small colonies produce more honey per bee than large ones
- C) Colony size has no effect on honey production
- D) Queen excluders double honey yields

20. (TF) Lorenzo Langstroth was the first person to build a movable-frame hive and the first to notice bee space.

21. (TF) *Apis mellifera* is native to the Americas.

22. (TF) The first Italian honey bees were successfully imported in 1859–60 and gradually replaced the darker, more defensive "German" bees the colonists had brought.

23. (TF) Stephen Taber III, a USDA bee researcher and author of *Breeding Super Bees*, was born in Columbia, South Carolina.

24. (TF) Brother Adam began breeding the Buckfast bee in response to heavy colony losses from Isle of Wight disease in Britain.

25. (SA) Name three hive designs that predated the movable-frame hive, and state the limitation they all shared.

26. (SA) What was Langstroth's actual contribution to hive design in 1851–52, and who is one earlier beekeeper who had already applied movable-frame or spacing principles?

27. (SA) Name two inventions of 1857–1873 that made modern beekeeping practical, and give the inventor of each.

Answer Key, Section 1: Chapter 1: History of Beekeeping (Q1–27)

1. (MC) *Spain's Cuevas de la Araña rock art, which depicts people raiding wild bee colonies for honey, is roughly how old?*

Answer: B) About 8,000 years

Rationale: About 8,000 years. Early humans were honey hunters, not beekeepers, long before anyone kept bees in a human-made container.

Study Guide: Ch. 1, §A — The Evolution of the Hive

2. (MC) *The earliest known picture of hives, from the sun temple of King Nyuserre (about 2400 BCE), shows hives made of:*

Answer: C) Stacked horizontal clay or mud tubes

Rationale: Stacked horizontal clay or mud hives (roughly 4,400 years ago). Clay pipe hives of this kind remain traditional across the Middle East and North Africa.

Study Guide: Ch. 1, §A — The Evolution of the Hive

3. (MC) *Where did the coiled-straw skep develop and remain the dominant hive for many centuries?*

Answer: B) Northwestern Europe and Britain

Rationale: Northwestern Europe and Britain. Greek and Roman beekeepers of the Mediterranean used clay hives along with woven wicker, bark, and cork hives.

Study Guide: Ch. 1, §A — The Evolution of the Hive

4. (MC) *Hollowed sections of black gum (tupelo) logs stood on end were used by early beekeepers in Appalachia and the Southeast. Log hives in America are still called:*

Answer: B) Gums

Rationale: Gums, named for the black gum logs used to make them.

Study Guide: Ch. 1, §A — The Evolution of the Hive

5. (MC) *What limitation did every early hive design (Egyptian clay, skeps, log gums, and African bark hives) share?*

Answer: C) The comb could not be removed and inspected without cutting it out, which usually destroyed it

Rationale: All were fixed-comb hives. Harvesting honey generally meant destroying the comb and often killing or driving off the colony.

Study Guide: Ch. 1, §A — The Evolution of the Hive

6. (MC) *Which beekeeper is credited with a genuine movable-frame hive in 1814?*

Answer: B) Petro Prokopovych

Rationale: Ukrainian beekeeper Petro Prokopovych. Huber's hinged-frame "leaf hive" (1789) came earlier, but Prokopovych's design let combs be inspected and harvested individually.

Study Guide: Ch. 1, §A — The Evolution of the Hive

7. (MC) *Who built a movable-comb hive in 1838 and by 1848 had worked out the propolis-free spacing (about 8 mm) that Langstroth later applied?*

Answer: A) Johann (Jan) Dzierzon

Rationale: Johann (Jan) Dzierzon, more than a decade before Langstroth's own work.

Study Guide: Ch. 1, §A — The Evolution of the Hive

8. (MC) *Langstroth's most important contribution to hive design was:*

Answer: C) Applying bee space on every side of frames hung in a single top-opening box, producing the first widely practical movable-frame hive

Rationale: Langstroth neither discovered bee space nor built the first movable-frame hive. His contribution was combining full bee space on all sides, movable frames, and practical stackable construction (1851).

Study Guide: Ch. 1, §A — The Evolution of the Hive

9. (MC) *Langstroth patented his hive on October 5 of which year?*

Answer: B) 1852

Rationale: 1852. The design is the direct ancestor of the modern wooden hive used throughout the United States.

Study Guide: Ch. 1, §A — The Evolution of the Hive

10. (MC) *In what year did the Virginia Company ship the first honey bee colonies to the Jamestown colony?*

Answer: C) 1622

Rationale: 1622, introducing *Apis mellifera* to North America.

Study Guide: Ch. 1, §C — Honey Bees in America

11. (MC) *Who invented the wax foundation sheet in 1857, giving bees a template to draw straight comb?*

Answer: A) Johannes Mehring

Rationale: Johannes Mehring (1857). Commercial foundation mills began mass-producing foundation in the 1870s.

Study Guide: Ch. 1, §C — Honey Bees in America

12. (MC) *The centrifugal honey extractor, which spins honey out of comb without destroying it, was invented in 1865 by:*

Answer: D) Franz von Hruschka

Rationale: Franz von Hruschka (1865).

Study Guide: Ch. 1, §C — Honey Bees in America

13. (MC) *Who built the first bellows smoker in 1873?*

Answer: B) Moses Quinby

Rationale: Moses Quinby (unpatented). T.F. Bingham's improved design, patented in 1878, set the basic pattern still used today.

Study Guide: Ch. 1, §C — Honey Bees in America

14. (MC) *The Federal Honey Bee Act, which restricts honey bee imports to help keep out foreign pests and diseases, was passed in:*

Answer: B) 1922

Rationale: 1922, following concern over Isle of Wight disease and tracheal mites.

Study Guide: Ch. 1, §C — Honey Bees in America

15. (MC) *Karl von Frisch received the 1973 Nobel Prize in Physiology or Medicine for decoding the honey bee's:*

Answer: B) Waggle dance

Rationale: The waggle dance.

Study Guide: Ch. 1, §C — Honey Bees in America

16. (MC) *Africanized honey bees established a permanent breeding presence in the United States in 1990 by crossing from Mexico into:*

Answer: D) Texas

Rationale: Texas. An earlier isolated colony had been detected and eradicated in California in 1985.

Study Guide: Ch. 1, §C — Honey Bees in America

17. (MC) *Which beekeeper developed practical instrumental insemination techniques for queens and is often called the "Father of Honey Bee Genetics"?*

Answer: C) Harry H. Laidlaw Jr.

Rationale: Harry H. Laidlaw Jr. (1907–2003), whose methods enabled controlled breeding programs still used today.

Study Guide: Ch. 1, §D — Historically Significant American Beekeepers

18. (MC) *Brother Adam of Buckfast Abbey is best known for developing which honey bee strain?*

Answer: C) Buckfast

Rationale: Brother Adam (Karl Kehrle, 1898–1996) spent about 70 years crossing surviving British stock with bees from across Europe, North Africa, and the Middle East after Isle of Wight disease losses, producing the gentle, productive Buckfast bee.

Study Guide: Ch. 1, §D — Historically Significant American Beekeepers

19. (MC) *What did C.L. Farrar's USDA research in Wisconsin show about colony size?*

Answer: A) Large, populous colonies produce far more honey per bee than small ones

Rationale: Farrar showed that large, populous colonies are disproportionately productive, which made building and maintaining colony population (including with pollen supplements) a core management principle.

Study Guide: Ch. 1, §D — Historically Significant American Beekeepers

20. (TF) *Lorenzo Langstroth was the first person to build a movable-frame hive and the first to notice bee space.*

Answer: False

Rationale: Huber, Prokopovych, and Dzierzon all preceded him, and Dzierzon had worked out the propolis-free spacing by 1848.

Study Guide: Ch. 1, §A — The Evolution of the Hive

21. (TF) *Apis mellifera is native to the Americas.*

Answer: False

Rationale: European colonists brought honey bees to North America; the first colonies arrived at Jamestown in 1622.

Study Guide: Ch. 1, §C — Honey Bees in America

22. (TF) *The first Italian honey bees were successfully imported in 1859–60 and gradually replaced the darker, more defensive "German" bees the colonists had brought.*

Answer: True

Rationale: Earlier import attempts had failed.

Study Guide: Ch. 1, §C — Honey Bees in America

23. (TF) *Stephen Taber III, a USDA bee researcher and author of Breeding Super Bees, was born in Columbia, South Carolina.*

Answer: True

Rationale: Taber (1924–2008) worked at the USDA bee laboratories in Baton Rouge, Louisiana, and Tucson, Arizona.

Study Guide: Ch. 1, §D — Historically Significant American Beekeepers

24. (TF) *Brother Adam began breeding the Buckfast bee in response to heavy colony losses from Isle of Wight disease in Britain.*

Answer: True

Rationale: Isle of Wight disease killed most British colonies in the early 1900s; Brother Adam rebuilt Buckfast Abbey's apiary from survivors and outcrosses, beginning the Buckfast line.

Study Guide: Ch. 1, §D — Historically Significant American Beekeepers

25. (SA) *Name three hive designs that predated the movable-frame hive, and state the limitation they all shared.*

Model answer: Any three of: Egyptian clay or mud hives; Mediterranean clay or woven wicker hives; coiled-straw skeps (northwestern Europe and Britain); hollow-log hives or American "gums"; African bark hives. Shared limitation: fixed comb. It could not be removed and inspected without cutting it out, which generally destroyed the comb and often killed or drove off the colony.

Study Guide: Ch. 1, §A — The Evolution of the Hive

26. (SA) *What was Langstroth's actual contribution to hive design in 1851–52, and who is one earlier beekeeper who had already applied movable-frame or spacing principles?*

Model answer: He applied bee space consistently to every side of frames suspended in a single top-opening box, so each frame lifts out without being glued down, and patented it in 1852, producing the first commercially practical, widely adopted movable-frame hive. Earlier beekeepers: François Huber (1789 leaf hive), Petro Prokopovych (1814 movable-frame hive), or Johann Dzierzon (1838 movable-comb hive; spacing worked out by 1848).

Study Guide: Ch. 1, §A — The Evolution of the Hive

27. (SA) *Name two inventions of 1857–1873 that made modern beekeeping practical, and give the inventor of each.*

Model answer: Any two of: wax foundation (Johannes Mehring, 1857); centrifugal honey extractor (Franz von Hruschka, 1865); bellows smoker (Moses Quinby, 1873).

Study Guide: Ch. 1, §C — Honey Bees in America

Section 2: Chapter 2: Honey Bee Biology and Behavior (Q28–60)

28. (MC) What is the scientific name of the honey bee species kept by beekeepers in North America?
- A) *Apis cerana*
 - B) *Apis mellifera*
 - C) *Apis dorsata*
 - D) *Bombus terrestris*
29. (MC) What is the closest relative species to *Apis mellifera*?
- A) *Apis dorsata*
 - B) *Apis cerana*
 - C) *Apis florea*
 - D) *Bombus impatiens*
30. (MC) The Italian honey bee race (*A. m. ligustica*) originates from which region?
- A) Northern Europe
 - B) Eastern Europe
 - C) Mediterranean
 - D) Southern Africa
31. (MC) What is the approximate annual economic impact of western honey bees in the U.S.?
- A) \$5–10 billion
 - B) \$15–20 billion
 - C) \$50+ billion
 - D) Under \$1 billion
32. (MC) What light wavelength can honey bees see that humans cannot?
- A) Infrared
 - B) Ultraviolet
 - C) Green
 - D) Yellow
33. (MC) How many legs, wings, and ocelli does a honey bee have?
- A) 6 legs, 4 wings, 3 ocelli
 - B) 4 legs, 2 wings, 2 ocelli
 - C) 6 legs, 2 wings, 3 ocelli
 - D) 8 legs, 4 wings, 2 ocelli
34. (MC) About how many days after the egg is laid does a queen emerge as an adult?
- A) 16
 - B) 21
 - C) 24
 - D) 12
35. (MC) Which form develops from an unfertilized egg?
- A) Worker
 - B) Queen
 - C) Drone
 - D) None — all bee eggs are fertilized
36. (MC) Which gland in young nurse bees produces the protein-rich brood food (and royal jelly)?

- A) Nasonov gland
 - B) Sting gland
 - C) Wax gland
 - D) Hypopharyngeal gland
37. (MC) How does a honey bee take in oxygen?
- A) Through lungs in the thorax
 - B) Through tracheae that open to the outside at spiracles
 - C) Through gills along the abdomen
 - D) Only through its skin
38. (MC) Which gland releases the lemony orienting scent that workers fan at the hive entrance or a swarm cluster?
- A) Mandibular gland
 - B) Salivary gland
 - C) Nasonov gland
 - D) Hypopharyngeal gland
39. (MC) Where are a worker bee's wax glands located?
- A) On the underside of the abdomen
 - B) On the head, beside the mandibles
 - C) On the hind legs, next to the pollen basket
 - D) Inside the thorax
40. (MC) What temperature do bees maintain in the brood-rearing area?
- A) 80–85°F
 - B) 92–95°F
 - C) 98–102°F
 - D) 70–75°F
41. (MC) What is the minimum dimension of "bee space"?
- A) 1/16"
 - B) 3/16"
 - C) 1/2"
 - D) 1"
42. (MC) If beekeepers leave a gap larger than bee space between combs, what will the bees do?
- A) Fill it with propolis
 - B) Build burr/bridge comb in it
 - C) Ignore it
 - D) Seal it with wax cappings
43. (MC) What is the process called in which a colony reproduces by having the old queen leave with part of the workforce to found a new colony?
- A) Supersedure
 - B) Absconding
 - C) Swarming
 - D) Balling
44. (MC) Which pheromone draws worker bees together (aggregation)?
- A) Alarm pheromone
 - B) Brood pheromone
 - C) Queen Mandibular Pheromone (QMP)

- D) Nasonov pheromone
45. (MC) What does Queen Mandibular Pheromone (the "queen sign") primarily do to workers?
- A) Recruits defenders
 - B) Suppresses ovary development, signals queen presence
 - C) Marks predators
 - D) Stimulates hypopharyngeal glands
46. (MC) What happens immediately after the swarm cluster leaves the original hive?
- A) The new queen mates and begins laying
 - B) Scout bees set out from the cluster to locate a new home
 - C) Workers cap the developing queen cells
 - D) The swarm builds new comb in a new cavity
47. (MC) What is the key difference in placement between swarm cells and supersedure cells on the comb?
- A) Swarm cells are capped, supersedure cells stay open
 - B) Swarm cells form along the edge/bottom of the comb, supersedure cells form in the middle of the brood area
 - C) Swarm cells are smaller
 - D) There's no reliable difference
48. (MC) Why can laying workers in a queenless, broodless colony only produce drones?
- A) They're too old to mate
 - B) They were never mated, so they can only lay unfertilized eggs
 - C) The colony deliberately chooses to raise only drones
 - D) Colony pheromones suppress female development
49. (MC) About how many bee species are native to the United States?
- A) About 40
 - B) About 400
 - C) About 4,000
 - D) About 40,000
50. (TF) Drones die after mating (copulation).
51. (TF) Queens typically mate only once in their lifetime.
52. (TF) Swarm cells are usually built along the edge/bottom of the comb, while supersedure cells are built in the middle of the brood area.
53. (TF) The queen mates inside the hive.
54. (TF) Like honey bees, yellowjackets feed their young on pollen and nectar.
55. (SA) Name the four resources a forager bee collects for the colony.
56. (SA) Name the two specialized mouthparts bees use — one to chew solids, one to drink liquids.
57. (SA) About how old (in days) is a worker bee when she begins producing brood food as a nurse bee? About how old when she begins foraging?
58. (SA) How do bees warm the brood nest when it's cold, and how do they cool it when it's hot?
59. (SA) In the waggle dance, what two pieces of information does a forager communicate, and how is each encoded?
60. (SA) Give three differences between a honey bee worker and a yellowjacket.

Answer Key, Section 2: Chapter 2: Honey Bee Biology and Behavior (Q28–60)

28. (MC) *What is the scientific name of the honey bee species kept by beekeepers in North America?*

Answer: B) *Apis mellifera*

Rationale: *Apis mellifera*, the western/European honey bee.

Study Guide: Ch. 2, §A — Origins of the Western Honey Bee

29. (MC) *What is the closest relative species to *Apis mellifera*?*

Answer: B) *Apis cerana*

Rationale: *Apis cerana*, the eastern honey bee.

Study Guide: Ch. 2, §A — Origins of the Western Honey Bee

30. (MC) *The Italian honey bee race (*A. m. ligustica*) originates from which region?*

Answer: C) Mediterranean

Rationale: Italian race (*A. m. ligustica*) originates from the Mediterranean.

Study Guide: Ch. 2, §A — Origins of the Western Honey Bee

31. (MC) *What is the approximate annual economic impact of western honey bees in the U.S.?*

Answer: B) \$15–20 billion

Rationale: Roughly \$15–20 billion per year in the U.S. (USDA credits honey bee pollination with about \$15 billion in added crop value).

Study Guide: Ch. 2, §A — Origins of the Western Honey Bee

32. (MC) *What light wavelength can honey bees see that humans cannot?*

Answer: B) Ultraviolet

Rationale: Ultraviolet.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

33. (MC) *How many legs, wings, and ocelli does a honey bee have?*

Answer: A) 6 legs, 4 wings, 3 ocelli

Rationale: 6 legs, 4 wings, 3 ocelli.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

34. (MC) *About how many days after the egg is laid does a queen emerge as an adult?*

Answer: A) 16

Rationale: Day 16 (worker: day 21, drone: day 24).

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

35. (MC) *Which form develops from an unfertilized egg?*

Answer: C) Drone

Rationale: Drone (unfertilized egg); workers and queens come from fertilized eggs.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

36. (MC) *Which gland in young nurse bees produces the protein-rich brood food (and royal jelly)?*

Answer: D) Hypopharyngeal gland

Rationale: The hypopharyngeal (brood-food) glands in the head are well developed in nurse bees and secrete brood food; in foragers they produce enzymes such as invertase.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

37. (MC) *How does a honey bee take in oxygen?*

Answer: B) Through tracheae that open to the outside at spiracles

Rationale: Insects have no lungs; air enters through spiracles along the thorax and abdomen and travels through branching tracheae directly to the tissues.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

38. (MC) Which gland releases the lemony orienting scent that workers fan at the hive entrance or a swarm cluster?

Answer: C) Nasonov gland

Rationale: The Nasonov (scent) gland near the tip of the worker's abdomen releases an orienting pheromone that guides nestmates to the entrance, a swarm, water, or food.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

39. (MC) Where are a worker bee's wax glands located?

Answer: A) On the underside of the abdomen

Rationale: Workers have four pairs of wax glands on the underside of the abdomen, most active at about 12–18 days of age.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

40. (MC) What temperature do bees maintain in the brood-rearing area?

Answer: B) 92–95°F

Rationale: 92–95°F.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

41. (MC) What is the minimum dimension of "bee space"?

Answer: B) 3/16"

Rationale: 3/16" (about 4.8 mm) is the commonly taught minimum. Bee space is the 3/16–3/8" (about 4.8–9.5 mm) gap that bees leave open: smaller gaps get sealed with propolis, and larger gaps get filled with burr or bridge comb.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

42. (MC) If beekeepers leave a gap larger than bee space between combs, what will the bees do?

Answer: B) Build burr/bridge comb in it

Rationale: Bees build burr/bridge comb in gaps larger than bee space; gaps smaller than bee space get packed with propolis.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

43. (MC) What is the process called in which a colony reproduces by having the old queen leave with part of the workforce to found a new colony?

Answer: C) Swarming

Rationale: Swarming.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

44. (MC) Which pheromone draws worker bees together (aggregation)?

Answer: D) Nasonov pheromone

Rationale: Nasonov pheromone (produced by workers, draws/aggregates bees together).

