

Hints:

- *Not all of the following questions will appear on the actual exam, but many will*
- *Many of the locations of these questions will change*
- *True/False Questions MAY change on the exam (read them carefully)*
- *The questions on this Study Guide that will be multiple choice on the exam have only the correct answer listed here*
- *The exam will consist of 40 true-false and multiple choice questions worth 1.5 points each (60 points), and 10 fill-in questions worth up to 2 points each (20 points), and 5 short-answer questions worth up to 4 points each (20 points)*
- *Fill-in questions are in blue*
- *Short answer questions are in purple here, and are provided without answers.*

Questions on Introduction to Insect Pest Management

1. Based on the number of insects per acre or total biomass, insects are
 - a. **Extremely numerous**
 - b. **The most successful animals on earth**
 - c. **A and B**
2. "Organisms with bodies divided into segments, a well-developed integument which is the exoskeleton and some body segments with one or more pairs of jointed legs" is a good description of
 - a. **Arthropods**
3. Insects belong to the following class:
 - a. **Hexapoda**
4. Arthropods in the class Arachnida include
 - a. **Spiders and mites**
5. The breathing system in most insects is composed of
 - a. **Air tubes**
6. Most members of this class of arthropods are aquatic and beneficial.
 - a. **Crustacea**
7. True or **false**: spiders, mites and ticks are all in the same order.
8. Members of this class of arthropods have a cylindrical body with 25-100 segments, each with two pairs of legs, and feed on decaying organic matter
 - a. **Diplopoda**
9. Members of the class Arachnida can be separated from members of Hexapoda because Arachnids
 - a. **Possess a cephalothorax and lack antennae**
10. Insects' reproductive capacity has been suggested as a possible explanation for their success. This includes large numbers of eggs, rapid adaptation and short generation time, and also
 - a. **A large amount of genetic variability**
11. The development of agriculture caused an increase in
 - a. **Competition between humans and insects for food**
12. Insects can provide man with primary and intermediate resources. Primary resources include
 - a. **Materials for direct use by man**
 - b. **Experimental animals**
 - c. **A and B**
13. Berries, pears, apples, citrus, melons, peas, beans, and tomatoes all benefit from
 - a. **Insect pollination**
14. Trichogramma wasps are
 - a. **Insect parasites**

15. Insect decomposers perform the important ecological function of scavenging. They do this by feeding on
a. Dead animals and plants
16. Insects perform an important function by acting as food for
a. Fish
b. Amphibians
c. Reptiles
d. Birds
e. All of the above
17. Pest insect species account for what proportion of all insect species?
a. Less than 1%
18. Pest insect injury to crop plants, forests and ornamentals is mostly through
a. Feeding and egg laying
19. **True** or false: insect damage to food in storage can exceed losses before harvest.
20. “Reducing insect pest losses in ways that are effective, economically sound and ecologically compatible” is a description of the main concepts of
a. Integrated pest management
21. The concept of a pest has been described as anthropocentric and circumstantial. This is because it is based on the insect’s relationship to
a. Man
22. The greatest numbers of pests are in
a. Agriculture and forestry systems
23. Most insect pests of agriculture are pests due to
a. Numbers not just presence
24. “The ranking of a pest relative to the economics of dealing with the species” is a definition of
a. Pest status
25. **True** or false: pest status can be lowered when plants compensate for pest damage
26. **True** or false: economic losses are difficult to measure for medical pests
27. The arachnid class Chilopoda can be represented by
a. Centipedes
28. This order in the class Arachnida usually occupies tropical and temperate regions, especially dry, warm regions, and has long front appendages with pincers and a sting in the end of the abdomen
a. Scorpiones
29. **True** or false: Insects were one of the first foods humans ate on a regular basis.
30. Insects’ small size has been suggested as an explanation for their success, partly because it allows them to
a. Use food present only in small amounts
31. In the US, as few as _____ insect species are significant pests
a. 600
32. Carrion beetles and fly maggots are important decomposers, consuming
a. Dead animals

Fill-in questions

33. Aesthetic pests are pests due to
a. Presence alone

34. Four of the major factors contributing to pest status are
- a. **Market value**
 - b. **Susceptibility of the crop to pest damage**
 - c. **Variable weather factors**
 - d. **Cultural procedures**
35. Insects cause harm to humans by feeding on or parasitizing them AND
- a. **As vectors for human pathogens**
36. Four reasons have been suggested for the success of insects. These are
- a. **Arthropod body architecture**
 - b. **Small size**
 - c. **Ability to fly**
 - d. **Great reproductive capacity**

Short-answer questions

37. Briefly describe why a termite feeding on a dead tree in a forest is not considered a pest, while the same termite feeding on a house is considered a pest.
38. Briefly define the term insect vectors.
39. Briefly explain the difference between direct crop losses caused by insect feeding and indirect crop losses caused by insect feeding.
40. Define the term cephalothorax and tell which class of arthropods possesses it.
41. The following beneficial insects all have the same general ecological function: termites, springtails, carrion beetles and fly maggots. Name and describe that function.
42. Briefly explain why a change in the market value of a crop will change the pest status of any insect pest feeding on that crop.

