

EAS Master Beekeeper Written Exam 2019
This is not an exhaustive list of acceptable answers.

Short Answer:

1. What is a bee gum and is it legal?

A feral or wild colony in a tree section and it is not legal

2. Name a minimum of three mite treatments that can legally be used when honey supers are on the hive?

1. drone comb removal
2. break in the brood cycle
3. sugar shake
4. formic acid
5. hopguard

3. Name and describe 3 characteristics of strong cell builder.

1. Lots of nurse bees
2. Capped brood
3. Honey and pollen
4. Swarm box
5. Closed to flight

4. What does the term 'threshold' mean when a beekeeper says that "the number of mites exceeded the threshold"?

It is the number of mites that determines when a beekeeper should implement mite control.

5. Name two factors that contribute to the minimal control beekeepers have over the genetics of their bees?

1. Nesting in the wild
2. Open mating
3. Multiple mating

4. Neighbors bringing in new bee stock
6. Describe three non-grafting methods that a beekeeper can use to prepare larvae for raising queens
 1. Miller method
 2. Alley method
 3. Smith method
 4. Cell punch method
 5. Jenter or Nicot system
7. Please name one cavity nesting honey bee species and describe one unique fact. Please name one open-nesting honey bee species and describe one unique fact.
Cavity nesting- *Apis cerana* or *mellifera* The ranges of these species are allopatric
Open-nesting species- *Apis dorsata* or *Apis florea* one dances on the horizontal
8. What is double grafting and what benefit could this technique provide if any?
Grafting, removing larvae and grafting again. Allows for a larger pool of royal jelly in increasing the care and quantity of cells raised.
9. Name three morphological or behavioral features of a honey bee that make them ideal pollinators.
Flower constant, feathered hairs, corbiculae, large colony, easily transportable
10. What are three differences between pollen and bee bread?
More reducing sugars
Unique bacteria and yeasts
More enzymes
Changes in levels of vitamins
Fermented versus not
11. During winter time what type of management would you do if any?
 1. Do nothing
 2. Oxalic acid vapo
 3. Feed dry sugar
 4. Moisture trap

12. How might the environmental and resource needs of a native bee species differ from those of honey bees? Please provide three specific differences related to behavior or life history.

Food stores, shelter, protection/defense, annual species versus perennial species, social versus solitary, thermoregulation

13. Provide three negative consequences of using a top bar hive over a movable frame hive.

One has to press frames to harvest honey, thereby destroying comb, overwintering can be tricky due to the horizontal configuration, specifically the size and placement of cluster in relation to honey stores . In-hive feeding can also be tricky due to the design.

14. Define pollination and define fertilization. How do these two important processes differ? When during the lifespan of the flower do these two processes occur?

Pollination is the movement of pollen (male gamete) from the stamen to the stigma (female reproductive structure). Fertilization is the union of the male and female gametes (pollen and egg) to produce a fertilized egg or zygote. These processes differ in that pollination is the precursor to fertilization. Pollination is simply the movement of the pollen to correct reproductive structure whereas fertilization occurs after pollination after the pollen grain lands on the stigma and grows a pollen tube that grows down the style to the ovaries where it unites with an egg.

15. List two pros and two cons of using wax foundation versus plastic foundation.

Wax foundation is made by bees and contains natural smells and compounds that are familiar to bees. Wax foundation can be manipulated for cut comb honey and also for cutting out comb with eggs or larvae for raising queens. Some cons of wax foundation is the growing contamination and buildup of agricultural compounds. Wax foundation can also be fragile depending on the construction and age of the wax.

True and False:

1. A benefit of purchasing packages is that they typically are pest free. T F
2. Bee bread is pollen collected by honey bee foragers that has undergone fermentation. T F
3. In a honey bee colony the mated queen controls the sex ratio. T F
4. It is estimated that there are over 4000 species of bees in North America T F
5. An important or a possible negative consequence of purchasing a nuc colony as a means of starting a new colony, is that you are purchasing used frames and equipment that may contain disease and or a buildup of pesticides T F
6. Laying workers are easy to recognize/ID in the hive because they behave differently T F
7. Honey bees will likely secrete wax and draw out comb when there is a strong nectar flow occurring T F
8. Robbing is a form of foraging and the behavior can be distinguished by flight of the robbers flying back and forth in front of the hive they are robbing. They will also recruit more robbers to the hive. T F
9. Ventilation is an important behavior performed by workers in a colony. Most of the ventilator bees are older returning foraging bees. T F
10. Generally speaking, 2:1 for spring feed, 3:1 for fall feed and 1:4 to stimulate brood rearing. T F
11. Four methods used to remove honey are; bee escapes, fume boards, brush and a blower or forced air. T F
12. Bumble bees overwinter as a solitary mated queen. T F
13. Due to the fact that strong honey bee colonies can tolerate the presence of small hive beetle populations with no damage Small Hive Beetles are considered a secondary pest.
T F

Fill in the blanks:

1. A honey bee goes through many larval instars before gorging and spinning a cocoon_____ and then becoming a ___pupa_____.