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

45. (MC) What does Queen Mandibular Pheromone (the "queen sign") primarily do to workers?

Answer: B) Suppresses ovary development, signals queen presence

Rationale: Suppresses ovary development in workers and signals the queen's presence (also drives worker development).

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

46. (MC) What happens immediately after the swarm cluster leaves the original hive?

Answer: B) Scout bees set out from the cluster to locate a new home

Rationale: Scout bees set out from the cluster to find a new home.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

47. (MC) *What is the key difference in placement between swarm cells and supersedure cells on the comb?*

Answer: B) Swarm cells form along the edge/bottom of the comb, supersedure cells form in the middle of the brood area

Rationale: Swarm cells: edge/bottom of comb. Supersedure cells: middle of the brood area.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

48. (MC) *Why can laying workers in a queenless, broodless colony only produce drones?*

Answer: B) They were never mated, so they can only lay unfertilized eggs

Rationale: Laying workers were never mated and can only lay unfertilized (drone-producing) eggs.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

49. (MC) *About how many bee species are native to the United States?*

Answer: C) About 4,000

Rationale: Roughly 4,000 bee species are native to the U.S., out of about 20,000 worldwide; the honey bee itself is not native to the Americas.

Study Guide: Ch. 2, §D — Honey Bees, Other Bees, and Wasps

50. (TF) *Drones die after mating (copulation).*

Answer: True

Rationale: Drones die after copulation.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

51. (TF) *Queens typically mate only once in their lifetime.*

Answer: False

Rationale: Queens mate in flight with multiple drones (about 12–20) during mating flights.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

52. (TF) *Swarm cells are usually built along the edge/bottom of the comb, while supersedure cells are built in the middle of the brood area.*

Answer: True

Rationale: Swarm cells develop along the edge of the comb; supersedure cells develop in the middle of the brood area.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

53. (TF) *The queen mates inside the hive.*

Answer: False

Rationale: The queen mates in flight, away from the hive, not inside it.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

54. (TF) *Like honey bees, yellowjackets feed their young on pollen and nectar.*

Answer: False

Rationale: Yellowjackets and other wasps feed their young insects and meat; bees feed their young pollen and nectar.

Study Guide: Ch. 2, §D — Honey Bees, Other Bees, and Wasps

55. (SA) *Name the four resources a forager bee collects for the colony.*

Model answer: Water, pollen, nectar, and tree resins.

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

56. (SA) Name the two specialized mouthparts bees use — one to chew solids, one to drink liquids.

Model answer: Mandibles (chew solids: wax, pollen, wood) and proboscis (suck liquids: water, nectar, honey).

Study Guide: Ch. 2, §B — Honey Bee Anatomy and Development

57. (SA) About how old (in days) is a worker bee when she begins producing brood food as a nurse bee? About how old when she begins foraging?

Model answer: ~5 days old to begin producing brood food as a nurse bee (nursing generally spans roughly days 3–12); ~20 days old to begin foraging.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

58. (SA) How do bees warm the brood nest when it's cold, and how do they cool it when it's hot?

Model answer: Warm: bees cluster together and vibrate their flight muscles to generate heat. Cool: bees fan their wings and evaporate water to cool the hive.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

59. (SA) In the waggle dance, what two pieces of information does a forager communicate, and how is each encoded?

Model answer: Direction — encoded by the angle of the waggle run relative to vertical on the comb, which corresponds to the angle to the sun outside. Distance — encoded by the duration/vigor (length) of the waggle run.

Study Guide: Ch. 2, §C — Honey Bee Behaviors and Colony Structure

60. (SA) Give three differences between a honey bee worker and a yellowjacket.

Model answer: Any three of: honey bees are fuzzy with branched hairs, yellowjackets are mostly hairless and shiny; honey bees feed young pollen and nectar, yellowjackets feed insects and meat; honey bees build wax comb in a cavity, yellowjackets build paper nests, often underground; a honey bee's barbed sting usually stays in the skin and the bee dies, while a yellowjacket can sting repeatedly and leaves no stinger; honey bees rarely sting while foraging, while yellowjackets can be aggressive scavengers, especially in fall.

Study Guide: Ch. 2, §D — Honey Bees, Other Bees, and Wasps

Section 3: Chapter 3: Safety in the Bee Yard (Q61–86)

61. (MC) Which of the following is NOT one of the early cues honey bees give as they become defensive?
- A) Nervous, erratic movements
 - B) Abrupt flights toward your hands/face
 - C) Loud buzzing
 - D) Increased comb-building near the entrance
62. (MC) Agitated, defensive honey bees are often described as smelling like:
- A) Apples
 - B) Bananas
 - C) Cherries
 - D) Almonds
63. (MC) Which of the following is an early warning sign a colony gives before bees begin to sting?
- A) Bees clustering quietly at the entrance
 - B) Bees bumping or head-butting the veil or hands, with rising buzzing pitch and volume
 - C) Foragers returning with extra pollen
 - D) Increased comb building near the entrance
64. (MC) Which of the following commonly provokes defensive behavior?
- A) Working at midday on a warm, sunny day
 - B) Opening the hive on a cool, cloudy, or rainy day
 - C) Using a few light puffs of smoke
 - D) Wearing light-colored, smooth clothing
65. (MC) Why can dark, rough-textured clothing provoke defensive responses?
- A) It overheats the beekeeper
 - B) It can visually and texturally resemble a natural predator such as a bear
 - C) It absorbs smoke
 - D) It attracts foragers carrying nectar
66. (MC) Why should pets and livestock be kept well away from an apiary?
- A) Bees pass diseases to them
 - B) They compete with bees for water
 - C) Animals that disturb or are stung by bees can provoke a broader defensive response that endangers people nearby
 - D) They eat hive equipment
67. (MC) Where should a beekeeper stand when approaching and working a hive?
- A) Directly in front of the entrance, to watch the guards
 - B) Off to the side or rear of the entrance, out of the flight path
 - C) On the landing board
 - D) Directly upwind, with the back to the hive
68. (MC) If bees become agitated and begin bumping or stinging, the correct response is to:
- A) Run away quickly
 - B) Swat the bees off
 - C) Open the hive wider and add smoke
 - D) Move away calmly
69. (MC) Why is swatting at stinging bees a poor response?

- A) It spreads Varroa mites
 - B) Crushing bees releases more alarm pheromone, escalating the response
 - C) It damages protective clothing
 - D) It calms the colony too much
70. (MC) Smoke calms a colony primarily because it:
- A) Kills the guard bees
 - B) Puts bees to sleep for an hour
 - C) Cools the hive
 - D) Masks alarm pheromone and prompts bees to gorge on honey, making it harder for them to curl their abdomens to sting
71. (MC) What is the effect of oversmoking a colony?
- A) It calms the bees more effectively
 - B) It agitates the bees and can taint honey with a smoky off-flavor
 - C) It has no effect
 - D) It prevents robbing
72. (MC) Before storing a smoker, the beekeeper should:
- A) Leave the fuel smoldering so it is ready next time
 - B) Set it on dry grass to cool
 - C) Fully extinguish the fuel by plugging the spout or dousing it
 - D) Seal it in a plastic bag while lit
73. (MC) At an absolute minimum, a beekeeper should wear a:
- A) Pair of gloves
 - B) Veil
 - C) Full bee suit
 - D) Pair of tall boots
74. (MC) Which clothing is preferred for working bees?
- A) Dark, rough wool
 - B) Black cotton
 - C) Light-colored, smooth fabric
 - D) Scented fleece
75. (MC) Why should pant legs be tucked into boots or banded, and sleeve cuffs kept snug?
- A) To keep smoke out
 - B) To prevent bees from crawling up under clothing, one of the more common causes of unexpected stings
 - C) To prevent propolis stains
 - D) To keep the beekeeper cool
76. (MC) Which first aid item is critical for a beekeeper or helper with a known bee-sting allergy?
- A) A tourniquet
 - B) A heating pad
 - C) An accessible, unexpired epinephrine auto-injector
 - D) Aspirin
77. (MC) Research on removing a bee sting shows that:
- A) Plucking the stinger is more dangerous than scraping
 - B) Speed of removal matters more than the method
 - C) The stinger should be left in place for several minutes

D) Only a credit card should be used

78. (MC) A stinger with an attached venom sac is left in the skin after a sting. Which insect most likely stung?

A) A yellowjacket

B) A hornet

C) A paper wasp

D) A honey bee worker

79. (TF) Opening a hive on a cool, cloudy, or rainy day tends to make colonies calmer because fewer bees are flying.

80. (TF) Working bees after drinking alcohol is acceptable as long as a veil is worn.

81. (TF) Telling someone when and where you will be working, or avoiding working bees alone, is a recommended bee-yard safety habit.

82. (TF) Knowing whether a honey bee or a wasp caused a sting can matter to an allergist, because venom allergy is often specific to bee or to wasp (vespid) venom.

83. (SA) List four early behavioral cues honey bees give as they become increasingly defensive.

84. (SA) List three early warning signs a colony gives before bees begin stinging.

85. (SA) Explain two reasons smoke calms a colony during inspection.

86. (SA) Name four items that belong in a basic bee-yard first aid kit.

Answer Key, Section 3: Chapter 3: Safety in the Bee Yard (Q61–86)

61. (MC) Which of the following is NOT one of the early cues honey bees give as they become defensive?

Answer: D) Increased comb-building near the entrance

Rationale: Increased comb-building is not a defensive cue; nervous movements, abrupt flights toward hands/face, loud buzzing, and the smell of bananas are.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

62. (MC) Agitated, defensive honey bees are often described as smelling like:

Answer: B) Bananas

Rationale: Bananas.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

63. (MC) Which of the following is an early warning sign a colony gives before bees begin to sting?

Answer: B) Bees bumping or head-butting the veil or hands, with rising buzzing pitch and volume

Rationale: Escalating cues include louder, higher-pitched buzzing, bees bumping the veil or hands, short aggressive darts at the face, and alarm pheromone. A beekeeper who spots them can close the hive and step back before anyone is stung.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

64. (MC) Which of the following commonly provokes defensive behavior?

Answer: B) Opening the hive on a cool, cloudy, or rainy day

Rationale: On cool, cloudy, or rainy days fewer foragers are out, so more defenders are at home.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

65. (MC) Why can dark, rough-textured clothing provoke defensive responses?

Answer: B) It can visually and texturally resemble a natural predator such as a bear

Rationale: Light-colored, smooth clothing is preferred.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

66. (MC) Why should pets and livestock be kept well away from an apiary?

Answer: C) Animals that disturb or are stung by bees can provoke a broader defensive response that endangers people nearby

Rationale: A disturbed or stung animal can trigger a colony-wide defense that also endangers the people nearby.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

67. (MC) Where should a beekeeper stand when approaching and working a hive?

Answer: B) Off to the side or rear of the entrance, out of the flight path

Rationale: The entrance is the flight path that foragers and guard bees actively patrol.

Study Guide: Ch. 3, §B — Safe Positioning and Movement Around the Hive

68. (MC) If bees become agitated and begin bumping or stinging, the correct response is to:

Answer: D) Move away calmly

Rationale: Running triggers a chase-and-sting response, and defending bees can follow a person a considerable distance.

Study Guide: Ch. 3, §B — Safe Positioning and Movement Around the Hive

69. (MC) Why is swatting at stinging bees a poor response?

Answer: B) Crushing bees releases more alarm pheromone, escalating the response

Rationale: Crushed bees release alarm pheromone that recruits more defenders.

Study Guide: Ch. 3, §B — Safe Positioning and Movement Around the Hive

70. (MC) *Smoke calms a colony primarily because it:*

Answer: D) Masks alarm pheromone and prompts bees to gorge on honey, making it harder for them to curl their abdomens to sting

Rationale: Smoke masks the alarm signal so panic does not spread, and bees that gorge on honey are calmer and physically less able to sting effectively.

Study Guide: Ch. 3, §C — The Smoker as a Safety Tool

71. (MC) *What is the effect of oversmoking a colony?*

Answer: B) It agitates the bees and can taint honey with a smoky off-flavor

Rationale: A few light puffs at the entrance and across the top are usually enough.

Study Guide: Ch. 3, §C — The Smoker as a Safety Tool

72. (MC) *Before storing a smoker, the beekeeper should:*

Answer: C) Fully extinguish the fuel by plugging the spout or dousing it

Rationale: Smoldering fuel can reignite later and start a fire. Keep the lit smoker upright and away from dry grass, and never use open flame near the hive.

Study Guide: Ch. 3, §C — The Smoker as a Safety Tool

73. (MC) *At an absolute minimum, a beekeeper should wear a:*

Answer: B) Veil

Rationale: A veil protects the face and eyes; facial stings are the most painful and the most dangerous.

Study Guide: Ch. 3, §D — Protective Clothing and Equipment

74. (MC) *Which clothing is preferred for working bees?*

Answer: C) Light-colored, smooth fabric

Rationale: Light, smooth fabric is less likely to trigger defensive responses, and stings are easier to see and remove from it.

Study Guide: Ch. 3, §D — Protective Clothing and Equipment

75. (MC) *Why should pant legs be tucked into boots or banded, and sleeve cuffs kept snug?*

Answer: B) To prevent bees from crawling up under clothing, one of the more common causes of unexpected stings

Rationale: Closed cuffs and pant legs keep bees from getting under clothing.

Study Guide: Ch. 3, §D — Protective Clothing and Equipment

76. (MC) *Which first aid item is critical for a beekeeper or helper with a known bee-sting allergy?*

Answer: C) An accessible, unexpired epinephrine auto-injector

Rationale: The kit should also hold a stinger-removal tool, an antihistamine, and a cold pack, with a charged cell phone within reach.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

77. (MC) *Research on removing a bee sting shows that:*

Answer: B) Speed of removal matters more than the method

Rationale: The detached venom sac keeps pumping venom, so remove the stinger immediately by whatever method is quickest.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

78. (MC) *A stinger with an attached venom sac is left in the skin after a sting. Which insect most likely stung?*

Answer: D) A honey bee worker

Rationale: A honey bee worker's barbed sting usually stays in the skin with the venom sac; wasps, hornets, and yellowjackets have smooth stingers and leave nothing behind.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

79. (TF) *Opening a hive on a cool, cloudy, or rainy day tends to make colonies calmer because fewer bees are flying.*

Answer: False

Rationale: Fewer foragers are out, so more defenders are at home.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

80. (TF) *Working bees after drinking alcohol is acceptable as long as a veil is worn.*

Answer: False

Rationale: Avoid alcohol and anything else that slows reaction time before working bees.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

81. (TF) *Telling someone when and where you will be working, or avoiding working bees alone, is a recommended bee-yard safety habit.*

Answer: True

Rationale: Keep an escape route in mind and close up and leave calmly if a colony becomes unusually defensive.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

82. (TF) *Knowing whether a honey bee or a wasp caused a sting can matter to an allergist, because venom allergy is often specific to bee or to wasp (vespid) venom.*

Answer: True

Rationale: Venom allergy is frequently specific to one venom family, so identifying the insect helps guide testing and venom immunotherapy.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

83. (SA) *List four early behavioral cues honey bees give as they become increasingly defensive.*

Model answer: Nervous/erratic movements, abrupt flights toward hands/face, loud buzzing, and the smell of bananas.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

84. (SA) *List three early warning signs a colony gives before bees begin stinging.*

Model answer: Any three of: increased buzzing pitch and volume; bees bumping or head-butting the veil or hands; bees flying at the face in short aggressive darts; the release of alarm pheromone, often described as smelling like bananas.

Study Guide: Ch. 3, §A — Recognizing Defensive Behavior

85. (SA) *Explain two reasons smoke calms a colony during inspection.*

Model answer: Smoke masks alarm pheromone, so one stinging bee's warning does not spread panic through the colony. It also prompts bees to gorge on honey in anticipation of fleeing a fire, which makes them calmer and less able to curl their abdomens to sting.

Study Guide: Ch. 3, §C — The Smoker as a Safety Tool

86. (SA) *Name four items that belong in a basic bee-yard first aid kit.*

Model answer: Any four of: a hive tool or fingernail for removing a stinger; an antihistamine (oral or topical); a cold pack or ice; an epinephrine auto-injector, accessible and unexpired, for anyone with a known allergy; a charged cell phone for calling emergency services.

Study Guide: Ch. 3, §E — First Aid in the Bee Yard

Section 4: Chapter 4: Allergic Reactions and Anaphylaxis (Q87–108)

87. (MC) Swelling that extends well beyond the sting site (for example, an entire forearm), sometimes peaking a day or two after the sting, is called a:

- A) Localized (normal) reaction
- B) Large local reaction
- C) Systemic reaction
- D) Biphasic reaction

88. (MC) About what percentage of stung adults have a systemic (allergic) reaction?

- A) 0.5%–3.3%
- B) 10%–15%
- C) 30%–40%
- D) 60%–70%

89. (MC) Anaphylaxis is defined by symptoms that:

- A) Stay confined to the sting site
- B) Occur in body systems away from the sting site, often within minutes
- C) Appear only after 24 hours
- D) Are limited to swelling and itching

90. (MC) Hoarseness, wheezing, throat tightness, or persistent coughing after a sting are signs involving which body system?

- A) Skin
- B) Gastrointestinal
- C) Respiratory
- D) Cardiovascular

91. (MC) Dizziness, a rapid or weak pulse, paleness, or fainting after a sting indicate involvement of which body system?

- A) Cardiovascular
- B) Skin
- C) Gastrointestinal
- D) Respiratory

92. (MC) Hives spreading beyond the sting site and swelling of the lips, tongue, or face (angioedema) are signs of anaphylaxis involving the:

- A) Respiratory system
- B) Cardiovascular system
- C) Gastrointestinal system
- D) Skin

93. (MC) After one systemic sting reaction, the commonly cited risk of a similar or worse reaction to a future sting is about:

- A) Under 5%
- B) 10%–20%
- C) 40%–60%
- D) 100%

94. (MC) The CDC reports an average of about how many deaths per year in the United States from hornet, wasp, and bee stings combined (2000–2017)?
- A) 6
 - B) 62
 - C) 620
 - D) 6,200
95. (MC) After any systemic sting reaction, which follow-up is strongly recommended?
- A) No follow-up if symptoms fully resolved
 - B) Daily antihistamines
 - C) Giving up beekeeping permanently
 - D) Allergist referral and evaluation, often including venom immunotherapy
96. (MC) What is the first step for a localized sting reaction?
- A) Wait until swelling develops
 - B) Squeeze the venom sac to drain it
 - C) Remove the stinger immediately by whatever method is quickest
 - D) Apply heat to the sting site
97. (MC) A helper develops widespread hives, throat tightness, and faintness after a sting. The first treatment is:
- A) An oral antihistamine
 - B) Wait 15 minutes to see whether symptoms pass
 - C) A cold pack and rest
 - D) An epinephrine auto-injector, followed by a call to 911
98. (MC) Why should 911 be called even if symptoms improve after epinephrine?
- A) The sting site is likely to become infected
 - B) Symptoms can return (a biphasic reaction)
 - C) The auto-injector must be returned to the pharmacy
 - D) Epinephrine only works for the first minute
99. (MC) If symptoms have not improved and a second auto-injector is available, a second dose of epinephrine may be given after about:
- A) 1 minute
 - B) 5–15 minutes
 - C) 45 minutes
 - D) 2 hours
100. (MC) Which person stung by a honey bee should receive epinephrine right away (if available) while someone calls 911?
- A) A person with redness and swelling only at the sting site
 - B) A person with throat tightness and wheezing a few minutes after the sting
 - C) A person with itching at the sting site the next day
 - D) A person whose whole forearm swelled over two days with no other symptoms
101. (TF) A large local reaction means the person will certainly have anaphylaxis from a future sting.
102. (TF) Trouble breathing or a sudden drop in blood pressure after a sting should be treated as anaphylaxis even if no other body system is involved.
103. (TF) Antihistamines can be used instead of epinephrine as the first treatment for suspected anaphylaxis.