Questions on Insect Structures and Life Processes

43. The grouping of segments of the insect body into distinct zones or areas (Head, Thorax, Abdomen) is called
- a. **Tagmosis**
44. This insect body part provides a rigid foundation for the body, attachment points for muscles, protects internal organs and prevents desiccation.
- a. **The body wall**
45. Internal in-pushings of the body wall (apodemes) serve to
- a. **Strengthen body wall**
46. The two main functions of the insect head are
- a. **Feeding and sensing the environment**
47. This hardened capsule bears the insect mouthparts, antennae and eyes
- a. **Cranium**
48. **True** or false: Insects with chewing mouthparts usually have heavier crania than insects with piercing-sucking mouthparts.
49. Insect mouth parts indicate their
- a. **Feeding habits**

50. Piercing-sucking mouthparts are adapted so the insect can feed on
a. Plant sap or blood
51. This type of mouth parts, found in thrips (Thysanoptera) consists of a cone-shaped beak.
a. Rasping-sucking
52. This type of mouth parts, found in moths (Lepidoptera) is modified for uptake of flower nectar and other liquids
a. Siphoning
53. This type of mouthparts, found in bees and wasps (Hymenoptera), is similar to chewing, and is used in forming wax, manipulating nest material & holding prey.
a. Chewing-lapping
54. Insect antennae are sensory organs, adapted to detect
a. Smells
b. Vibration
c. A and B
55. The shape of these insect body parts is strikingly different among insect species and often between sexes of the same species, and is frequently used in insect ID and sex determination.
a. Antennae
56. **True** or false: some immature insects have no eyes.
57. Insect legs are jointed, and are composed of _____ segments
a. Five
58. **True** or false: some insect wings are covered with scales.
59. Some insects only have wings
a. At certain life-cycle stages
b. At certain times of year
c. A and B
60. Adult insects lack legs on their abdomen, but some immatures have these structures to aid in locomotion:
a. Fleshy prolegs
61. Collections of similar cells form tissues, which, in turn form _____ and _____.
a. Organs, organ systems
62. Feeding and digestion, respiration, blood circulation, waste excretion, musculature and nerves and sensory receptors are all examples of
a. Organ systems
63. Phytophagous insects feed on
a. Plants
64. Zoophagous insects feed on
a. Non-insect animals
b. Other insects
c. A and B
65. Saprohagous insects feed on
a. Dead organic material
66. In most insects, Malpighian tubes are the main organ for
a. Excretion
67. **True** or false: Fats and oils are not generally considered essential in insect nutrition.
68. The main food energy source for insects is
a. Carbohydrates

69. The insect heart is located in the
a. Abdomen
70. Insect blood flows
a. Forward along the ‘top’ (dorsal side) of the insect and back along the ‘bottom’ (ventral side)
71. The main function of insect blood is to carry
a. Nutrients, wastes and hormones
72. Insect blood is different from that of mammals, because it does not contain
a. Hemoglobin
73. The insect respiratory system consists of spiracles (on most segments), which are attached to
a. Tracheae
74. Fast-flying insects have this modification to the tracheal system.
a. Air sacs
75. The basic means of locomotion for most insects on land is
a. Walking
76. In most insects
a. Only adults can fly
77. Insects with no eyes can often sense light
a. Through the cuticle
78. Taste receptors are usually abundant on
a. Mouthparts
79. True or **false**: insects’ main hearing organ is always located on their tibiae.
80. **True** or false: geomagnetic receptors in honeybees aid in orientation by sensing the earth’s magnetic field.
81. The insect nerve cord is composed of a series of ganglia, arranged
a. Along the ventral (bottom) side of the body
82. Insect spermathecia are sperm storage organs present in
a. Females
83. Insect seminal vesicles are sperm storage organs present in
a. Males
84. True or **false**: insects eggs are fertilized after laying, in the manner of fish and frog eggs.

Fill-in Questions

85. List the three basic layers of the insect body wall, starting from the outside
- a. Cuticle**
 - b. Epidermis**
 - c. Basement membrane**
86. Insect crania can be attached in three different arrangements. List them
- a. Vertically**
 - b. Horizontally**
 - c. Obliquely**

87. List the three sub-segments of the insect thorax, in order beginning at the head
- a. **Prothorax**
 - b. **Mesothorax**
 - c. **Metathorax**
88. Many adult insects have four wings. List the subsegments of the thorax to which they are attached.
- a. **Mesothorax**
 - b. **Metathorax**
89. Define the term hemocoel.
- a. **The open body cavity through which blood flows**
90. Immatures of aquatic insect species do not have open spiracles. Briefly describe the modifications to the tracheal system that allow such an insect to live underwater.
- a. **Tracheoles occur under the skin or are attached to external gills for gas exchange**
91. The insect nervous system consists of two parts:
- a. **The visceral nervous system**
 - b. **The central nervous system**
92. Insect nerve transmission is of two types:
- a. **Axonic**
 - b. **Synaptic**
93. Insect nerve transmissions are disrupted by certain insecticides. DDT and pyrethroids disrupt this type of transmission
- a. **Axonic**
94. Insect nerve transmissions are disrupted by certain insecticides. Carbamates and organophosphates disrupt this type of transmission
- a. **Synaptic**
95. Most insects are dioecious. Briefly define this term
- a. **Male and female are separate organisms and mate to produce a zygote**
96. List the three types on insect sensory organs and the type of stimuli they detect
- a. **Photoreceptors** **light**
 - b. **Chemoreceptors** **chemical compounds in air or liquids (scent and taste)**
 - c. **Mechanoreceptors** **motion, touch or vibrations (including sound)**

Short Answer Questions

97. Most adult insects have two prominent compound eyes. Briefly describe how these differ from the simple eyes present in many immature and some adult insects.
98. In beetles (Coleoptera), the front pair of wings is modified, and does not resemble the back pair. Briefly describe the structure and function of the front pair of wings (called the elytra).
99. The exoskeleton of most insects is only slightly flexible, and provides support to the body and attachment points for muscles. Briefly describe and explain how insects can move their bodies easily given this constraint. Focus on the structure of the exterior of the insect, not musculature.
100. Briefly compare and contrast the crania of insects with chewing mouthparts and piercing-sucking mouthparts. Focus on the crania, not the mouthparts themselves.