2. One may be able to detect the odor of __nasonov gland__
_____ by sniffing the rear of a fanning bee.
3. An unfertilized egg will result in a __haploid drone__. A fertilized egg will develop into a __diploid worker or queen depending on care and nutrition__.
4. __Honey dew__ is the concentrated waste high in sugar from insects such as aphids, scales and leafhoppers that bees collect to ripen into forest honey.
5. Optimum foraging strategy implies that bees will forage at the __closest__ and __richest__ location.
6. If you happen to be stung by a bee apply smoke to the sting to cover up the __alarm pheromone__.
7. Nectar __concentration__ and nectar __volume__ are the main characteristics that determine visitation.
8. A rare type of reproduction called thelytoky where a non-mated queen can produce eggs that will develop into females occurs in the __Cape honey bees__.
9. Wasps are organized into three main subgroups; parasitic wasps, __predatory__ wasps, and __paralyzing__ wasps.
10. Chalkbrood is caused by the fungus __Ascosphaera apis__. It turns the __larvae__ into chalky mummies.
11. A __pollen patty__ is made of __pollen and sucrose__ and is generally fed to a colony to stimulate brood rearing.

12. ____ **Swarms** _____ are excellent wax makers and comb builders. They have been on a break from nursing and foraging duties and are engaged with ____ **honey** _____.

Multiple choice:

1. The melting point of beeswax is

- a. 100-110 degrees F
- b. 110-115 degrees F
- c. 122-128 degrees F
- d. **144-147 degrees F**
- e. 152-156 degrees F

2. What colony level activity has allowed the honey bee to successfully inhabit all parts of the world?

- a. nectar ripening
- b. pollen fermentation
- c. **nest thermoregulation**
- d. comb building
- e. colony defensive behavior

3. Honey bees exhibit interesting behavior towards adult small hive beetles by (circle all that apply)

- a. stinging them
- b. coating them with honey
- c. **making propolis prisons**
- d. eating them
- e. **feeding them**

4. The most damaging stage of the Small Hive Beetle for a beekeeper is

- a. all stages
- b. the pupae
- c. the adult
- d. **the larvae**
- e. the egg

5. Adult honey bees have tri-chromatic vision just like humans except

- a. They can see ultra violet
- b. They cannot see green

- c. They cannot see red
 - d. a and b
 - e. a and c
6. Symptoms associated with European foulbrood or EFB include
- a. quivering
 - b. ropiness in the capped brood
 - c. slow to no spring build up
 - d. twisted, yellowing larvae
 - e. c and d
7. Problems associated with transporting hives include
- a. Bees can suffocate if it is too hot
 - b. Drones could be laid instead of workers
 - c. Brood could become chilled
 - d. Queen could be killed or balled
 - e. answers a, c and d
8. *Nosema cerana*
- a. Is a microsporidian, a spore forming fungus
 - b. Infects many types of insects
 - c. Can be controlled by feeding antibiotics
 - d. Causes the pollen to spoil
 - e. Answers a and b
9. All bees species can be separated from other members of Hymenoptera like wasps and ants by looking at their
- a. legs
 - b. mouthparts
 - c. antennae
 - d. hairs
 - e. eyes
10. Honey bees respire via tubular/pipeline system made up of
- a. ostia
 - b. spiracles and ostia
 - c. pores
 - d. trachea and tracheoles
 - e. pumps
11. Circle all the normal sting reactions
- a. itching

- b. swelling
 - c. inflammation
 - d. confusion
 - e. vomiting
12. *Apis mellifera* and the sister taxa *Apis cerana* are unique in the Genus *Apis* in that they both are:
- a. eusocial
 - b. cavity nesters
 - c. honey producers
 - d. hairy
 - e. all of the above

13. Honey bees have a unique life history where the adult bee performs different tasks during their lifetime. The first three weeks they perform jobs inside the hive and the last three weeks are spent in the field foraging. This is called:
- a. sex determination
 - b. eusociality
 - c. age-based polyethism
 - d. haplodiploidy
 - e. answers a and b

Essays: Pick two

1. Imagine we miraculously solved all of the factors contributing to loss of honey bee colonies and could guarantee adequate crop pollination by honey bees for the future, would we need native bees? Do they have value to humans that honey bees do not?
YES!!! Native bees have co-evolved with native flora and therefore native bees are very efficient at pollinating many of the natural plants in various ecosystems. Many of the plants supported by the pollination of native bees are at the base of the food chain, providing energy to other trophic levels.

2. Explain what the Demaree method is and how it works.

This is a hive management method for producing honey while managing swarming pressure. Use a queen excluder to divide the queen and brood nest from the honey supers, keeping the queen and brood down below the excluder with an additional brood chamber and any honey supers above. Move brood up to the boxes above the excluder every week or so and move any open comb down back to the brood chamber. Make sure to constantly be scouting for queen cells and removing them.

3. Why is genetic variation so important to maintain in a species? Name two colony level benefits of a highly diverse colony.

- Better foraging
- Disease tolerance
- Improved task division
- More plasticity in behavior
- Reduced inbreeding

4. What is organic honey? How does one get their honey certified as organic? If your honey is not certified organic how would you defend your honey if someone asked you if it was organic?

Different answers were accepted for this question with well thought out reasoning. You had to develop your argument based on facts. Key issues to discuss are what is organic honey, foraging range, agencies that certify, and what the certification means. The answer really depends on your definition of organic honey. For example, I personally do not believe we can say honey is organic, because in my view, the foraging area of that hive would have to be free of chemicals, and not just agrochemicals, but other human inputs in natural systems (pollutants). Also much of the foundation wax will either come with a pesticide load or eventually build one up over time, because of the hydrocarbon chains of beeswax. However, if your definition of organic honey is different than mine (maybe with more focus on apiary management decisions) then you had to explain your definition and view based on facts. For example, getting honey certified as organic is a different matter. This isn't talking about the organic nature of the honey itself but rather the protocols beekeepers use when managing their apiary for honey production.