- 104. (TF)** Every apiary should keep at least one, and ideally two, unexpired epinephrine auto-injectors on hand, and helpers should know where they are kept and how to use them.
- 105. (TF)** A person with suspected anaphylaxis should always be laid flat with the legs elevated, even if vomiting or having trouble breathing.
- 106. (SA)** Name the three general categories of honey bee sting reaction and roughly how common each is.
- 107. (SA)** Name the four body systems commonly involved in anaphylaxis and give one symptom of each.
- 108. (SA)** A helper is stung and develops hives, throat tightness, and faintness. List the emergency steps in order.

Answer Key, Section 4: Chapter 4: Allergic Reactions and Anaphylaxis (Q87–108)

87. (MC) Swelling that extends well beyond the sting site (for example, an entire forearm), sometimes peaking a day or two after the sting, is called a:

Answer: B) Large local reaction

Rationale: A large local reaction. It looks alarming but is not a true allergy and does not by itself mean a person will react systemically to a future sting, though the person should be monitored.

Study Guide: Ch. 4, §A — Types of Sting Reactions

88. (MC) About what percentage of stung adults have a systemic (allergic) reaction?

Answer: A) 0.5%–3.3%

Rationale: About 0.5%–3.3% of stung adults (about 0.15%–0.8% of stung children).

Study Guide: Ch. 4, §A — Types of Sting Reactions

89. (MC) Anaphylaxis is defined by symptoms that:

Answer: B) Occur in body systems away from the sting site, often within minutes

Rationale: Anaphylaxis involves symptoms away from the sting site, typically in two or more body systems, and is a medical emergency. Breathing difficulty or a sudden drop in blood pressure after a sting should be treated as anaphylaxis even on its own.

Study Guide: Ch. 4, §B — Recognizing Anaphylaxis by Body System

90. (MC) Hoarseness, wheezing, throat tightness, or persistent coughing after a sting are signs involving which body system?

Answer: C) Respiratory

Rationale: Respiratory.

Study Guide: Ch. 4, §B — Recognizing Anaphylaxis by Body System

91. (MC) Dizziness, a rapid or weak pulse, paleness, or fainting after a sting indicate involvement of which body system?

Answer: A) Cardiovascular

Rationale: Cardiovascular (including a sudden drop in blood pressure).

Study Guide: Ch. 4, §B — Recognizing Anaphylaxis by Body System

92. (MC) Hives spreading beyond the sting site and swelling of the lips, tongue, or face (angioedema) are signs of anaphylaxis involving the:

Answer: D) Skin

Rationale: Skin.

Study Guide: Ch. 4, §B — Recognizing Anaphylaxis by Body System

93. (MC) After one systemic sting reaction, the commonly cited risk of a similar or worse reaction to a future sting is about:

Answer: C) 40%–60%

Rationale: About 40%–60%, depending on the severity of the prior reaction and individual factors. This is why an allergist referral is strongly recommended.

Study Guide: Ch. 4, §C — Recurrence Risk and Mortality Context

94. (MC) The CDC reports an average of about how many deaths per year in the United States from hornet, wasp, and bee stings combined (2000–2017)?

Answer: B) 62

Rationale: About 62 per year. Fatal reactions are rare in absolute terms, but a known allergy raises personal risk.

Study Guide: Ch. 4, §C — Recurrence Risk and Mortality Context

95. (MC) *After any systemic sting reaction, which follow-up is strongly recommended?*

Answer: D) Allergist referral and evaluation, often including venom immunotherapy

Rationale: An allergist evaluation, often including venom immunotherapy.

Study Guide: Ch. 4, §C — Recurrence Risk and Mortality Context

96. (MC) *What is the first step for a localized sting reaction?*

Answer: C) Remove the stinger immediately by whatever method is quickest

Rationale: Remove the stinger at once. Speed matters more than technique. Then wash the area and apply a cold pack; an oral antihistamine or topical treatment can ease itching.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

97. (MC) *A helper develops widespread hives, throat tightness, and faintness after a sting. The first treatment is:*

Answer: D) An epinephrine auto-injector, followed by a call to 911

Rationale: Give epinephrine immediately and call 911. Do not delay it in favor of trying antihistamines first.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

98. (MC) *Why should 911 be called even if symptoms improve after epinephrine?*

Answer: B) Symptoms can return (a biphasic reaction)

Rationale: Anaphylaxis can recur after initial improvement (a biphasic reaction), so the person needs emergency monitoring.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

99. (MC) *If symptoms have not improved and a second auto-injector is available, a second dose of epinephrine may be given after about:*

Answer: B) 5–15 minutes

Rationale: About 5–15 minutes. Continue monitoring breathing and responsiveness until emergency responders arrive.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

100. (MC) *Which person stung by a honey bee should receive epinephrine right away (if available) while someone calls 911?*

Answer: B) A person with throat tightness and wheezing a few minutes after the sting

Rationale: Throat tightness and wheezing are signs of airway involvement, a medical emergency; the other choices describe normal local or large local reactions.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

101. (TF) *A large local reaction means the person will certainly have anaphylaxis from a future sting.*

Answer: False

Rationale: A large local reaction is not a true allergy and does not by itself predict a systemic reaction, although the person should be monitored and may be advised to carry antihistamines or an epinephrine auto-injector.

Study Guide: Ch. 4, §A — Types of Sting Reactions

102. (TF) *Trouble breathing or a sudden drop in blood pressure after a sting should be treated as anaphylaxis even if no other body system is involved.*

Answer: True

Rationale: Current World Allergy Organization criteria treat respiratory compromise or low blood pressure after a likely allergen exposure as anaphylaxis on its own; epinephrine should not wait for a second body system.

Study Guide: Ch. 4, §B — Recognizing Anaphylaxis by Body System

103. (TF) *Antihistamines can be used instead of epinephrine as the first treatment for suspected anaphylaxis.*

Answer: False

Rationale: Antihistamines treat itching and hives but do not reliably stop airway swelling or cardiovascular collapse the way epinephrine does.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

104. (TF) Every apiary should keep at least one, and ideally two, unexpired epinephrine auto-injectors on hand, and helpers should know where they are kept and how to use them.

Answer: True

Rationale: Anaphylaxis can progress within minutes, so the plan must be rehearsed in advance.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

105. (TF) A person with suspected anaphylaxis should always be laid flat with the legs elevated, even if vomiting or having trouble breathing.

Answer: False

Rationale: Lying down with legs elevated is preferred only if the person is not vomiting or having difficulty breathing; otherwise use a more comfortable position.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

106. (SA) Name the three general categories of honey bee sting reaction and roughly how common each is.

Model answer: Localized (normal) reaction: nearly universal. Large local reaction: about 2.4%–26.4% of stung individuals, depending on the study population. Systemic (allergic) reaction or anaphylaxis: about 0.5%–3.3% of stung adults and 0.15%–0.8% of stung children.

Study Guide: Ch. 4, §A — Types of Sting Reactions

107. (SA) Name the four body systems commonly involved in anaphylaxis and give one symptom of each.

Model answer: Skin (hives, widespread itching, flushing, or swelling of the lips, tongue, or face); respiratory (throat tightness, hoarseness, wheezing, shortness of breath, or persistent cough); cardiovascular (dizziness, rapid or weak pulse, drop in blood pressure, paleness, or fainting); gastrointestinal (nausea, vomiting, cramping, or diarrhea). Anaphylaxis typically involves two or more systems.

Study Guide: Ch. 4, §B — Recognizing Anaphylaxis by Body System

108. (SA) A helper is stung and develops hives, throat tightness, and faintness. List the emergency steps in order.

Model answer: Give an epinephrine auto-injector immediately; call 911 (even if symptoms improve, since they can return); keep the person lying down with legs elevated unless vomiting or having trouble breathing; give a second dose after about 5–15 minutes if there is no improvement and a second auto-injector is available; monitor breathing and responsiveness until emergency responders arrive.

Study Guide: Ch. 4, §D — Treatment and Emergency Response

Section 5: Chapter 5: Selecting an Apiary Site (Q109–131)

109. (MC) What is the most common source of unplanned stings near an apiary?
- A) Opening hives in the afternoon
 - B) Using too much smoke
 - C) Placing hives in full sun
 - D) A hive entrance whose flight path crosses a walkway, driveway, or other area where people pass
110. (MC) When space is tight, which simple fix helps keep bees from flying at head height near people?
- A) Painting the hive white
 - B) Placing a solid obstacle (fence, hedge, or wall) a few feet in front of the entrance
 - C) Removing the entrance reducer
 - D) Setting the hive directly on the ground
111. (MC) Why should low-lying areas generally be avoided for an apiary?
- A) Foragers cannot find them
 - B) They are always shaded
 - C) They trap cold air and moisture, which stress a colony
 - D) They attract bears
112. (MC) Which hive entrance orientation is generally preferred?
- A) North to northwest
 - B) West, facing the afternoon sun
 - C) Toward the nearest walkway
 - D) South to southeast, to catch early morning sun
113. (MC) In the Southeast, which site condition also helps discourage small hive beetles?
- A) Deep shade
 - B) A sunny, dry site
 - C) Damp ground
 - D) Standing water nearby
114. (MC) Where should wind protection (a hedge, fence, or structure) be placed?
- A) Directly against the entrance
 - B) South of the hive
 - C) To the north or northwest, without blocking the entrance's own flight path
 - D) Wind protection should never be used
115. (MC) Why does good year-round vehicle access matter when selecting an apiary site?
- A) Bees will not forage near roads
 - B) Hive bodies and supers full of honey are heavy (often 40–90 pounds), and carrying loaded equipment far by hand is impractical and risks injury
 - C) Inspectors require it
 - D) Bees prefer sites near driveways
116. (MC) What is the preferred distance from the hive to a water source?
- A) Less than about 1/4 mile
 - B) About 1 mile
 - C) About 2 miles
 - D) Distance does not matter
117. (MC) Why should bees be offered a water source when a hive is first established near a swimming pool?

- A) Bees must be trained to drink
 - B) Pool chemicals attract bees
 - C) To prevent them from fixating on the pool, because an established water source is very hard to change
 - D) Pools dry up in summer
118. (MC) A practical rule of thumb for bee water sources is:
- A) Any standing water will do
 - B) If you would not drink the water yourself, do not offer it to the bees
 - C) Water should be offered only in winter
 - D) Bees prefer chlorinated water
119. (MC) Which location should an apiary avoid?
- A) A spot with light afternoon shade
 - B) A site with a windbreak to the north
 - C) A site with year-round vehicle access
 - D) A site next to heavily sprayed agricultural fields or golf courses
120. (MC) A single apiary site generally supports a minimum of how many hives, and a practical maximum of about how many?
- A) 1 and 5
 - B) 2 and 20
 - C) 5 and 50
 - D) 10 and 100
121. (MC) What practical advantage does keeping at least two hives at one site provide?
- A) It is required for registration
 - B) It doubles the honey harvested per hive
 - C) It prevents swarming
 - D) The beekeeper can compare colonies and exchange a frame of eggs, honey, or brood between a weak and a strong colony
122. (MC) On the 11-point site scoring approach, a score of roughly 7–11 indicates:
- A) The site does not appear favorable
 - B) Moderately favorable, but bees may not thrive as well as elsewhere
 - C) The location will probably work well
 - D) The site is legally approved
123. (MC) Before installing backyard hives, which rules should a new beekeeper check first?
- A) A federal USDA beekeeping license
 - B) FAA airspace rules
 - C) Local zoning ordinances and any homeowners' association covenants
 - D) EPA pesticide registration
124. (MC) Which of the following is NOT a common kind of local beekeeping ordinance?
- A) A requirement that all hives be painted white
 - B) A setback from property lines
 - C) A requirement to provide a water source
 - D) A limit on the number of hives per lot
125. (TF) Light afternoon shade can ease heat stress during South Carolina summers, but deep shade and damp ground should be avoided.

- 126. (TF)** Sites with locked gates, or that require advance permission for each visit, are fine because hives rarely need attention.
- 127. (TF)** A weakness in a single factor, such as partial afternoon shade, automatically disqualifies an apiary site.
- 128. (SA)** Why should a hive entrance never face directly across a walkway, and what simple fix helps when space is tight?
- 129. (SA)** Why is a water source within about 1/4 mile of the hive strongly preferred, and what can happen if bees are not offered one early?
- 130. (SA)** Name three factors beyond flight path that affect how safe and neighbor-friendly an apiary site is.
- 131. (SA)** List three things a beekeeper should discuss with neighbors before installing hives.

Answer Key, Section 5: Chapter 5: Selecting an Apiary Site (Q109–131)

109. (MC) *What is the most common source of unplanned stings near an apiary?*

Answer: D) A hive entrance whose flight path crosses a walkway, driveway, or other area where people pass

Rationale: Foragers fly a low, fast, direct line out of the entrance, and crossing that line is the most common cause of unplanned stings.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

110. (MC) *When space is tight, which simple fix helps keep bees from flying at head height near people?*

Answer: B) Placing a solid obstacle (fence, hedge, or wall) a few feet in front of the entrance

Rationale: A solid obstacle forces bees to fly up and over before leveling off, raising their flight path above head height.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

111. (MC) *Why should low-lying areas generally be avoided for an apiary?*

Answer: C) They trap cold air and moisture, which stress a colony

Rationale: Cold air and moisture collect there; excess moisture is often more dangerous to overwintering bees than cold itself.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

112. (MC) *Which hive entrance orientation is generally preferred?*

Answer: D) South to southeast, to catch early morning sun

Rationale: Morning sun warms the hive and gets foragers flying earlier in the day.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

113. (MC) *In the Southeast, which site condition also helps discourage small hive beetles?*

Answer: B) A sunny, dry site

Rationale: Sunny, dry sites discourage small hive beetles; deep shade and damp ground should be avoided.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

114. (MC) *Where should wind protection (a hedge, fence, or structure) be placed?*

Answer: C) To the north or northwest, without blocking the entrance's own flight path

Rationale: A windbreak to the north/northwest reduces the cooling effect of prevailing winter winds.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

115. (MC) *Why does good year-round vehicle access matter when selecting an apiary site?*

Answer: B) Hive bodies and supers full of honey are heavy (often 40–90 pounds), and carrying loaded equipment far by hand is impractical and risks injury

Rationale: Reliable vehicle access makes heavy work safer. Unimpeded access at any time also makes inspection and swarm or emergency response easier.

Study Guide: Ch. 5, §C — Access and Convenience

116. (MC) *What is the preferred distance from the hive to a water source?*

Answer: A) Less than about 1/4 mile

Rationale: Less than about 1/4 mile is strongly preferred, because a colony that has established a water source is very difficult to retrain.

Study Guide: Ch. 5, §D — Water Sources

117. (MC) *Why should bees be offered a water source when a hive is first established near a swimming pool?*

Answer: C) To prevent them from fixating on the pool, because an established water source is very hard to change

Rationale: Offering an attractive source early heads off a recurring source of neighbor complaints.

Study Guide: Ch. 5, §D — Water Sources

118. (MC) *A practical rule of thumb for bee water sources is:*

Answer: B) If you would not drink the water yourself, do not offer it to the bees

Rationale: If you would not drink it yourself, do not offer it to the bees.

Study Guide: Ch. 5, §D — Water Sources

119. (MC) *Which location should an apiary avoid?*

Answer: D) A site next to heavily sprayed agricultural fields or golf courses

Rationale: Avoid places regularly exposed to pesticide application, and places vulnerable to vandalism or theft, such as visible roadside sites and unsecured public land.

Study Guide: Ch. 5, §E — Safety and Good-Neighbor Practices

120. (MC) *A single apiary site generally supports a minimum of how many hives, and a practical maximum of about how many?*

Answer: B) 2 and 20

Rationale: A minimum of two and a practical maximum of around twenty, depending on available forage and the beekeeper's goals.

Study Guide: Ch. 5, §F — How Many Hives at One Site

121. (MC) *What practical advantage does keeping at least two hives at one site provide?*

Answer: D) The beekeeper can compare colonies and exchange a frame of eggs, honey, or brood between a weak and a strong colony

Rationale: Direct comparison and the ability to exchange resources are meaningful management advantages that a single isolated hive does not offer.

Study Guide: Ch. 5, §F — How Many Hives at One Site

122. (MC) *On the 11-point site scoring approach, a score of roughly 7–11 indicates:*

Answer: C) The location will probably work well

Rationale: 7–11 means the location will probably work well; roughly 4–6 is moderate and 0–3 is unfavorable.

Study Guide: Ch. 5, §G — A Simple Scoring Approach

123. (MC) *Before installing backyard hives, which rules should a new beekeeper check first?*

Answer: C) Local zoning ordinances and any homeowners' association covenants

Rationale: Many cities, towns, and counties regulate backyard hives, and some HOA covenants restrict or prohibit them; checking first avoids a costly move later.

Study Guide: Ch. 5, §H — Local Rules and Talking with Neighbors

124. (MC) *Which of the following is NOT a common kind of local beekeeping ordinance?*

Answer: A) A requirement that all hives be painted white

Rationale: Ordinances commonly limit hive numbers, set setbacks, and require water and flyway barriers; paint color is not a typical requirement.

Study Guide: Ch. 5, §H — Local Rules and Talking with Neighbors

125. (TF) *Light afternoon shade can ease heat stress during South Carolina summers, but deep shade and damp ground should be avoided.*

Answer: True

Rationale: A sunny site with light afternoon shade balances heat relief against the benefits of sun.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

126. (TF) *Sites with locked gates, or that require advance permission for each visit, are fine because hives rarely need attention.*

Answer: False

Rationale: A beekeeper should favor sites with full, unimpeded access at any time, since locked gates and permission requirements make routine inspection and swarm or emergency response difficult.

Study Guide: Ch. 5, §C — Access and Convenience

127. (TF) *A weakness in a single factor, such as partial afternoon shade, automatically disqualifies an apiary site.*

Answer: False

Rationale: No single factor is an automatic disqualifier in isolation; the beekeeper can often compensate, for example with supplemental water or wind protection.

Study Guide: Ch. 5, §G — A Simple Scoring Approach

128. (SA) *Why should a hive entrance never face directly across a walkway, and what simple fix helps when space is tight?*

Model answer: Foragers fly a low, fast, direct line out of the entrance, and crossing that line is the most common source of unplanned stings. When space is tight, place a solid obstacle (fence, hedge, or wall) a few feet in front of the entrance so bees fly up and over, raising their flight path above head height.

Study Guide: Ch. 5, §B — Location: Flight Path, Sun, and Wind

129. (SA) *Why is a water source within about 1/4 mile of the hive strongly preferred, and what can happen if bees are not offered one early?*

Model answer: A nearby source is more efficient for the bees. Once a colony has established a water source it is very hard to retrain them, so if bees are not offered water at the start they may fixate on a neighbor's pool or other sensitive water feature, causing recurring complaints.

Study Guide: Ch. 5, §D — Water Sources

130. (SA) *Name three factors beyond flight path that affect how safe and neighbor-friendly an apiary site is.*

Model answer: Any three of: distance from children's play areas, shared walkways, and livestock; orienting entrances away from neighboring properties and sidewalks; screening hives from view; avoiding areas exposed to pesticide application; avoiding sites prone to vandalism or theft; checking local beekeeping ordinances.

Study Guide: Ch. 5, §E — Safety and Good-Neighbor Practices

131. (SA) *List three things a beekeeper should discuss with neighbors before installing hives.*

Model answer: Any three of: where the hives will sit and which way the entrances face; whether anyone in the household has a known sting allergy; whom to call if they see a swarm; the plan for providing water so bees do not use their pool or birdbath; an offer of honey after the first harvest.

Study Guide: Ch. 5, §H — Local Rules and Talking with Neighbors

Section 6: Chapter 6: Beekeeping Equipment and Getting Started (Q132–158)

132. (MC) The Langstroth hive — the stackable, top-opening, movable-frame system that dominates modern beekeeping — is named for which American, known as the "Father of American Beekeeping"?
- A) Johann Dzierzon
 - B) Lorenzo Langstroth
 - C) Charles Dadant
 - D) L.L. Langstroth's mentor
133. (MC) In a Langstroth hive, the deep boxes on the bottom of the stack — where bees raise their larvae — are commonly called:
- A) Supers
 - B) Brood boxes
 - C) Nuc
 - D) Feeders
134. (MC) The medium and shallow boxes placed above the brood boxes, used for collecting honey, are commonly called:
- A) Brood boxes
 - B) Supers
 - C) Excluders
 - D) Risers
135. (MC) What is the primary purpose of a queen excluder?
- A) Prevent the queen from entering another hive
 - B) Prevent the queen from swarming
 - C) Prevent the queen from mating with drones
 - D) Prevent the queen from laying brood in honey supers
136. (MC) What is the purpose of foundation installed in a frame?
- A) To exclude the queen from the frame
 - B) To provide bees a template for drawing comb
 - C) To filter pollen from incoming nectar
 - D) To ventilate the hive
137. (MC) If a shallow frame is accidentally placed into a deep box, what will likely happen?
- A) Bees will refuse to use that box
 - B) Bees will build burr comb in the empty space below the frame
 - C) The frame will float loose with no issue
 - D) The colony will swarm immediately
138. (MC) Which is an advantage of a telescoping cover compared to a migratory cover?
- A) It's cheaper
 - B) It's more durable and provides better ventilation
 - C) It stacks more easily for migratory operations
 - D) It requires no inner cover
139. (MC) Which of the following should NOT be used as smoker fuel?
- A) Pine straw
 - B) Burlap

- C) Used motor oil
 - D) Cedar/wood chips
140. (MC) What are the two most important pieces of safety equipment needed in the bee yard?
- A) Gloves and boots
 - B) Veil and smoker
 - C) Bee suit and hive tool
 - D) Smoker and hive tool
141. (MC) When a queen arrives in a candy-plugged cage, about how long does it typically take workers to chew through the candy and release her?
- A) 1–2 minutes
 - B) 1–2 hours
 - C) 1–2 days
 - D) 1–2 weeks
142. (MC) Aside from collecting swarms, what are the two main options for physically acquiring bees?
- A) Splitting an existing colony or requeening
 - B) Purchasing from a local retailer or ordering from an online supplier
 - C) Renting bees or leasing an apiary
 - D) Grafting queens or rearing drones
143. (MC) Within how long after installing a package should a beekeeper confirm the colony has begun producing brood?
- A) Within 24 hours
 - B) Within a week
 - C) Within a month
 - D) Within a season
144. (MC) Which type of feed is used specifically to stimulate comb production in a new colony?
- A) 2:1 heavy syrup
 - B) 1:1 simple syrup
 - C) Candy/fondant
 - D) Pollen patties
145. (MC) Which hive design lets honey drain from split-cell plastic frames through a tap without removing the frames?
- A) Warré hive
 - B) Top-bar hive
 - C) Flow Hive
 - D) 8-frame Langstroth
146. (MC) Why do most mentors recommend that beginners start with Langstroth equipment?
- A) It produces higher-quality honey
 - B) Bees will not live in other hive styles
 - C) It never needs inspection
 - D) Its standardized, interchangeable parts are widely available from suppliers and other beekeepers
147. (MC) Which feeding method most strongly encourages robbing and can spread disease between colonies?
- A) A hive-top feeder
 - B) An inverted jar over the inner cover
 - C) An in-hive frame feeder with floats

- D)** Open feeding from shared containers in the yard
- 148. (MC)** What is the main drawback of an in-hive frame (division-board) feeder?
- A)** It strongly encourages robbing
 - B)** Bees drown in it unless floats or ladders are added
 - C)** It cannot hold sugar syrup
 - D)** It sits outside the hive in the sun
- 149. (MC)** Which sugar is appropriate for making syrup to feed bees?
- A)** White granulated cane or beet sugar
 - B)** Molasses
 - C)** Brown sugar
 - D)** Powdered sugar containing cornstarch
- 150. (MC)** A 2025 Mississippi State University Extension estimate put the first-year cost of establishing one fully equipped Langstroth hive (excluding extraction equipment) at roughly:
- A)** \$300
 - B)** \$600
 - C)** \$1,070
 - D)** \$2,500
- 151. (TF)** A nucleus colony ("nuc") comes with drawn comb, frames, and brood already established, while a package of bees does not.
- 152. (TF)** Bees collected from a swarm come with fully known genetics and health status, making swarms the most reliable source of new bees.
- 153. (TF)** A queen cage should be installed between frames with the candy end facing up.
- 154. (TF)** An 8-frame Langstroth hive uses a different frame size from a 10-frame Langstroth hive.
- 155. (SA)** Name two labeled components of a bellows smoker — one where the fuel burns, and one that pumps air into it.
- 156. (SA)** Name at least three sources a beekeeper can use to acquire new bees.
- 157. (SA)** Give one advantage and one disadvantage of starting a colony from a caught swarm.
- 158. (SA)** What three things should a beekeeper look for 3–5 days after installing a swarm or package to confirm the bees have successfully settled into their new home?

Answer Key, Section 6: Chapter 6: Beekeeping Equipment and Getting Started (Q132–158)

132. (MC) *The Langstroth hive — the stackable, top-opening, movable-frame system that dominates modern beekeeping — is named for which American, known as the "Father of American Beekeeping"?*

Answer: B) Lorenzo Langstroth

Rationale: Lorenzo L. Langstroth, who patented his hive in 1852. He popularized and refined the movable-frame hive built around bee space, but he did not build the first movable-frame hive (Huber, Prokopovych, and Dzierzon came earlier) and was not the first to notice bee space.

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

133. (MC) *In a Langstroth hive, the deep boxes on the bottom of the stack — where bees raise their larvae — are commonly called:*

Answer: B) Brood boxes

Rationale: Brood boxes (deep boxes where bees raise larvae).

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

134. (MC) *The medium and shallow boxes placed above the brood boxes, used for collecting honey, are commonly called:*

Answer: B) Supers

Rationale: Supers (medium/shallow boxes for honey collection, placed above the brood boxes).

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

135. (MC) *What is the primary purpose of a queen excluder?*

Answer: D) Prevent the queen from laying brood in honey supers

Rationale: Prevent the queen from laying brood in honey supers.

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

136. (MC) *What is the purpose of foundation installed in a frame?*

Answer: B) To provide bees a template for drawing comb

Rationale: Provides bees a template to draw comb within the frame.

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

137. (MC) *If a shallow frame is accidentally placed into a deep box, what will likely happen?*

Answer: B) Bees will build burr comb in the empty space below the frame

Rationale: Bees will build burr comb in the empty space left below the shallow frame.

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

138. (MC) *Which is an advantage of a telescoping cover compared to a migratory cover?*

Answer: B) It's more durable and provides better ventilation

Rationale: More durable and provides better ventilation (though it's more expensive and requires an inner cover, which limits migratory stacking).

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

139. (MC) *Which of the following should NOT be used as smoker fuel?*

Answer: C) Used motor oil

Rationale: Used motor oil (tar paper, magazines, and motor oil should not be used as smoker fuel; raw cotton, pine straw, cedar/wood chips, and burlap are acceptable).

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

140. (MC) *What are the two most important pieces of safety equipment needed in the bee yard?*

Answer: B) Veil and smoker

Rationale: Veil and smoker.

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

141. (MC) *When a queen arrives in a candy-plugged cage, about how long does it typically take workers to chew through the candy and release her?*

Answer: C) 1–2 days

Rationale: 1–2 days.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

142. (MC) *Aside from collecting swarms, what are the two main options for physically acquiring bees?*

Answer: B) Purchasing from a local retailer or ordering from an online supplier

Rationale: Purchase from a local bee equipment retailer or order from an online supplier.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

143. (MC) *Within how long after installing a package should a beekeeper confirm the colony has begun producing brood?*

Answer: B) Within a week

Rationale: Within a week.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

144. (MC) *Which type of feed is used specifically to stimulate comb production in a new colony?*

Answer: B) 1:1 simple syrup

Rationale: 1:1 simple syrup stimulates comb production.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

145. (MC) *Which hive design lets honey drain from split-cell plastic frames through a tap without removing the frames?*

Answer: C) Flow Hive

Rationale: The Flow Hive (introduced in 2015) uses split-cell frames that drain through a tap; the colony still needs normal inspections and mite control.

Study Guide: Ch. 6, §C — Hive Styles, Box Choices, and Foundation

146. (MC) *Why do most mentors recommend that beginners start with Langstroth equipment?*

Answer: D) Its standardized, interchangeable parts are widely available from suppliers and other beekeepers

Rationale: Standard Langstroth dimensions mean frames, boxes, nucs, and help from other beekeepers all fit, which makes learning and troubleshooting easier.

Study Guide: Ch. 6, §C — Hive Styles, Box Choices, and Foundation

147. (MC) *Which feeding method most strongly encourages robbing and can spread disease between colonies?*

Answer: D) Open feeding from shared containers in the yard

Rationale: Open feeding feeds every colony (and neighbors' bees and wasps) at once, inciting robbing and spreading disease; it is not recommended.

Study Guide: Ch. 6, §D — Feeders and Feeding Equipment

148. (MC) *What is the main drawback of an in-hive frame (division-board) feeder?*

Answer: B) Bees drown in it unless floats or ladders are added

Rationale: Frame feeders sit inside the hive, so robbing risk is low, but bees drown in the open syrup unless floats, mesh, or ladders are added.

Study Guide: Ch. 6, §D — Feeders and Feeding Equipment

149. (MC) *Which sugar is appropriate for making syrup to feed bees?*

Answer: A) White granulated cane or beet sugar

Rationale: Only white granulated (cane or beet) sugar should be used; brown sugar, molasses, and powdered sugar with cornstarch can cause dysentery.

Study Guide: Ch. 6, §D — Feeders and Feeding Equipment

150. (MC) *A 2025 Mississippi State University Extension estimate put the first-year cost of establishing one fully equipped Langstroth hive (excluding extraction equipment) at roughly:*

Answer: C) \$1,070

Rationale: The estimate was about \$1,070 for hive components, accessories, a nuc, protective gear and tools, supplies, and miscellaneous items, plus about \$325 for optional extraction equipment.

Study Guide: Ch. 6, §E — Budgeting for the First Year

151. (TF) *A nucleus colony ("nuc") comes with drawn comb, frames, and brood already established, while a package of bees does not.*

Answer: True

Rationale: Nucs include drawn comb, frames, and brood; packages are just bees (and a caged queen) with no comb or frames.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

152. (TF) *Bees collected from a swarm come with fully known genetics and health status, making swarms the most reliable source of new bees.*

Answer: False

Rationale: Swarms carry unknown genetics, temperament, and disease/pest risk.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

153. (TF) *A queen cage should be installed between frames with the candy end facing up.*

Answer: True

Rationale: Candy end faces up when installing the queen cage between frames.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

154. (TF) *An 8-frame Langstroth hive uses a different frame size from a 10-frame Langstroth hive.*

Answer: False

Rationale: 8-frame boxes are narrower and about 20 percent lighter when full, but they use the same frames as 10-frame equipment.

Study Guide: Ch. 6, §C — Hive Styles, Box Choices, and Foundation

155. (SA) *Name two labeled components of a bellows smoker — one where the fuel burns, and one that pumps air into it.*

Model answer: Fire box (where the fuel burns) and bellows (the pump that attaches to push air/smoke through the funnel/chimney).

Study Guide: Ch. 6, §A — Hive Systems, Tools, and Safety Equipment

156. (SA) *Name at least three sources a beekeeper can use to acquire new bees.*

Model answer: Package, nucleus ("nuc"), full/established hive, or a collected swarm.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

157. (SA) *Give one advantage and one disadvantage of starting a colony from a caught swarm.*

Model answer: Advantage: free. Disadvantage: unknown genetics/temperament and risk of bringing in pests or disease.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

158. (SA) *What three things should a beekeeper look for 3–5 days after installing a swarm or package to confirm the bees have successfully settled into their new home?*

Model answer: New comb being drawn, eggs present (confirms the queen survived and is laying), and nectar/syrup being stored.

Study Guide: Ch. 6, §B — Starting New Honey Bee Colonies

Section 7: Chapter 7: Hive Management (Q159–179)

159. (MC) About what temperature do honey bees tend to stop foraging below?
- A) 40°F
 - B) 55°F
 - C) 65°F
 - D) 32°F
160. (MC) What primarily triggers bees to build new comb?
- A) Cold weather
 - B) Availability of nectar/food resources
 - C) Presence of a queen excluder
 - D) Shortened daylight hours
161. (MC) About how many pounds of honey must bees consume to produce one pound of beeswax?
- A) 2 pounds
 - B) 4 pounds
 - C) 8 pounds
 - D) 15 pounds
162. (MC) Comb built in spaces larger than bee space, not confined within a frame, is called:
- A) Foundation
 - B) Burr comb
 - C) Queen comb
 - D) Brood comb
163. (MC) Which of the following is a recommended step to help prevent robbing?
- A) Use open feeders so bees can feed faster
 - B) Reduce hive entrances
 - C) Open hives frequently to check on weak colonies
 - D) Feed syrup outdoors during a nectar dearth
164. (MC) In the swarming process, which event happens FIRST?
- A) Workers build swarm cells around developing queen larvae
 - B) Spring build-up: colony increases workforce, produces drones, and builds queen cups
 - C) The old queen and a portion of workers leave to form a swarm cluster
 - D) A new queen emerges and eliminates rival queen cells
165. (MC) Which of the following is NOT one of the ways to assess a colony's condition without opening the hive?
- A) Observing guard bee activity at the entrance
 - B) Counting landing bees and flight patterns
 - C) Checking for pollen on returning foragers' legs
 - D) Counting eggs per cell inside
166. (MC) Why do beekeepers follow the "3 feet or 3 miles" rule when relocating a hive?
- A) To comply with state law
 - B) To prevent older foragers from returning to the original spot and becoming lost or drifting into another colony
 - C) To avoid mixing genetics between colonies
 - D) To reduce the chance of swarming

- 167. (MC)** Using "Bee Math," what is the minimum number of days for a "walk-away split" to begin producing new worker bees?
- A)** 21 days
 - B)** 28 days
 - C)** 35 days
 - D)** 42 days
- 168. (MC)** When should a hive entrance be closed in preparation for moving the colony?
- A)** At midday, when the hive is warmest
 - B)** At dusk or after dark, when the foragers are home
 - C)** In early afternoon, during peak foraging
 - D)** Timing does not matter
- 169. (MC)** What is the greatest danger when moving a closed colony in the Southeast in summer?
- A)** Chilled brood
 - B)** Swarming during the move
 - C)** Overheating and suffocation
 - D)** Wax moth damage
- 170. (TF)** Using an open (uncontained) syrup feeder in the bee yard can incite robbing between colonies.
- 171. (TF)** Honey bees are generalists, capable of feeding on a wide range of plants.
- 172. (TF)** Honey bees only forage out about 1 mile from the nest site.
- 173. (TF)** Honey bees forage at night.
- 174. (TF)** Larger colonies are more efficient at finding and using a nectar source.
- 175. (TF)** A solid wooden block is the best way to close a hive entrance for a move.
- 176. (SA)** List three ways a beekeeper can assess a hive's condition without opening it.
- 177. (SA)** Why is a queenless period typically needed before introducing a new queen when requeening a colony?
- 178. (SA)** One colony is queenless with no brood; another is strong but has run out of food. Name at least two things a beekeeper could do to strengthen both colonies.
- 179. (SA)** A colony must be moved 100 yards within the same apiary. Describe two ways to do it without losing most of the foragers.

Answer Key, Section 7: Chapter 7: Hive Management (Q159–179)

159. (MC) *About what temperature do honey bees tend to stop foraging below?*

Answer: B) 55°F

Rationale: 55°F (13°C).

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

160. (MC) *What primarily triggers bees to build new comb?*

Answer: B) Availability of nectar/food resources

Rationale: Availability of nectar/food resources.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

161. (MC) *About how many pounds of honey must bees consume to produce one pound of beeswax?*

Answer: C) 8 pounds

Rationale: About 8 pounds of honey per pound of beeswax (published estimates range from about 6 to 8 pounds).

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

162. (MC) *Comb built in spaces larger than bee space, not confined within a frame, is called:*

Answer: B) Burr comb

Rationale: Burr comb.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

163. (MC) *Which of the following is a recommended step to help prevent robbing?*

Answer: B) Reduce hive entrances

Rationale: Reducing hive entrances helps prevent robbing (along with avoiding opening colonies during a dearth and combining weak colonies).

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

164. (MC) *In the swarming process, which event happens FIRST?*

Answer: B) Spring build-up: colony increases workforce, produces drones, and builds queen cups

Rationale: Spring build-up (increased workforce, new drones, queen cups) is the first step; full sequence: spring build-up → congestion/nectar flow, queen lays in cups → swarm cells built, intense foraging → cells capped, queen slows laying → old queen + workers leave, form cluster → scouts set out → scouts locate new home, swarm relocates → new comb built, queen lays again → new queen emerges, eliminates rivals, mating flight → new queen mated and laying.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

165. (MC) *Which of the following is NOT one of the ways to assess a colony's condition without opening the hive?*

Answer: D) Counting eggs per cell inside

Rationale: Counting eggs per cell requires opening the hive; the other three are external, no-open assessment methods.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

166. (MC) *Why do beekeepers follow the "3 feet or 3 miles" rule when relocating a hive?*

Answer: B) To prevent older foragers from returning to the original spot and becoming lost or drifting into another colony

Rationale: Prevents older foragers from returning to the original location and becoming lost or drifting into another colony.

Study Guide: Ch. 7, §D — Sustainable Practices

167. (MC) Using "Bee Math," what is the minimum number of days for a "walk-away split" to begin producing new worker bees?

Answer: D) 42 days

Rationale: 42 days is the standard "bee math" planning figure: about 16 days for the new queen to emerge, 5–7 more days until she is mated and laying, then 21 days for her first workers to develop. (If bees start the queen from a young larva rather than an egg, she can emerge a few days sooner.)

Study Guide: Ch. 7, §D — Sustainable Practices

168. (MC) When should a hive entrance be closed in preparation for moving the colony?

Answer: B) At dusk or after dark, when the foragers are home

Rationale: Closing the entrance at dusk or after dark keeps the foraging force with the colony; daytime closure strands foragers.

Study Guide: Ch. 7, §E — Moving Hives

169. (MC) What is the greatest danger when moving a closed colony in the Southeast in summer?

Answer: C) Overheating and suffocation

Rationale: A closed, crowded hive can overheat and die within hours; move at night or in the cool morning with screened ventilation and never leave a closed hive in the sun.

Study Guide: Ch. 7, §E — Moving Hives

170. (TF) Using an open (uncontained) syrup feeder in the bee yard can incite robbing between colonies.

Answer: True

Rationale: Open feeders can incite robbing (they also attract unwanted pests, are hard for bees to find, and can spread disease).

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

171. (TF) Honey bees are generalists, capable of feeding on a wide range of plants.

Answer: True

Rationale: Honey bees are generalist foragers.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

172. (TF) Honey bees only forage out about 1 mile from the nest site.

Answer: False

Rationale: They are not limited to about 1 mile; they can and do forage farther when needed.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

173. (TF) Honey bees forage at night.

Answer: False

Rationale: Honey bees do not forage at night.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

174. (TF) Larger colonies are more efficient at finding and using a nectar source.

Answer: True

Rationale: Larger colonies are more efficient at finding and exploiting nectar sources.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

175. (TF) A solid wooden block is the best way to close a hive entrance for a move.

Answer: False

Rationale: Screen wire or a screened entrance block should be used so the colony can breathe and cool itself during the move.

Study Guide: Ch. 7, §E — Moving Hives

176. (SA) *List three ways a beekeeper can assess a hive's condition without opening it.*

Model answer: Any three of: guard bee activity at the entrance, landing bee counts/flight patterns, pollen visible on returning foragers' legs, hefting/weighing the hive.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

177. (SA) *Why is a queenless period typically needed before introducing a new queen when requeening a colony?*

Model answer: The old queen's pheromones must dissipate before workers will accept a new queen.

Study Guide: Ch. 7, §A — Natural Tendencies of Honey Bees

178. (SA) *One colony is queenless with no brood; another is strong but has run out of food. Name at least two things a beekeeper could do to strengthen both colonies.*

Model answer: Give the queenless colony a frame of eggs (and young larvae) from the strong colony so its workers can raise a new queen, or give it a mated queen; feed the hungry colony syrup or give it a frame of honey/pollen (the queenless colony's surplus stores can be moved to it). If the queenless colony is too weak to recover, combine it with the strong colony.

Study Guide: Ch. 7, §D — Sustainable Practices

179. (SA) *A colony must be moved 100 yards within the same apiary. Describe two ways to do it without losing most of the foragers.*

Model answer: Any two of: move it more than 3 miles away for about three weeks, then bring it back to the new spot; move it no more than about 3 feet every day or two until it reaches the new location; move it directly and place a leafy branch or other obstruction at the entrance so foragers are forced to reorient (accepting some loss of older foragers).

Study Guide: Ch. 7, §E — Moving Hives

Section 8: Chapter 8: Seasonal Management (Q180–199)

180. (MC) What does the phrase "all beekeeping is local" mean?
- A) Management timing depends on the region's bloom, dearth, and winter conditions
 - B) Only local queens should be purchased
 - C) Honey must be sold locally
 - D) Bees forage only within 100 yards
181. (MC) Which of the five things every colony needs includes protection from pesticides, predators, and disturbance?
- A) A dry cavity of the correct volume
 - B) Food and water
 - C) The correct population
 - D) A safe environment
182. (MC) Which three months carry the greatest threat of colony starvation in South Carolina?
- A) June–August
 - B) September–November
 - C) January–March
 - D) April–June
183. (MC) Which feed helps prevent winter starvation?
- A) 1:1 simple syrup
 - B) Pollen patties
 - C) 2:1 heavy syrup or candy/fondant
 - D) None — bees don't need feeding in fall
184. (MC) When does drone production typically begin in South Carolina?
- A) December
 - B) February
 - C) June
 - D) September
185. (MC) When are drones typically ousted from the colony?
- A) Spring (March–May)
 - B) Summer (June–August)
 - C) Fall (October–November)
 - D) Never — they overwinter with workers
186. (MC) What critical colony behavior is most likely during the spring nectar flow (March–May)?
- A) Robbing
 - B) Absconding
 - C) Swarming
 - D) Supersedure
187. (MC) On a frame from the center of the brood nest, where is pollen typically stored?
- A) In a band surrounding the brood
 - B) Only in the top corners
 - C) Scattered randomly among the brood
 - D) Only along the bottom bar
188. (MC) How does capped drone brood differ in appearance from capped worker brood?

- A) Drone cappings are flat and white
 - B) Drone cappings are blue-purple
 - C) Drone cappings are sunken and perforated
 - D) Drone cappings are larger, bullet-shaped, and strongly domed
189. (MC) How does a freshly laid (day 1) egg appear in the cell?
- A) Lying flat on the cell wall
 - B) Standing upright at the bottom of the cell
 - C) Curled into a C shape in a pool of jelly
 - D) Floating in nectar
190. (MC) Glistening liquid in uncapped cells that spills when the frame is turned flat is most likely:
- A) Pollen
 - B) Royal jelly
 - C) Nectar
 - D) Propolis
191. (MC) What time of day is generally best for opening a hive?
- A) 6–8 a.m.
 - B) After dark
 - C) About 10 a.m.–2 p.m.
 - D) Late evening on cold days
192. (MC) A rough benchmark for overcrowding is bees covering more than about what share of the available frames?
- A) 25%
 - B) 50%
 - C) 75–80%
 - D) 100%
193. (MC) A beekeeper sees bees fighting and tumbling at the landing board with frantic flight around the hive. What is the right response?
- A) No action; these are orientation flights
 - B) Reduce or close the entrance of the colony under attack immediately
 - C) Add a honey super
 - D) Start open feeding in the yard
194. (MC) University of Georgia guidance for overwintering stores in the Southeast is about:
- A) 0.5 frame of honey per frame of bees
 - B) 1.5 frames of capped honey per frame of bees
 - C) 10 pounds of honey per colony
 - D) 90 pounds of honey per colony
195. (MC) Why should the queen excluder be removed before winter?
- A) So the queen can move up through the stores with the cluster
 - B) To increase honey production
 - C) To reduce hive moisture
 - D) To keep mice out
196. (MC) Why should a hive be tilted slightly forward for winter?
- A) To help bees fly out
 - B) To discourage mice

- C) To keep the hive warmer
- D) So condensation and rain drain out of the hive

197. (MC) By about when should Varroa treatment be completed to protect the winter bees?

- A) Midwinter
- B) Late summer or early fall
- C) Only in spring
- D) Treatment timing does not matter

198. (TF) Orientation flights involve bees fighting and tumbling at the hive entrance.

199. (SA) Name four items on a fall winter-preparation checklist for a Southeastern colony.

Answer Key, Section 8: Chapter 8: Seasonal Management (Q180–199)

180. (MC) *What does the phrase "all beekeeping is local" mean?*

Answer: A) Management timing depends on the region's bloom, dearth, and winter conditions

Rationale: The same calendar date can call for very different management in different regions because bloom timing, dearth periods, and winter severity vary.

Study Guide: Ch. 8, §A — Two Guiding Principles

181. (MC) *Which of the five things every colony needs includes protection from pesticides, predators, and disturbance?*

Answer: D) A safe environment

Rationale: A safe environment means protection from extreme weather, pesticide exposure, predators, and human or livestock disturbance.

Study Guide: Ch. 8, §B — The Five Things Every Colony Needs

182. (MC) *Which three months carry the greatest threat of colony starvation in South Carolina?*

Answer: C) January–March

Rationale: January, February, March.

Study Guide: Ch. 8, §C — The Seasonal Wheel: Applying the Five Needs Across the Year

183. (MC) *Which feed helps prevent winter starvation?*

Answer: C) 2:1 heavy syrup or candy/fondant

Rationale: 2:1 heavy syrup and candy/fondant both help prevent winter starvation.

Study Guide: Ch. 8, §C — The Seasonal Wheel: Applying the Five Needs Across the Year

184. (MC) *When does drone production typically begin in South Carolina?*

Answer: B) February

Rationale: February.

Study Guide: Ch. 8, §C — The Seasonal Wheel: Applying the Five Needs Across the Year

185. (MC) *When are drones typically ousted from the colony?*

Answer: C) Fall (October–November)

Rationale: Fall (October–November).

Study Guide: Ch. 8, §C — The Seasonal Wheel: Applying the Five Needs Across the Year

186. (MC) *What critical colony behavior is most likely during the spring nectar flow (March–May)?*

Answer: C) Swarming

Rationale: Swarming.

Study Guide: Ch. 8, §C — The Seasonal Wheel: Applying the Five Needs Across the Year

187. (MC) *On a frame from the center of the brood nest, where is pollen typically stored?*

Answer: A) In a band surrounding the brood

Rationale: The typical layout is brood in the center, a band of pollen (bee bread) around it, and honey above and at the sides.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

188. (MC) *How does capped drone brood differ in appearance from capped worker brood?*

Answer: D) Drone cappings are larger, bullet-shaped, and strongly domed

Rationale: Drone brood has large, domed, bullet-shaped cappings, usually along the lower edges of frames; worker cappings are flatter and tan.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

189. (MC) *How does a freshly laid (day 1) egg appear in the cell?*

Answer: B) Standing upright at the bottom of the cell

Rationale: Eggs stand upright on day 1 and gradually lean over until they hatch on day 3; a C-shaped grub is a larva.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

190. (MC) *Glistening liquid in uncapped cells that spills when the frame is turned flat is most likely:*

Answer: C) Nectar

Rationale: Uncapped nectar glistens and will drip if the frame is held flat; pollen is packed and matte.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

191. (MC) *What time of day is generally best for opening a hive?*

Answer: C) About 10 a.m.–2 p.m.

Rationale: Between about 10 a.m. and 2 p.m., most foragers are out of the hive and the colony is calmer.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

192. (MC) *A rough benchmark for overcrowding is bees covering more than about what share of the available frames?*

Answer: C) 75–80%

Rationale: When bees cover more than about 75–80 percent of the frames, the colony needs more room to reduce swarming pressure.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

193. (MC) *A beekeeper sees bees fighting and tumbling at the landing board with frantic flight around the hive. What is the right response?*

Answer: B) Reduce or close the entrance of the colony under attack immediately

Rationale: Fighting, frantic flight, and wax debris at the entrance indicate robbing, which calls for immediate entrance reduction (or full closure) on the colony being robbed.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

194. (MC) *University of Georgia guidance for overwintering stores in the Southeast is about:*

Answer: B) 1.5 frames of capped honey per frame of bees

Rationale: UGA's Southeastern rule of thumb is roughly 1.5 frames of capped honey for every frame of bees; colonies short of that should be fed 2:1 syrup in early fall.

Study Guide: Ch. 8, §E — Preparing Colonies for Winter: A Checklist

195. (MC) *Why should the queen excluder be removed before winter?*

Answer: A) So the queen can move up through the stores with the cluster

Rationale: If the excluder stays on, the cluster can move up into honey above it and leave the queen behind, where she can die.

Study Guide: Ch. 8, §E — Preparing Colonies for Winter: A Checklist

196. (MC) *Why should a hive be tilted slightly forward for winter?*

Answer: D) So condensation and rain drain out of the hive

Rationale: Moisture dripping onto the cluster is more dangerous than cold; a slight forward tilt lets water drain out the entrance.

Study Guide: Ch. 8, §E — Preparing Colonies for Winter: A Checklist

197. (MC) *By about when should Varroa treatment be completed to protect the winter bees?*

Answer: B) Late summer or early fall

Rationale: Winter bees are reared in late summer and fall, so mite levels must be reduced before they develop.

Study Guide: Ch. 8, §E — Preparing Colonies for Winter: A Checklist

198. (TF) *Orientation flights involve bees fighting and tumbling at the hive entrance.*

Answer: False

Rationale: Orientation flights are calm hovering by young bees facing the hive; fighting and tumbling bees indicate robbing.

Study Guide: Ch. 8, §D — Working the Hive Through the Seasons

199. (SA) *Name four items on a fall winter-preparation checklist for a Southeastern colony.*

Model answer: Any four of: treat for Varroa by late summer/early fall; confirm a laying queen and good brood pattern; check and top up food stores (about 1.5 frames of capped honey per frame of bees); combine weak colonies; remove empty supers and the queen excluder; reduce entrances and add mouse guards; manage moisture with a forward tilt and upper ventilation; provide a windbreak; keep records and limit winter openings.

Study Guide: Ch. 8, §E — Preparing Colonies for Winter: A Checklist

Section 9: Chapter 9: Queens and Colony Increase (Q200–222)

200. (MC) Where does a virgin queen mate?
- A) Inside the hive, on the comb
 - B) On the landing board
 - C) In the air at a drone congregation area
 - D) Inside her queen cell
201. (MC) In which organ does a queen store the sperm she receives during mating?
- A) Spermatheca
 - B) Honey stomach
 - C) Proventriculus
 - D) Malpighian tubule
202. (MC) At the peak of spring build-up, about how many eggs can a productive queen lay in a day?
- A) About 50
 - B) About 200
 - C) 1,500 or more
 - D) More than 10,000
203. (MC) What color is used to mark a queen raised in 2026?
- A) Blue
 - B) Green
 - C) Yellow
 - D) White
204. (MC) Which mnemonic gives the queen-marking color sequence?
- A) "Bees Give You Real Wax"
 - B) "Will You Raise Good Bees?"
 - C) "Real Young Girls Bring Water"
 - D) "Your Bees Will Grow Rich"
205. (MC) A queen raised in 2025 would be marked with which color?
- A) Green
 - B) Red
 - C) Blue
 - D) White
206. (MC) Which feature best identifies the queen on a frame?
- A) A long, tapered abdomen extending well past her wings and longer legs
 - B) She is smaller than the workers
 - C) Very large eyes that meet at the top of the head
 - D) Pollen baskets on her hind legs
207. (MC) Eggs standing upright in cells show that a laying queen was present within about the last:
- A) 21 days
 - B) 2 weeks
 - C) month
 - D) 3 days
208. (MC) A hive has several eggs per cell stuck to the cell walls, scattered drone brood in worker cells, and no queen. What is the most likely problem?

- A) A failing queen
 - B) Laying workers
 - C) Supersedure in progress
 - D) European foulbrood
- 209. (MC)** A queen is present and lays single eggs centered in the cells, but the brood is mostly drones in worker-size cells. What is the problem?
- A) Laying workers
 - B) Swarm preparation
 - C) A drone-laying queen
 - D) Chilled brood
- 210. (MC)** After removing an old queen, about how long should a beekeeper usually wait before introducing a caged mated queen?
- A) About 24 hours
 - B) Two weeks
 - C) 30 days
 - D) Introduce her immediately while the old queen is still present
- 211. (MC)** How soon after introduction should a beekeeper check that a caged queen has been released?
- A) After 1 hour
 - B) After 6 weeks
 - C) After 3 weeks
 - D) After 3–5 days
- 212. (MC)** Which conditions give the best chance that a new queen will be accepted?
- A) A colony with long-established laying workers
 - B) A colony that is queenless but not long queenless, with no queen cells and a nectar flow or light feeding
 - C) A colony with several queen cells
 - D) A colony that is being robbed
- 213. (MC)** While capturing a swarm, the bees fly back to the branch instead of staying in the box. What most likely happened?
- A) The queen is in the box
 - B) The bees are hungry
 - C) The queen was missed and is still on the branch
 - D) Too much smoke was used
- 214. (MC)** According to Thomas Seeley's research, what cavity volume do swarm scouts prefer in a bait hive?
- A) About 10 liters
 - B) About 40 liters
 - C) About 100 liters
 - D) About 200 liters
- 215. (MC)** Why give a newly hived swarm a frame of open brood?
- A) To anchor the swarm and discourage absconding
 - B) To feed the queen
 - C) To kill Varroa mites
 - D) To increase honey stores immediately
- 216. (MC)** In the newspaper method of combining colonies, what is the purpose of the sheet of newspaper?
- A) To keep the two queens apart permanently

- B) To act as a mite barrier
 - C) To insulate the hive
 - D) To let the bees merge gradually as they chew through it and their scents blend
217. (MC) In grafting, larvae transferred into queen cups should be less than about:
- A) 24 hours old
 - B) 5 days old
 - C) 9 days old
 - D) 14 days old
218. (TF) A queen mates again each spring to replenish her supply of sperm.
219. (TF) A spotty brood pattern always means the queen is failing.
220. (TF) A colony showing signs of disease is a good candidate for combining with a strong colony.
221. (SA) How can you tell laying workers from a drone-laying queen, and what is the usual remedy for each?
222. (SA) Name three types of splits and briefly describe one.

Answer Key, Section 9: Chapter 9: Queens and Colony Increase (Q200–222)

200. (MC) *Where does a virgin queen mate?*

Answer: C) In the air at a drone congregation area

Rationale: Queens mate in flight at drone congregation areas, usually within the first one to two weeks of adult life, and never inside the hive.

Study Guide: Ch. 9, §A — The Queen's Role and Life

201. (MC) *In which organ does a queen store the sperm she receives during mating?*

Answer: A) Spermatheca

Rationale: The spermatheca holds several million sperm cells, which the queen uses for the rest of her life.

Study Guide: Ch. 9, §A — The Queen's Role and Life

202. (MC) *At the peak of spring build-up, about how many eggs can a productive queen lay in a day?*

Answer: C) 1,500 or more

Rationale: A productive queen can lay 1,500 or more eggs a day at the spring peak.

Study Guide: Ch. 9, §A — The Queen's Role and Life

203. (MC) *What color is used to mark a queen raised in 2026?*

Answer: D) White

Rationale: Years ending in 1 or 6 are white; 2026 queens are marked white.

Study Guide: Ch. 9, §B — Finding and Marking the Queen

204. (MC) *Which mnemonic gives the queen-marking color sequence?*

Answer: B) "Will You Raise Good Bees?"

Rationale: "Will You Raise Good Bees?" gives white, yellow, red, green, blue for years ending in 1/6, 2/7, 3/8, 4/9, and 5/0.

Study Guide: Ch. 9, §B — Finding and Marking the Queen

205. (MC) *A queen raised in 2025 would be marked with which color?*

Answer: C) Blue

Rationale: Years ending in 5 or 0 are blue.

Study Guide: Ch. 9, §B — Finding and Marking the Queen

206. (MC) *Which feature best identifies the queen on a frame?*

Answer: A) A long, tapered abdomen extending well past her wings and longer legs

Rationale: The queen is longer than workers with a long, tapered abdomen and longer legs; large eyes meeting at the top describe a drone.

Study Guide: Ch. 9, §B — Finding and Marking the Queen

207. (MC) *Eggs standing upright in cells show that a laying queen was present within about the last:*

Answer: D) 3 days

Rationale: Eggs hatch on day 3, so upright eggs mean the queen laid within the last three days.

Study Guide: Ch. 9, §B — Finding and Marking the Queen

208. (MC) *A hive has several eggs per cell stuck to the cell walls, scattered drone brood in worker cells, and no queen. What is the most likely problem?*

Answer: B) Laying workers

Rationale: Multiple, off-center eggs and drone brood in worker cells in a queenless colony are the classic signs of laying workers.

Study Guide: Ch. 9, §C — Recognizing Queen Problems

209. (MC) *A queen is present and lays single eggs centered in the cells, but the brood is mostly drones in worker-size cells. What is the problem?*

Answer: C) A drone-laying queen

Rationale: A drone-laying queen is poorly mated, sperm-depleted, or failing and should be replaced.

Study Guide: Ch. 9, §C — Recognizing Queen Problems

210. (MC) *After removing an old queen, about how long should a beekeeper usually wait before introducing a caged mated queen?*

Answer: A) About 24 hours

Rationale: Waiting about 24 hours lets the colony recognize that it is queenless, which improves acceptance.

Study Guide: Ch. 9, §D — Requeening and Queen Introduction

211. (MC) *How soon after introduction should a beekeeper check that a caged queen has been released?*

Answer: D) After 3–5 days

Rationale: Workers usually eat through the candy in several days; check in 3–5 days and avoid unnecessary disturbance right after release.

Study Guide: Ch. 9, §D — Requeening and Queen Introduction

212. (MC) *Which conditions give the best chance that a new queen will be accepted?*

Answer: B) A colony that is queenless but not long queenless, with no queen cells and a nectar flow or light feeding

Rationale: Acceptance is highest in a recently queenless colony with no queen cells, no robbing, and incoming food.

Study Guide: Ch. 9, §D — Requeening and Queen Introduction

213. (MC) *While capturing a swarm, the bees fly back to the branch instead of staying in the box. What most likely happened?*

Answer: C) The queen was missed and is still on the branch

Rationale: Bees gather where the queen is; if they return to the branch, she was not shaken into the box.

Study Guide: Ch. 9, §E — Swarm Prevention, Capture, and Bait Hives

214. (MC) *According to Thomas Seeley's research, what cavity volume do swarm scouts prefer in a bait hive?*

Answer: B) About 40 liters

Rationale: Scouts prefer about 40 liters (roughly a deep Langstroth box), with a small entrance near the bottom and a location well off the ground.

Study Guide: Ch. 9, §E — Swarm Prevention, Capture, and Bait Hives

215. (MC) *Why give a newly hived swarm a frame of open brood?*

Answer: A) To anchor the swarm and discourage absconding

Rationale: Open brood gives the bees a reason to stay and discourages the swarm from leaving its new hive.

Study Guide: Ch. 9, §E — Swarm Prevention, Capture, and Bait Hives

216. (MC) *In the newspaper method of combining colonies, what is the purpose of the sheet of newspaper?*

Answer: D) To let the bees merge gradually as they chew through it and their scents blend

Rationale: Over one to three days the bees chew through the paper and become accustomed to each other's scent, so they merge peacefully.

Study Guide: Ch. 9, §G — Combining Colonies

217. (MC) *In grafting, larvae transferred into queen cups should be less than about:*

Answer: A) 24 hours old

Rationale: Only very young larvae (under about 24 hours old) develop into well-fed, high-quality queens.

Study Guide: Ch. 9, §H — Queen Rearing Basics

218. (TF) *A queen mates again each spring to replenish her supply of sperm.*

Answer: False

Rationale: A queen mates only during her first days of adult life and uses the stored sperm for the rest of her life.

Study Guide: Ch. 9, §A — The Queen's Role and Life

219. (TF) *A spotty brood pattern always means the queen is failing.*

Answer: False

Rationale: Disease, heavy Varroa infestation, hygienic removal of diseased brood, or inbreeding can also cause a spotty pattern; look at the larvae before blaming the queen.

Study Guide: Ch. 9, §C — Recognizing Queen Problems

220. (TF) *A colony showing signs of disease is a good candidate for combining with a strong colony.*

Answer: False

Rationale: Combining a diseased colony simply spreads the disease to the healthy one.

Study Guide: Ch. 9, §G — Combining Colonies

221. (SA) *How can you tell laying workers from a drone-laying queen, and what is the usual remedy for each?*

Model answer: Laying workers: no queen, several eggs per cell, often stuck to the walls, with scattered drone brood; usually remedied by combining with a queenright colony, shaking the bees out away from the hive, or adding open brood weekly before requeening. Drone-laying queen: a queen is present and lays single, centered eggs, but they develop into drones in worker cells; remedied by replacing the queen.

Study Guide: Ch. 9, §C — Recognizing Queen Problems

222. (SA) *Name three types of splits and briefly describe one.*

Model answer: Any three of: walk-away split (divide brood, bees, and food, leaving eggs for the queenless half to raise a queen); even split with a purchased mated queen; nuc split (two to four frames of brood, bees, and food moved into a nucleus box); queen-cell split (divide a colony with swarm cells so each unit gets good cells). The description should match the method named.

Study Guide: Ch. 9, §F — Splits and Making Increase

Section 10: Chapter 10: Forage, Nutrition, and Pollinator Protection (Q223–245)

223. (MC) What does pollen provide to the colony?
- A) Carbohydrates for energy
 - B) Protein, fats, vitamins, and minerals
 - C) Resin for propolis
 - D) Wax for comb building
224. (MC) What is honeydew?
- A) Nectar collected from clover
 - B) Morning dew collected from the comb
 - C) The sugary excretion of aphids and scale insects
 - D) Honey diluted with water by the bees
225. (MC) Why is a colony with access to many different pollen sources usually better nourished?
- A) Pollen quality varies between plant species, so diversity better meets nutritional needs
 - B) Bees can digest only one type of pollen at a time
 - C) Diverse pollen prevents swarming
 - D) Diverse pollen kills Varroa mites
226. (MC) Which of the following is a major spring honey plant in South Carolina?
- A) Goldenrod
 - B) Spanish needles
 - C) Aster
 - D) Tulip poplar
227. (MC) What is red maple's main value to colonies?
- A) It provides the main fall honey flow
 - B) It supplies late-winter pollen that helps trigger spring brood rearing
 - C) It is the main summer nectar source
 - D) It is toxic to brood
228. (MC) When and where does sourwood mainly bloom in the Carolinas?
- A) January–February, statewide
 - B) October–November, on the coast
 - C) June–July, in the upper Piedmont and mountains
 - D) Year-round
229. (MC) Which plants dominate the Southeastern fall nectar flow?
- A) Goldenrod and asters
 - B) Red maple and henbit
 - C) Tulip poplar and black locust
 - D) Blueberry and plum
230. (MC) Nectar or pollen of summer titi (*Cyrilla racemiflora*) causes which brood problem?
- A) Chalkbrood
 - B) Sacbrood
 - C) American foulbrood
 - D) Purple brood

231. (MC) Honey that can make people ill ("mad honey") comes from grayanotoxins in which plants?
- A) White clover
 - B) Mountain laurel, rhododendrons, and some azaleas
 - C) Tupelo
 - D) Sourwood
232. (MC) How can a beekeeper reduce harm from toxic plants such as Carolina jessamine?
- A) Treat colonies with antibiotics
 - B) Requeen every colony
 - C) Move colonies during the bloom or feed light syrup to dilute the effect
 - D) Add honey supers
233. (MC) Which planting approach does the most to improve forage for bees?
- A) Planting a succession of native plants so something blooms from late winter to frost, including the summer dearth
 - B) Planting a large stand of a single species
 - C) Planting only ornamental annuals
 - D) Buying nursery plants treated with systemic insecticides
234. (MC) Which observation most strongly suggests acute pesticide poisoning?
- A) A gradual population decline over the winter
 - B) Bees bearding on a hot evening
 - C) Spotty brood with ropy larvae
 - D) Piles of dead or trembling bees in front of several hives at once, soon after a spray
235. (MC) What sample should a beekeeper collect after a suspected pesticide kill?
- A) Ten bees kept at room temperature
 - B) At least a cup of freshly dead bees in a clean container, frozen
 - C) A jar of honey only
 - D) A piece of old comb only
236. (MC) In South Carolina, which agency investigates suspected pesticide kills of honey bees?
- A) USDA Animal and Plant Health Inspection Service
 - B) SC Department of Agriculture honey program
 - C) Clemson Department of Pesticide Regulation
 - D) U.S. Food and Drug Administration
237. (MC) Since 2013, the U.S. EPA has required what on the labels of neonicotinoid products used outdoors?
- A) A "Protection of Pollinators" advisory box
 - B) An organic certification seal
 - C) A honey safety warning
 - D) A skull-and-crossbones symbol
238. (MC) When is a pesticide application near bees safest?
- A) At midday
 - B) During full bloom
 - C) In early afternoon
 - D) Late in the evening, when bees are not flying
239. (MC) Neonicotinoid insecticides are a concern for bees mainly because they are:
- A) Contact-only sprays that break down in minutes
 - B) Systemic, moving into the plant's pollen and nectar

- C) Fungicides that kill bee bread
- D) Herbicides that remove forage

240. (MC) Which trait helps make honey bees effective crop pollinators?

- A) Smooth, hairless bodies
- B) Foraging mainly at night
- C) Flower fidelity, staying with one kind of flower on a trip
- D) Avoiding flowers of the target crop

241. (TF) Well-fed bees with large fat bodies tend to tolerate disease and pesticide exposure better than poorly nourished bees.

242. (TF) Carolina jessamine nectar and pollen are toxic to honey bees.

243. (TF) Miticides that beekeepers apply are pesticides and must be used exactly as the label directs.

244. (SA) List the steps a beekeeper should take after a suspected pesticide kill.

245. (SA) Name two ways a beekeeper can prevent pesticide exposure to colonies.

Answer Key, Section 10: Chapter 10: Forage, Nutrition, and Pollinator Protection (Q223–245)

223. (MC) *What does pollen provide to the colony?*

Answer: B) Protein, fats, vitamins, and minerals

Rationale: Nectar supplies carbohydrates; pollen supplies protein, fats, vitamins, and minerals, eaten as bee bread by nurse bees.

Study Guide: Ch. 10, §A — What Colonies Need from Plants

224. (MC) *What is honeydew?*

Answer: C) The sugary excretion of aphids and scale insects

Rationale: Honeydew is excreted by sap-feeding insects such as aphids and scale insects; bees sometimes collect it like nectar.

Study Guide: Ch. 10, §A — What Colonies Need from Plants

225. (MC) *Why is a colony with access to many different pollen sources usually better nourished?*

Answer: A) Pollen quality varies between plant species, so diversity better meets nutritional needs

Rationale: Nutritional value differs widely between pollens, so a varied diet over the season meets the colony's needs better than a single source.

Study Guide: Ch. 10, §A — What Colonies Need from Plants

226. (MC) *Which of the following is a major spring honey plant in South Carolina?*

Answer: D) Tulip poplar

Rationale: Tulip poplar, blooming in April–May, is a major spring nectar source; the others are fall plants.

Study Guide: Ch. 10, §B — Major Bee Plants of the Southeast

227. (MC) *What is red maple's main value to colonies?*

Answer: B) It supplies late-winter pollen that helps trigger spring brood rearing

Rationale: Red maple blooms in late winter and supplies early pollen and some nectar that stimulate spring build-up.

Study Guide: Ch. 10, §B — Major Bee Plants of the Southeast

228. (MC) *When and where does sourwood mainly bloom in the Carolinas?*

Answer: C) June–July, in the upper Piedmont and mountains

Rationale: Sourwood blooms in early summer in the upper Piedmont and mountains and produces a prized light honey.

Study Guide: Ch. 10, §B — Major Bee Plants of the Southeast

229. (MC) *Which plants dominate the Southeastern fall nectar flow?*

Answer: A) Goldenrod and asters

Rationale: Goldenrod, asters, Spanish needles, and smartweeds are the main fall sources.

Study Guide: Ch. 10, §B — Major Bee Plants of the Southeast

230. (MC) *Nectar or pollen of summer titi (*Cyrilla racemiflora*) causes which brood problem?*

Answer: D) Purple brood

Rationale: Summer titi causes "purple brood," in which larvae and pupae turn blue-purple and die.

Study Guide: Ch. 10, §C — Plants That Can Harm Bees or Honey

231. (MC) *Honey that can make people ill ("mad honey") comes from grayanotoxins in which plants?*

Answer: B) Mountain laurel, rhododendrons, and some azaleas

Rationale: Grayanotoxins from mountain laurel, rhododendrons, and some azaleas can carry into honey; such honey is rare in the U.S.

Study Guide: Ch. 10, §C — Plants That Can Harm Bees or Honey

232. (MC) *How can a beekeeper reduce harm from toxic plants such as Carolina jessamine?*

Answer: C) Move colonies during the bloom or feed light syrup to dilute the effect

Rationale: Moving colonies away from large stands during bloom, or feeding light syrup, reduces how much toxic nectar and pollen they collect.

Study Guide: Ch. 10, §C — Plants That Can Harm Bees or Honey

233. (MC) *Which planting approach does the most to improve forage for bees?*

Answer: A) Planting a succession of native plants so something blooms from late winter to frost, including the summer dearth

Rationale: A succession of bloom, especially plants that flower during the summer dearth, helps both honey bees and native bees.

Study Guide: Ch. 10, §D — Improving Forage

234. (MC) *Which observation most strongly suggests acute pesticide poisoning?*

Answer: D) Piles of dead or trembling bees in front of several hives at once, soon after a spray

Rationale: Sudden piles of dead, trembling, or crawling bees in several colonies at once, especially soon after an application, are typical of a pesticide kill.

Study Guide: Ch. 10, §E — Pesticides and Bees

235. (MC) *What sample should a beekeeper collect after a suspected pesticide kill?*

Answer: B) At least a cup of freshly dead bees in a clean container, frozen

Rationale: Investigators need a sizable sample of freshly dead bees, frozen promptly, along with notes and photographs.

Study Guide: Ch. 10, §E — Pesticides and Bees

236. (MC) *In South Carolina, which agency investigates suspected pesticide kills of honey bees?*

Answer: C) Clemson Department of Pesticide Regulation

Rationale: The Clemson Department of Pesticide Regulation investigates pesticide incidents and enforces pesticide law in South Carolina.

Study Guide: Ch. 10, §E — Pesticides and Bees

237. (MC) *Since 2013, the U.S. EPA has required what on the labels of neonicotinoid products used outdoors?*

Answer: A) A "Protection of Pollinators" advisory box

Rationale: The pollinator advisory ("bee box") warns applicators about bee hazards and restricts applications while bees are foraging.

Study Guide: Ch. 10, §E — Pesticides and Bees

238. (MC) *When is a pesticide application near bees safest?*

Answer: D) Late in the evening, when bees are not flying

Rationale: Evening applications, after foraging stops, greatly reduce bee exposure.

Study Guide: Ch. 10, §E — Pesticides and Bees

239. (MC) *Neonicotinoid insecticides are a concern for bees mainly because they are:*

Answer: B) Systemic, moving into the plant's pollen and nectar

Rationale: Systemic insecticides are taken up throughout the plant, including pollen and nectar that bees collect.

Study Guide: Ch. 10, §E — Pesticides and Bees

240. (MC) *Which trait helps make honey bees effective crop pollinators?*

Answer: C) Flower fidelity, staying with one kind of flower on a trip

Rationale: Flower fidelity, branched body hairs that pick up pollen, and the ability to move large numbers of foragers to a crop make honey bees effective pollinators.

Study Guide: Ch. 10, §F — How Honey Bees Pollinate

241. (TF) *Well-fed bees with large fat bodies tend to tolerate disease and pesticide exposure better than poorly nourished bees.*

Answer: True

Rationale: Good nutrition supports larger fat bodies, longer life, more brood, and greater tolerance of viruses, Nosema, and pesticides.

Study Guide: Ch. 10, §A — What Colonies Need from Plants

242. (TF) *Carolina jessamine nectar and pollen are toxic to honey bees.*

Answer: True

Rationale: Carolina (yellow) jessamine is toxic to bees and can kill brood in years when it is abundant.

Study Guide: Ch. 10, §C — Plants That Can Harm Bees or Honey

243. (TF) *Miticides that beekeepers apply are pesticides and must be used exactly as the label directs.*

Answer: True

Rationale: Miticides are pesticides; the label is the law, and misuse can harm bees and contaminate wax and honey.

Study Guide: Ch. 10, §E — Pesticides and Bees

244. (SA) *List the steps a beekeeper should take after a suspected pesticide kill.*

Model answer: Record the date, time, and observations; photograph the dead bees and affected hives; collect at least a cup of freshly dead bees in a clean container and freeze it; note any recent spraying nearby; and report promptly to the state pesticide regulatory agency (in South Carolina, the Clemson Department of Pesticide Regulation).

Study Guide: Ch. 10, §E — Pesticides and Bees

245. (SA) *Name two ways a beekeeper can prevent pesticide exposure to colonies.*

Model answer: Any two of: tell neighboring farmers, landscapers, and mosquito-control programs where the hives are and ask to be notified before spraying; register hives on a registry such as FieldWatch's BeeCheck where available; move colonies or cover them with wet burlap during an announced application; encourage applicators to follow the label and spray in the evening when bees are not flying.

Study Guide: Ch. 10, §E — Pesticides and Bees

Section 11: Chapter 11: Predators, Pests, and Diseases of Honey Bee Colonies (Q246–291)

- 246. (MC)** In the southeastern US, which two predators can destroy or drive out an entire colony (rather than just catching bees in flight)?
- A) Skunks and bears
 - B) Birds and lizards
 - C) Dragonflies and spiders
 - D) Yellowjackets and hornets
- 247. (MC)** The Northern Giant Hornet ("murder hornet"), first detected in the US in December 2019, was found near which town?
- A) Miami, FL
 - B) Savannah, GA
 - C) Blaine, WA
 - D) Seattle, WA
- 248. (MC)** The yellow-legged hornet, found in the US in 2023, was first detected near:
- A) Seattle, WA
 - B) Savannah, GA
 - C) New Orleans, LA
 - D) Charleston, SC
- 249. (MC)** What is the correct order of small hive beetle (SHB) life stages?
- A) Larva → egg → pupa → adult
 - B) Egg → larva → pupa → adult
 - C) Pupa → larva → egg → adult
 - D) Egg → pupa → larva → adult
- 250. (MC)** Which statement about small hive beetles is TRUE?
- A) SHB are native to North America and have many natural enemies here
 - B) Feeding pollen patties inside hives can attract SHB
 - C) The best deterrent for SHB is placing hives in moist, shady locations
 - D) GardStar insecticide is designed for use inside hives to kill SHB larvae
- 251. (MC)** Drenching the soil around a hive with GardStar insecticide to kill pupating small hive beetles is an example of which type of pest control?
- A) Cultural
 - B) Mechanical
 - C) Biological
 - D) Chemical
- 252. (MC)** Applying beneficial nematodes to the soil under hives to attack small hive beetle pupae is an example of which type of pest control?
- A) Cultural
 - B) Mechanical
 - C) Biological
 - D) Chemical
- 253. (MC)** Wax moths are primarily a problem for:

- A) Strong, actively patrolled colonies
 - B) Stored/unoccupied comb no longer protected by bees
 - C) Queen cells only
 - D) Newly installed package colonies
254. (MC) If a beekeeper suspects a colony is Africanized, who should they contact to get it tested?
- A) US Department of Agriculture
 - B) SC Department of Natural Resources
 - C) Clemson Apiary Inspection Program
 - D) SC Department of Agriculture
255. (MC) Which statement about brown fecal spotting (dysentery) on the hive front is TRUE?
- A) It confirms a Vairimorpha (Nosema) infection
 - B) It indicates the most severe stage of Nosema infection
 - C) It may suggest Nosema but is not a reliable sign; diagnosis requires examining bees under a microscope
 - D) It is caused only by Nosema ceranae
256. (MC) Integrated pest management (IPM) begins with which steps?
- A) Identify the pest, monitor its level, and compare it with an action threshold
 - B) Treat every colony on a fixed calendar
 - C) Requeen every colony
 - D) Buy resistant stock and stop monitoring
257. (MC) How do Africanized honey bee colonies typically differ from European colonies?
- A) They are less defensive and rarely swarm
 - B) They can be identified reliably by color
 - C) They never nest in small cavities
 - D) They respond in greater numbers, pursue threats farther, and swarm and abscond more often
258. (MC) What should a person do if attacked by a large number of bees?
- A) Jump into a pond or pool
 - B) Run away, cover the face, and get inside a building or car
 - C) Stand still and swat at the bees
 - D) Lie down and stay motionless
259. (MC) What is the status of Tropilaelaps mites in the United States?
- A) Widespread since 1987
 - B) A native species of little concern
 - C) Not present, but considered a serious threat
 - D) Established in Florida
260. (MC) Chalkbrood and stonebrood are caused by which type of pathogen?
- A) Bacteria
 - B) Virus
 - C) Fungus
 - D) Protozoa
261. (MC) American Foulbrood (AFB) and European Foulbrood (EFB) are both caused by which type of pathogen?
- A) Fungus
 - B) Virus
 - C) Bacteria

- D) Protozoa
262. (MC) Sacbrood and Deformed Wing Virus (DWV) are both caused by which type of pathogen?
- A) Bacteria
 - B) Virus
 - C) Fungus
 - D) Mite-borne toxin
263. (MC) Which foulbrood disease CANNOT be cured, requiring the hive to be destroyed to prevent its spread?
- A) European Foulbrood (EFB)
 - B) American Foulbrood (AFB)
 - C) Both are equally curable
 - D) Neither is curable
264. (MC) In the diagnostic "ropey test," a positive result — liquefied larval remains stretching out to about an inch — is characteristic of:
- A) European Foulbrood (EFB)
 - B) American Foulbrood (AFB)
 - C) Chalkbrood
 - D) Sacbrood
265. (MC) European Foulbrood (EFB) often appears in late winter and can sometimes be overcome by the colony itself. Under what condition?
- A) During the fall dearth
 - B) During the spring nectar flow, as colony nutrition improves
 - C) Only after antibiotic treatment
 - D) It can never be overcome without requeening
266. (MC) To acquire antibiotics needed to prevent the spread of foulbrood, a beekeeper must now:
- A) Simply purchase them from any farm supply store
 - B) Contact a veterinarian who can issue a Veterinary Feed Directive (VFD)
 - C) Contact the USDA lab directly
 - D) No antibiotics are approved for use in honey bees
267. (MC) Which signs describe parasitic mite syndrome (PMS)?
- A) A ropey thread over an inch long
 - B) Hard white chalk-like mummies
 - C) Blue-purple dead larvae
 - D) Spotty brood with sunken, chewed cappings and discolored, melting larvae, with many mites present
268. (MC) Many dead bees found head-first in cells, with no honey near the cluster, indicate:
- A) K-wing
 - B) Starvation
 - C) Bearding
 - D) Purple brood
269. (MC) What is the single greatest threat to honey bee colonies — an external parasite that feeds on bees, reproduces on larvae, and transmits deadly viruses?
- A) Small hive beetle
 - B) Varroa mite
 - C) Wax moth
 - D) Tracheal mite

270. (MC) Varroa mites reproduce primarily on:
- A) Adult worker bees
 - B) Adult drones
 - C) Bee brood (larvae/pupae), reproducing best on drone brood
 - D) Pollen stores
271. (MC) What is the commonly cited acceptable threshold for taking action to control Varroa mites?
- A) 0.5% (0.5 mites per 100 bees)
 - B) 2% (2 mites per 100 bees)
 - C) 10% (10 mites per 100 bees)
 - D) There is no threshold — treat monthly regardless
272. (MC) Which organic acid, sold as Api-Bioxal and applied by vaporizer or dribble, is commonly used to control Varroa mites in spring and fall?
- A) Formic acid
 - B) Oxalic acid
 - C) Citric acid
 - D) Acetic acid
273. (MC) Formic acid and thymol should not be applied in mid-summer heat because bees are especially sensitive to:
- A) Humidity
 - B) Temperature
 - C) Sunlight
 - D) Wind
274. (MC) What behavior helps bees remove mite-infested larvae, resulting in a spotty brood pattern?
- A) Fanning behavior
 - B) Hygienic behavior
 - C) Nasonov signaling
 - D) Festooning
275. (MC) What is a common method beekeepers use to directly monitor Varroa mite loads?
- A) Alcohol wash
 - B) Weighing the hive
 - C) Visual inspection of adult bees alone
 - D) Counting eggs per cell
276. (MC) An alcohol wash of about 300 bees yields 9 mites. What is the infestation level?
- A) 1 mite per 100 bees (1%)
 - B) 3 mites per 100 bees (3%)
 - C) 9 mites per 100 bees (9%)
 - D) 0.3 mites per 100 bees (0.3%)
277. (MC) Which Varroa monitoring method is non-lethal to the sampled bees?
- A) Powdered-sugar roll
 - B) Alcohol wash
 - C) Soapy-water wash
 - D) Freezing the sample
278. (MC) Which practice helps slow the development of miticide resistance in Varroa?
- A) Using the same product every month

- B) Doubling the label dose
 - C) Treating only when monitoring shows a need, following the label, and rotating products with different modes of action
 - D) Leaving strips in the hive indefinitely
279. (MC) What is Varroa Sensitive Hygiene (VSH)?
- A) A trait in which workers find and remove mite-infested pupae
 - B) A hairier body that repels mites
 - C) Smaller cell size in foundation
 - D) A queen that lays more eggs
280. (MC) From where did the USDA import Russian honey bees beginning in 1997?
- A) Ukraine
 - B) The Caucasus Mountains
 - C) Siberia
 - D) The Primorsky region of eastern Russia
281. (MC) Before moving bee colonies from South Carolina to another state, a beekeeper must:
- A) Do nothing — no permit is required
 - B) Have Clemson's Apiary Inspection Program inspect and certify the hives
 - C) Simply notify the destination state by phone
 - D) Treat the colonies with antibiotics
282. (MC) If a beekeeper suspects a pesticide kill of an entire colony, who should they contact immediately?
- A) The USDA lab in Beltsville, MD
 - B) The SC Department of Health and Environmental Control
 - C) The Clemson Department of Pesticide Regulation
 - D) The SC Department of Natural Resources
283. (TF) The goal of integrated pest management is to eliminate every pest from the hive.
284. (TF) Colony collapse disorder (CCD) has a single, well-established cause.
285. (TF) Varroa mites have always been a pest of western honey bees.
286. (TF) Varroa mites can survive and reproduce on bumble bees.
287. (TF) Beekeepers who monitor and control Varroa mites tend to have more productive colonies that survive longer.
288. (TF) Varroa mite populations typically peak during winter.
289. (SA) What is "snotbrood," and what type of pathogen causes it?
290. (SA) Why is American Foulbrood considered such a serious regulatory concern compared to most other honey bee diseases?
291. (SA) Name the two agencies/programs a beekeeper would contact for: (a) certifying hives before an interstate move, and (b) investigating a suspected pesticide kill.

Answer Key, Section 11: Chapter 11: Predators, Pests, and Diseases of Honey Bee Colonies (Q246–291)

246. (MC) *In the southeastern US, which two predators can destroy or drive out an entire colony (rather than just catching bees in flight)?*

Answer: A) Skunks and bears

Rationale: Black bears and striped skunks. Bears tear hives apart to eat the brood and honey (a properly built electric fence is the best deterrent). Skunks rarely break into a hive; they scratch at the entrance at night and eat the guards and workers that come out until the colony is badly weakened.

Study Guide: Ch. 11, §A — Predators of Honey Bees in the Southeastern United States

247. (MC) *The Northern Giant Hornet ("murder hornet"), first detected in the US in December 2019, was found near which town?*

Answer: C) Blaine, WA

Rationale: Blaine, in Whatcom County near the Canadian border, in December 2019. Seattle is a common wrong answer; it is about 100 miles south. Washington and federal officials declared the hornet eradicated from the U.S. in December 2024.

Study Guide: Ch. 11, §A — Predators of Honey Bees in the Southeastern United States

248. (MC) *The yellow-legged hornet, found in the US in 2023, was first detected near:*

Answer: B) Savannah, GA

Rationale: Savannah, GA (August 2023). The yellow-legged hornet is now spreading in South Carolina: the first SC queens and nests were found in Beaufort County in spring 2024, the first nest outside the Lowcountry was found in York County on December 8, 2025, and by mid-September 2026 Clemson reported 566 nests removed or scheduled for removal, with monitoring traps across 13 counties. Report sightings, with a photo, through Clemson's reporting tool (linked from clemson.edu/ylh).

Study Guide: Ch. 11, §A — Predators of Honey Bees in the Southeastern United States

249. (MC) *What is the correct order of small hive beetle (SHB) life stages?*

Answer: B) Egg → larva → pupa → adult

Rationale: Egg → larva → pupa → adult.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

250. (MC) *Which statement about small hive beetles is TRUE?*

Answer: B) Feeding pollen patties inside hives can attract SHB

Rationale: Feeding pollen patties inside hives can attract SHB. (SHB are NOT native and have few natural enemies here; the best deterrent is dry, sunny hive locations; GardStar is a soil drench, not for use inside the hive.)

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

251. (MC) *Drenching the soil around a hive with GardStar insecticide to kill pupating small hive beetles is an example of which type of pest control?*

Answer: D) Chemical

Rationale: Chemical control.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

252. (MC) *Applying beneficial nematodes to the soil under hives to attack small hive beetle pupae is an example of which type of pest control?*

Answer: C) Biological

Rationale: Biological control.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

253. (MC) *Wax moths are primarily a problem for:*

Answer: B) Stored/unoccupied comb no longer protected by bees

Rationale: Stored/unoccupied comb no longer protected by a patrolling colony.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

254. (MC) *If a beekeeper suspects a colony is Africanized, who should they contact to get it tested?*

Answer: C) Clemson Apiary Inspection Program

Rationale: Clemson Apiary Inspection Program (CAIP). Africanized bees can be identified only by testing, not by appearance.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

255. (MC) *Which statement about brown fecal spotting (dysentery) on the hive front is TRUE?*

Answer: C) It may suggest Nosema but is not a reliable sign; diagnosis requires examining bees under a microscope

Rationale: Fecal spotting can accompany Nosema apis but has other causes, and N. ceranae, now the dominant species, often causes no dysentery at all. Confirmation requires microscopy.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

256. (MC) *Integrated pest management (IPM) begins with which steps?*

Answer: A) Identify the pest, monitor its level, and compare it with an action threshold

Rationale: IPM's steps are identify, monitor, compare with a threshold, choose options, act, and record and evaluate.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

257. (MC) *How do Africanized honey bee colonies typically differ from European colonies?*

Answer: D) They respond in greater numbers, pursue threats farther, and swarm and abscond more often

Rationale: Africanized colonies are more defensive, sting in greater numbers, pursue farther, swarm and abscond more, and nest in small, unusual cavities; identification requires laboratory testing.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

258. (MC) *What should a person do if attacked by a large number of bees?*

Answer: B) Run away, cover the face, and get inside a building or car

Rationale: Running to shelter while covering the face is the recommended response; bees will wait for a person who jumps into water.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

259. (MC) *What is the status of Tropilaelaps mites in the United States?*

Answer: C) Not present, but considered a serious threat

Rationale: Tropilaelaps mites are not present in the U.S., but they have spread beyond their native Asian range and are treated as a major threat.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

260. (MC) *Chalkbrood and stonebrood are caused by which type of pathogen?*

Answer: C) Fungus

Rationale: Fungus (chalkbrood, stonebrood).

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

261. (MC) *American Foulbrood (AFB) and European Foulbrood (EFB) are both caused by which type of pathogen?*

Answer: C) Bacteria

Rationale: Bacteria (AFB, EFB).

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

262. (MC) *Sacbrood and Deformed Wing Virus (DWV) are both caused by which type of pathogen?*

Answer: B) Virus

Rationale: Virus (sacbrood/"snotbrood," DWV).

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

263. (MC) Which foulbrood disease CANNOT be cured, requiring the hive to be destroyed to prevent its spread?

Answer: B) American Foulbrood (AFB)

Rationale: American Foulbrood (AFB) cannot be cured; the hive must be destroyed.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

264. (MC) In the diagnostic "ropey test," a positive result — liquefied larval remains stretching out to about an inch — is characteristic of:

Answer: B) American Foulbrood (AFB)

Rationale: American Foulbrood (AFB); a ropey stretch of about an inch is the classic positive AFB "ropey test" (EFB, if it ropes at all, stretches much less, around 1/4 inch).

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

265. (MC) European Foulbrood (EFB) often appears in late winter and can sometimes be overcome by the colony itself. Under what condition?

Answer: B) During the spring nectar flow, as colony nutrition improves

Rationale: During the spring nectar flow, as colony nutrition and strength improve, bees can sometimes overcome EFB on their own.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

266. (MC) To acquire antibiotics needed to prevent the spread of foulbrood, a beekeeper must now:

Answer: B) Contact a veterinarian who can issue a Veterinary Feed Directive (VFD)

Rationale: Contact a veterinarian who can issue a Veterinary Feed Directive (VFD); federal rules no longer allow beekeepers to simply purchase antibiotics.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

267. (MC) Which signs describe parasitic mite syndrome (PMS)?

Answer: D) Spotty brood with sunken, chewed cappings and discolored, melting larvae, with many mites present

Rationale: PMS results from heavy Varroa infestation with associated viruses and can resemble EFB; reducing mite levels is the remedy.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

268. (MC) Many dead bees found head-first in cells, with no honey near the cluster, indicate:

Answer: B) Starvation

Rationale: Bees that die head-first in cells while searching for food are a classic sign of starvation.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

269. (MC) What is the single greatest threat to honey bee colonies — an external parasite that feeds on bees, reproduces on larvae, and transmits deadly viruses?

Answer: B) Varroa mite

Rationale: Varroa mite.

Study Guide: Ch. 11, §D — Varroa Mites

270. (MC) Varroa mites reproduce primarily on:

Answer: C) Bee brood (larvae/pupae), reproducing best on drone brood

Rationale: Bee brood (larvae/pupae); mites reproduce better on drone brood specifically, since drones take longer to develop.

Study Guide: Ch. 11, §D — Varroa Mites

271. (MC) *What is the commonly cited acceptable threshold for taking action to control Varroa mites?*

Answer: B) 2% (2 mites per 100 bees)

Rationale: 2% (2 mites per 100 bees) is the figure most commonly taught. Many extension guides refine it by season: about 1% in late winter/early spring and 2–3% during the growing season.

Study Guide: Ch. 11, §D — Varroa Mites

272. (MC) *Which organic acid, sold as Api-Bioxal and applied by vaporizer or dribble, is commonly used to control Varroa mites in spring and fall?*

Answer: B) Oxalic acid

Rationale: Oxalic acid. It does not penetrate wax cappings, so it works best when little or no capped brood is present (for example, a late-fall broodless period). Formic acid, by contrast, is the pungent acid ants produce, and it does penetrate cappings.

Study Guide: Ch. 11, §D — Varroa Mites

273. (MC) *Formic acid and thymol should not be applied in mid-summer heat because bees are especially sensitive to:*

Answer: B) Temperature

Rationale: Temperature. Formic acid and thymol products each have a label temperature range, and applying them in mid-summer heat can harm bees and brood.

Study Guide: Ch. 11, §D — Varroa Mites

274. (MC) *What behavior helps bees remove mite-infested larvae, resulting in a spotty brood pattern?*

Answer: B) Hygienic behavior

Rationale: Hygienic behavior.

Study Guide: Ch. 11, §D — Varroa Mites

275. (MC) *What is a common method beekeepers use to directly monitor Varroa mite loads?*

Answer: A) Alcohol wash

Rationale: Alcohol wash.

Study Guide: Ch. 11, §D — Varroa Mites

276. (MC) *An alcohol wash of about 300 bees yields 9 mites. What is the infestation level?*

Answer: B) 3 mites per 100 bees (3%)

Rationale: Divide the mite count by 3 for a 300-bee sample: $9 \div 3 = 3$ mites per 100 bees, which is at or above most action thresholds.

Study Guide: Ch. 11, §D — Varroa Mites

277. (MC) *Which Varroa monitoring method is non-lethal to the sampled bees?*

Answer: A) Powdered-sugar roll

Rationale: The powdered-sugar roll dislodges mites while the bees survive; it is slightly less accurate than an alcohol wash, especially in humid weather.

Study Guide: Ch. 11, §D — Varroa Mites

278. (MC) *Which practice helps slow the development of miticide resistance in Varroa?*

Answer: C) Treating only when monitoring shows a need, following the label, and rotating products with different modes of action

Rationale: Resistance develops when one product is overused or misused; rotation, label compliance, and monitoring slow it.

Study Guide: Ch. 11, §D — Varroa Mites

279. (MC) *What is Varroa Sensitive Hygiene (VSH)?*

Answer: A) A trait in which workers find and remove mite-infested pupae

Rationale: VSH, developed by the USDA in Baton Rouge, is a heritable trait in which workers detect and remove brood infested with reproducing mites.

Study Guide: Ch. 11, §D — Varroa Mites

280. (MC) *From where did the USDA import Russian honey bees beginning in 1997?*

Answer: D) The Primorsky region of eastern Russia

Rationale: Russian bees came from the Primorsky region, where they had coexisted with Varroa for many decades.

Study Guide: Ch. 11, §D — Varroa Mites

281. (MC) *Before moving bee colonies from South Carolina to another state, a beekeeper must:*

Answer: B) Have Clemson's Apiary Inspection Program inspect and certify the hives

Rationale: Have CAIP inspect and certify the hives before an interstate move. (Bees or used equipment moving into SC also require a CAIP entry permit and a certificate of inspection from the state of origin, based on an inspection made within 60 days before shipment.)

Study Guide: Ch. 11, §E — South Carolina Regulations

282. (MC) *If a beekeeper suspects a pesticide kill of an entire colony, who should they contact immediately?*

Answer: C) The Clemson Department of Pesticide Regulation

Rationale: Contact the Clemson Department of Pesticide Regulation immediately.

Study Guide: Ch. 11, §E — South Carolina Regulations

283. (TF) *The goal of integrated pest management is to eliminate every pest from the hive.*

Answer: False

Rationale: IPM accepts a low level of a pest and aims to keep it below the damaging level using the least harmful effective controls.

Study Guide: Ch. 11, §B — Major Pests of Honey Bees

284. (TF) *Colony collapse disorder (CCD) has a single, well-established cause.*

Answer: False

Rationale: No single cause was found; Varroa, viruses, pesticides, and poor nutrition are all thought to contribute.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

285. (TF) *Varroa mites have always been a pest of western honey bees.*

Answer: False

Rationale: Varroa mites originally parasitized the eastern honey bee (*Apis cerana*) and jumped to western honey bees, spreading globally beginning in the 1980s.

Study Guide: Ch. 11, §D — Varroa Mites

286. (TF) *Varroa mites can survive and reproduce on bumble bees.*

Answer: False

Rationale: Varroa mites cannot survive/reproduce on bumble bees.

Study Guide: Ch. 11, §D — Varroa Mites

287. (TF) *Beekeepers who monitor and control Varroa mites tend to have more productive colonies that survive longer.*

Answer: True

Rationale: Monitoring and controlling Varroa leads to more productive, longer-surviving colonies.

Study Guide: Ch. 11, §D — Varroa Mites

288. (TF) *Varroa mite populations typically peak during winter.*

Answer: False

Rationale: Varroa populations build through the season and tend to peak in late summer/fall, not winter.

Study Guide: Ch. 11, §D — Varroa Mites

289. (SA) *What is "snotbrood," and what type of pathogen causes it?*

Model answer: "Snotbrood" is a common nickname for sacbrood — infected larvae liquefy inside an unbroken sac-like skin, resembling mucus. It is caused by a virus.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

290. (SA) *Why is American Foulbrood considered such a serious regulatory concern compared to most other honey bee diseases?*

Model answer: Unlike most honey bee diseases, American Foulbrood is incurable — an infected hive must be destroyed — and it is highly infectious, capable of spreading to other colonies in the bee yard. Because of this, most US states regulate and inspect for it to prevent its spread through the movement of bees and equipment.

Study Guide: Ch. 11, §C — Primary Diseases of Honey Bees

291. (SA) *Name the two agencies/programs a beekeeper would contact for: (a) certifying hives before an interstate move, and (b) investigating a suspected pesticide kill.*

Model answer: (a) Clemson Apiary Inspection Program (CAIP) — inspects/certifies hives and issues import/export permits under the SC Honey Bee Law. (b) Clemson Department of Pesticide Regulation (DPR) — investigates bee kills and enforces pesticide laws.

Study Guide: Ch. 11, §E — South Carolina Regulations

Section 12: Chapter 12: Honey Bee Products (Q292–334)

292. (MC) What compound gives honey some of its medicinal/antimicrobial properties?
- A) Chlorine
 - B) Hydrogen peroxide
 - C) Sulfur dioxide
 - D) Ozone
293. (MC) About how many individual flowers must bees visit to produce one pound of honey?
- A) 2,000
 - B) 200,000
 - C) 2 million
 - D) 20 million
294. (MC) About how much does a gallon of honey weigh?
- A) 8 pounds
 - B) 12 pounds
 - C) 15 pounds
 - D) 20 pounds
295. (MC) Approximately what percentage of honey's composition is sugar?
- A) 30%
 - B) 50%
 - C) 65%
 - D) 80%
296. (MC) Honey should not be fed to infants under one year old because it may contain spores that can cause:
- A) Salmonella
 - B) E. coli infection
 - C) Botulism
 - D) Listeriosis
297. (MC) Bees dry nectar down to about what moisture content before capping it as honey?
- A) 10%
 - B) 18.6%
 - C) 25%
 - D) 35%
298. (MC) What instrument do beekeepers use to measure the moisture content of honey?
- A) Hydrometer
 - B) Refractometer
 - C) Spectrometer
 - D) Densitometer
299. (MC) Which honey-removal technique is generally the cheapest but most labor-intensive, practical for only a few supers at a time?
- A) Blowers
 - B) Fume boards
 - C) Shaking frames
 - D) Bee escapes

300. (MC) Which honey-removal technique works within minutes but can affect honey flavor and requires extra equipment/repellents?

- A) Blowers
- B) Fume boards
- C) Shaking frames
- D) Bee escapes

301. (MC) Which honey-removal technique removes bees with the least agitation but requires multiple bee yard visits and can leave honey unguarded against small hive beetles?

- A) Blowers
- B) Fume boards
- C) Shaking frames
- D) Bee escapes

302. (MC) What is the recommended way to reverse honey granulation?

- A) Shake or stir it vigorously
- B) Place it in the refrigerator for a few days
- C) Pour it through a strainer to remove crystals
- D) Heat it gently in a warm water bath, not exceeding 110°F

303. (MC) Why should freshly extracted and filtered honey sit in a holding tank for at least 24 hours before bottling?

- A) To pasteurize it
- B) To allow fine sediment to settle and tiny air bubbles to rise, clarifying the honey
- C) To let it cool to room temperature
- D) To allow legally required aging

304. (MC) What are two problems with using the "crush and strain" method to extract honey?

- A) It over-heats the honey and destroys enzymes
- B) It affects honey clarity and destroys the comb, requiring bees to rebuild it
- C) It's illegal in South Carolina
- D) It only works with plastic foundation

305. (MC) Under South Carolina's honey labeling terminology, blending different honeys together, or adding a chunk of comb honey into a bottle of extracted honey, are both examples of:

- A) Adulterated honey
- B) Altered honey
- C) Contaminated honey
- D) Regulated honey

306. (MC) Adding corn syrup or food dye to honey is considered:

- A) Altered honey — allowed with proper labeling
- B) Adulterated honey — adding non-honey substances
- C) A standard, unregulated practice
- D) Only illegal if the honey is sold out of state

307. (MC) Under South Carolina's Home-Based Food Production Law (enacted 2012, expanded 2022), what must a beekeeper who extracts and bottles honey in a home kitchen put on the label?

- A) "Produced in a Home Kitchen"
- B) A statement that the product was processed by a home-based food operation not subject to SC's food safety regulations
- C) "Uninspected Product"

D) No special label is required

308. (MC) Which honey sales pathway allows a producer to sell honey without restriction on where or to whom it is sold?

- A)** Filing an Exemption Form and extracting in an uninspected facility
- B)** Filing a Registration Verification Certificate (RVC) and using an approved, inspected honey house
- C)** Simply labeling it "home-based food"
- D)** No pathway allows unrestricted sales in SC

309. (MC) Where must the net weight appear on a honey label?

- A)** On the back panel
- B)** In the bottom third of the front (principal display) panel
- C)** On the lid only
- D)** Anywhere on the container

310. (MC) About how much honey does a 1-pint jar hold?

- A)** 1 pound
- B)** 1.5 pounds
- C)** 2 pounds
- D)** 0.75 pound

311. (MC) Why should honey never be stored or processed in galvanized metal containers?

- A)** They rust quickly
- B)** They are too heavy
- C)** Zinc in the coating reacts with honey's acids
- D)** They are illegal for all foods

312. (MC) How is creamed honey made using the Dyce method?

- A)** By mixing about one part finely crystallized seed honey into about ten parts liquid honey and holding it near 57°F
- B)** By heating honey to 160°F
- C)** By freezing honey solid
- D)** By adding cornstarch

313. (MC) Which Southeastern varietal honey rarely granulates because of its high fructose content?

- A)** Canola
- B)** Clover
- C)** Goldenrod
- D)** Tupelo

314. (MC) What is chunk honey?

- A)** Honey that has crystallized into chunks
- B)** A piece of comb honey in a jar filled with liquid honey
- C)** Honey with pollen added
- D)** Creamed honey cut into blocks

315. (MC) What is the primary factor a beekeeper can control that most affects how much surplus honey a colony collects?

- A)** The race of bee kept
- B)** The size (population) of the colony
- C)** The color of the hive
- D)** The number of supers stacked, regardless of colony strength

- 316. (MC)** In South Carolina, honey supers should generally be added just before the two main nectar flows. When do these typically occur?
- A) Feb–Mar and Jul–Aug
 - B) May–Jun and Nov–Dec
 - C) Jan–Feb only
 - D) Year-round, no need to time it
- 317. (MC)** Which plant group is generally the dominant nectar source in spring?
- A) Meadowland wildflowers
 - B) Field crops/ornamentals
 - C) Trees/shrubs/woody vines
 - D) Grasses
- 318. (MC)** Which plant group is generally the dominant nectar source in fall?
- A) Meadowland wildflowers
 - B) Field crops/ornamentals
 - C) Trees/shrubs/woody vines
 - D) Grasses
- 319. (MC)** About what temperature does beeswax melt at?
- A) 100°F
 - B) 145°F
 - C) 212°F
 - D) 250°F
- 320. (MC)** Beekeepers are cautioned not to heat beeswax above what temperature, because it will darken and lose its natural odor?
- A) 150°F
 - B) 175°F
 - C) 200°F
 - D) 250°F
- 321. (MC)** The process of melting comb in a water bath to separate wax from pollen, cocoons, propolis, and other debris is called:
- A) Extracting
 - B) Filtering
 - C) Rendering
 - D) Decocooning
- 322. (MC)** Because propolis will not dissolve in water, beekeepers typically dissolve it in alcohol to make a product technically called a:
- A) Balm
 - B) Salve
 - C) Liqueur
 - D) Tincture
- 323. (MC)** Which pair of storage methods is appropriate to keep bee bread from over-fermenting or molding?
- A) Cooking it in an oven and boiling it in water
 - B) Drying it in a dehydrator and freezing it until use
 - C) Leaving it at room temperature and refrigerating it
 - D) Boiling it and then freezing it

- 324. (MC)** The use of bees and bee products (royal jelly, venom, propolis, etc.) for holistic/therapeutic purposes is called:
- A) Melliferaceuticals
 - B) Apitherapy
 - C) Honey Holistics
 - D) Bee Remedies
- 325. (MC)** Royal jelly is secreted by which glands?
- A) Wax glands
 - B) The queen's mandibular glands only
 - C) The hypopharyngeal and mandibular glands of nurse bees
 - D) Drone glands
- 326. (MC)** What is required to sell mead (honey wine)?
- A) Federal and state alcohol permits
 - B) Nothing beyond a honey label
 - C) Only an SCDA honey registration
 - D) A veterinarian's VFD
- 327. (MC)** A new beekeeper wants the fastest head start possible — a colony that already comes with drawn comb, brood, and food stores in its own woodenware. They should buy a:
- A) Package
 - B) Nucleus ("nuc")
 - C) Queen only
 - D) Swarm
- 328. (TF)** The term "raw" has a legal federal definition for honey.
- 329. (TF)** Beeswax is naturally white but turns yellow as it absorbs compounds from brood, honey, pollen, etc.
- 330. (TF)** To legally sell beeswax products in SC, a beekeeper must create a label and get it approved by the SC Department of Agriculture.
- 331. (TF)** Beeswax should be stored in a warm, sunny location to help retain its color and odor.
- 332. (TF)** Pollen traps should be left on the hive continuously all season.
- 333. (SA)** Name two crops grown in South Carolina that commonly need contract pollination from honey bees.
- 334. (SA)** List at least three things a beekeeper should do to ensure good crop pollination when placing hives under a pollination contract.

Answer Key, Section 12: Chapter 12: Honey Bee Products (Q292–334)

292. (MC) *What compound gives honey some of its medicinal/antimicrobial properties?*

Answer: B) Hydrogen peroxide

Rationale: Hydrogen peroxide, produced by an enzyme the bees add to nectar. Honey's very high sugar content and acidity also help limit microbial growth.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

293. (MC) *About how many individual flowers must bees visit to produce one pound of honey?*

Answer: C) 2 million

Rationale: About 2 million flowers per pound of honey.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

294. (MC) *About how much does a gallon of honey weigh?*

Answer: B) 12 pounds

Rationale: About 12 pounds per gallon.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

295. (MC) *Approximately what percentage of honey's composition is sugar?*

Answer: D) 80%

Rationale: About 80% sugar.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

296. (MC) *Honey should not be fed to infants under one year old because it may contain spores that can cause:*

Answer: C) Botulism

Rationale: Botulism (infant botulism spores).

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

297. (MC) *Bees dry nectar down to about what moisture content before capping it as honey?*

Answer: B) 18.6%

Rationale: About 18.6% moisture is the figure most commonly taught; it is also the maximum moisture allowed for U.S. Grade A honey.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

298. (MC) *What instrument do beekeepers use to measure the moisture content of honey?*

Answer: B) Refractometer

Rationale: Refractometer (measures the angle of light refraction, which correlates with moisture content).

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

299. (MC) *Which honey-removal technique is generally the cheapest but most labor-intensive, practical for only a few supers at a time?*

Answer: C) Shaking frames

Rationale: Shaking frames: cheapest, but labor-intensive and only practical for a few supers at a time.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

300. (MC) *Which honey-removal technique works within minutes but can affect honey flavor and requires extra equipment/repellents?*

Answer: B) Fume boards

Rationale: Fume boards: work within minutes but can affect flavor and need extra equipment/repellents.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

301. (MC) Which honey-removal technique removes bees with the least agitation but requires multiple bee yard visits and can leave honey unguarded against small hive beetles?

Answer: D) Bee escapes

Rationale: Bee escapes: least agitation, but require multiple visits and can leave honey unguarded against SHB.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

302. (MC) What is the recommended way to reverse honey granulation?

Answer: D) Heat it gently in a warm water bath, not exceeding 110°F

Rationale: Heat it gently in a warm water bath, not exceeding 110°F.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

303. (MC) Why should freshly extracted and filtered honey sit in a holding tank for at least 24 hours before bottling?

Answer: B) To allow fine sediment to settle and tiny air bubbles to rise, clarifying the honey

Rationale: Fine sediment settles and tiny air bubbles rise, clarifying the honey.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

304. (MC) What are two problems with using the "crush and strain" method to extract honey?

Answer: B) It affects honey clarity and destroys the comb, requiring bees to rebuild it

Rationale: Crush and strain affects honey clarity and destroys the comb (bees must rebuild it — labor- and resource-intensive).

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

305. (MC) Under South Carolina's honey labeling terminology, blending different honeys together, or adding a chunk of comb honey into a bottle of extracted honey, are both examples of:

Answer: B) Altered honey

Rationale: Altered honey (only honey-based ingredients/processing).

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

306. (MC) Adding corn syrup or food dye to honey is considered:

Answer: B) Adulterated honey — adding non-honey substances

Rationale: Adulterated honey (introducing non-honey substances like corn syrup or dye).

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

307. (MC) Under South Carolina's Home-Based Food Production Law (enacted 2012, expanded 2022), what must a beekeeper who extracts and bottles honey in a home kitchen put on the label?

Answer: B) A statement that the product was processed by a home-based food operation not subject to SC's food safety regulations

Rationale: A label statement that the product was processed/prepared by a home-based food operation not subject to SC's food safety regulations.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

308. (MC) Which honey sales pathway allows a producer to sell honey without restriction on where or to whom it is sold?

Answer: B) Filing a Registration Verification Certificate (RVC) and using an approved, inspected honey house

Rationale: Filing a Registration Verification Certificate (RVC) and using an approved, inspected honey house allows unrestricted sales; the exemption/home-based pathway restricts where and to whom honey can be sold.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

309. (MC) Where must the net weight appear on a honey label?

Answer: B) In the bottom third of the front (principal display) panel

Rationale: The net weight belongs in the bottom third of the front panel, in both U.S. and metric units.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

310. (MC) *About how much honey does a 1-pint jar hold?*

Answer: B) 1.5 pounds

Rationale: Honey weighs about 12 pounds per gallon, so a pint (1/8 gallon) holds about 1.5 pounds; honey is sold by weight, not volume.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

311. (MC) *Why should honey never be stored or processed in galvanized metal containers?*

Answer: C) Zinc in the coating reacts with honey's acids

Rationale: Honey is acidic and dissolves zinc from galvanized surfaces; use food-grade stainless steel or food-grade plastic.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

312. (MC) *How is creamed honey made using the Dyce method?*

Answer: A) By mixing about one part finely crystallized seed honey into about ten parts liquid honey and holding it near 57°F

Rationale: Controlled crystallization from fine seed crystals at about 57°F (14°C) produces a smooth, spreadable texture.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

313. (MC) *Which Southeastern varietal honey rarely granulates because of its high fructose content?*

Answer: D) Tupelo

Rationale: Tupelo honey's high fructose-to-glucose ratio keeps it liquid for a very long time.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

314. (MC) *What is chunk honey?*

Answer: B) A piece of comb honey in a jar filled with liquid honey

Rationale: Chunk honey combines a piece of comb with extracted liquid honey in the same jar.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

315. (MC) *What is the primary factor a beekeeper can control that most affects how much surplus honey a colony collects?*

Answer: B) The size (population) of the colony

Rationale: Colony size/population.

Study Guide: Ch. 12, §B — Nectar Sources and Seasonal Flows

316. (MC) *In South Carolina, honey supers should generally be added just before the two main nectar flows. When do these typically occur?*

Answer: A) Feb–Mar and Jul–Aug

Rationale: February–March and July–August (ahead of the spring and late-summer/fall flows).

Study Guide: Ch. 12, §B — Nectar Sources and Seasonal Flows

317. (MC) *Which plant group is generally the dominant nectar source in spring?*

Answer: C) Trees/shrubs/woody vines

Rationale: Trees/shrubs/woody vines (spring).

Study Guide: Ch. 12, §B — Nectar Sources and Seasonal Flows

318. (MC) *Which plant group is generally the dominant nectar source in fall?*

Answer: A) Meadowland wildflowers

Rationale: Meadowland wildflowers (fall).

Study Guide: Ch. 12, §B — Nectar Sources and Seasonal Flows

319. (MC) *About what temperature does beeswax melt at?*

Answer: B) 145°F

Rationale: About 145°F.

Study Guide: Ch. 12, §C — Beeswax

320. (MC) *Beekeepers are cautioned not to heat beeswax above what temperature, because it will darken and lose its natural odor?*

Answer: C) 200°F

Rationale: 200°F.

Study Guide: Ch. 12, §C — Beeswax

321. (MC) *The process of melting comb in a water bath to separate wax from pollen, cocoons, propolis, and other debris is called:*

Answer: C) Rendering

Rationale: Rendering.

Study Guide: Ch. 12, §C — Beeswax

322. (MC) *Because propolis will not dissolve in water, beekeepers typically dissolve it in alcohol to make a product technically called a:*

Answer: D) Tincture

Rationale: Tincture.

Study Guide: Ch. 12, §D — Propolis, Bee Bread, and Other Hive Products

323. (MC) *Which pair of storage methods is appropriate to keep bee bread from over-fermenting or molding?*

Answer: B) Drying it in a dehydrator and freezing it until use

Rationale: Drying in a dehydrator or freezing until use (cooking/boiling would destroy bee bread).

Study Guide: Ch. 12, §D — Propolis, Bee Bread, and Other Hive Products

324. (MC) *The use of bees and bee products (royal jelly, venom, propolis, etc.) for holistic/therapeutic purposes is called:*

Answer: B) Apitherapy

Rationale: Apitherapy.

Study Guide: Ch. 12, §D — Propolis, Bee Bread, and Other Hive Products

325. (MC) *Royal jelly is secreted by which glands?*

Answer: C) The hypopharyngeal and mandibular glands of nurse bees

Rationale: Nurse bees secrete royal jelly from their hypopharyngeal and mandibular glands; it is harvested commercially from queen cells about three days after larvae are placed in them.

Study Guide: Ch. 12, §D — Propolis, Bee Bread, and Other Hive Products

326. (MC) *What is required to sell mead (honey wine)?*

Answer: A) Federal and state alcohol permits

Rationale: Adults may make limited amounts of mead at home for personal use, but selling it requires federal and state alcohol permits.

Study Guide: Ch. 12, §D — Propolis, Bee Bread, and Other Hive Products

327. (MC) *A new beekeeper wants the fastest head start possible — a colony that already comes with drawn comb, brood, and food stores in its own woodenware. They should buy a:*

Answer: B) Nucleus ("nuc")

Rationale: Nucleus ("nuc") — comes with woodenware, drawn comb, brood, and food stores already established.

Study Guide: Ch. 12, §E — Selling and Renting Bees

328. (TF) *The term "raw" has a legal federal definition for honey.*

Answer: False

Rationale: There is no federal legal definition of "raw" honey; beekeepers who use the term should be able to explain what it means for their product.

Study Guide: Ch. 12, §A — Producing and Selling Honey in South Carolina

329. (TF) *Beeswax is naturally white but turns yellow as it absorbs compounds from brood, honey, pollen, etc.*

Answer: True

Rationale: Beeswax starts white and yellows as it absorbs compounds from brood, honey, and pollen.

Study Guide: Ch. 12, §C — Beeswax

330. (TF) *To legally sell beeswax products in SC, a beekeeper must create a label and get it approved by the SC Department of Agriculture.*

Answer: False

Rationale: No SCDA label approval is required to sell beeswax products (unlike honey, which is a regulated food).

Study Guide: Ch. 12, §C — Beeswax

331. (TF) *Beeswax should be stored in a warm, sunny location to help retain its color and odor.*

Answer: False

Rationale: Beeswax should be stored in a cool, dark location; heat and sunlight cause it to darken and lose its color/odor.

Study Guide: Ch. 12, §C — Beeswax

332. (TF) *Pollen traps should be left on the hive continuously all season.*

Answer: False

Rationale: Traps should be used intermittently, because the colony needs pollen to rear brood.

Study Guide: Ch. 12, §D — Propolis, Bee Bread, and Other Hive Products

333. (SA) *Name two crops grown in South Carolina that commonly need contract pollination from honey bees.*

Model answer: Any two of: peaches/plums, apples, blueberries, watermelon, cucumbers, squash, pumpkins (crops in SC commonly needing contract pollination). Beans, peas, tomatoes, and corn are not bee-pollination-dependent (self-pollinating or wind-pollinated); many muscadine grape cultivars, however, are female-flowered and do need insect pollination.

Study Guide: Ch. 12, §E — Selling and Renting Bees

334. (SA) *List at least three things a beekeeper should do to ensure good crop pollination when placing hives under a pollination contract.*

Model answer: Any three of: place at least 2 hives per crop acre (stocking rates vary by crop, so follow the grower's or extension agent's figure where one is given); make sure bees are strong with at least 6 full frames of active brood; place hives as close to the crop as possible; produce a written and signed contract stating the needs/expectations of both grower and beekeeper. (Note: keeping other forage blooming nearby and heavily feeding bees during bloom are NOT recommended — both can distract bees from the target crop.)

Study Guide: Ch. 12, §E — Selling and Renting Bees