Bio-10-Q3W3--Arthropods-Qs. Bank

True/False
Indicate whether the statement is true or false.

____ 1. Having compound eyes on movable stalks is an advantage for aquatic crustaceans whose potential predators could attack from almost any direction.

____ 2. The legs of most crustaceans are unspecialized and used only for walking.

____ 3. You might be more likely to see pill bugs moving around out in the open on a rainy day than on a sunny one.

____ 4. Both centipedes and millipedes have book lungs for gas exchange.

____ 5. The acute senses of arthropods are the result of organs such as compound eyes and antennae.

____ 6. Arthropods have a well-developed excretory system consisting of nephridia.

____ 7. The well-developed arthropod nervous system consists of a double ventral nerve cord, an anterior brain, and several ganglia.

____ 8. Efficient gas exchange in arthropods is accomplished by tracheal tubes, book lungs, or gills.

____ 9. The exoskeleton is a protective adaptation that enables arthropods to move freely.

____ 10. Jointed appendages are advantageous because they are limited in their strength and functions.

____ 11. In arthropods, appendages are adapted for a variety of purposes including sensing, walking, feeding, and mating.

____ 12. The exoskeleton of arthropods is harder and provides more protection than the cuticle of annelids.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 13. An animal that is not a member of the class Arachnida is
a. a spider.
b. a deer tick.
c. a walking stick.
d. a dust mite.

____ 14. In spiders, chelicerae are highly modified appendages that are adapted for
a. holding food and injecting poison.
b. spinning silk and weaving webs.
c. chewing food.
d. mating and reproduction.

____ 15. The appendages of a spider that function as sense organs are
a. its chelicerae.
b. its pedipalps.
c. its legs.
d. its spinnerets.

____ 16. After catching their prey and injecting it with poison, spiders
a. eat the prey whole.
b. lay their eggs in the prey.
c. chew the prey into small pieces.
d. suck up the prey's contents, which have been liquified with enzymes.

____ 17. In ticks and mites, the head, thorax, and abdomen
a. are absent.
b. are well-defined.
c. are fused into one section.
d. are all the same size.

____ 18. The fact that horseshoe crabs have remained relatively unchanged for 500 million years indicates that
a. natural selection has not taken place.
b. they must reproduce by parthenogenesis.
c. they have very little genetic diversity.
d. their environment has changed very little.

____ 19. Grasshoppers have _____.
a. two compound eyes and three simple eyes
b. three compound eyes and two simple eyes
c. two compound eyes and two simple eyes
d. none of these

____ 20. The stages of incomplete metamorphosis are _____.
a. egg, larva, pupa, adult
b. larva, pupa, adult
c. egg, larva, adult
d. egg, nymph, adult

____ 21. Crabs, lobsters, shrimps, and pill bugs are members of the class _____.
a. Insecta
b. Chilopoda
c. Crustacea
d. Arachnida

____ 22. The typical tick body consists of _____ segment(s).
a. one
b. two
c. three
d. four

____ 23. Most insects have one pair of _____ that are used to sense vibrations, food, and pheromones in the environment.
a. pedipalps
b. wings
c. antennae
d. eyes

____ 24. In spiders, the exchange of gases takes place in _____.
a. book lungs
b. lungs
c. gills
d. spiracles

____ 25. When a spider bites, it uses its _____.
a. chelicerae
b. mandibles
c. pedipalps
d. silk glands

____ 26. How many pairs of jointed appendages do arachnids have?
a. two
b. four
c. three
d. six

____ 27. Aquatic arthropods exchange gases through _____.
a. tracheal tubes
b. gills
c. their exoskeleton
d. book lungs

____ 28. Before an arthropod molts, a new exoskeleton _____.
a. grows on top of its old one
b. must be found
c. cannot grow
d. grows beneath its old one

____ 29. The characteristic that most distinguishes arthropods from other invertebrates is _____.
a. the coelom
b. the endoskeleton
c. jointed appendages
d. bilateral symmetry

____ 30. What clue tells you immediately that the organism shown in Figure 28-2 is not an arthropod?

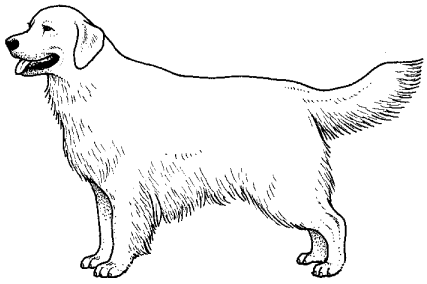

Figure 28-2

a. it has no jointed appendages
b. it has no exoskeleton
c. it has no open circulation system
d. it is warm blooded

____ 31. What clue tells you immediately that the organism shown in Figure 28-3 is not an arthropod?

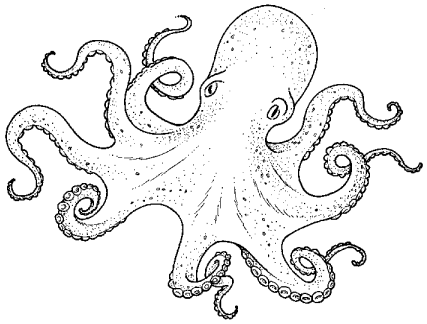

Figure 28-3

a. it has no jointed appendages
b. it has more than 6 legs
c. it doesn't molt
d. it cannot fly

____ 32. What clue tells you immediately that the organism shown in Figure 28-4 is not an arthropod?

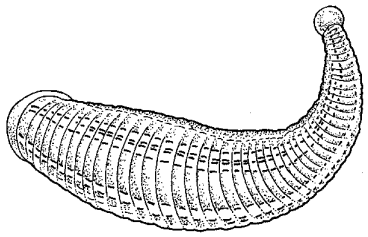

Figure 28-4

a. its gas exchange is inefficient
b. there are too many segments
c. it has no endoskeleton
d. it has no jointed appendages

____ 33. No one has ever seen a living trilobite. From this fossil picture in Figure 28-5, how can you tell it was an arthropod?

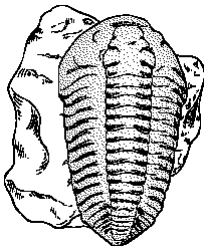

Figure 28-5

a. it molted
b. it produced asexually
c. it had segments
d. it had Malpighian tubules

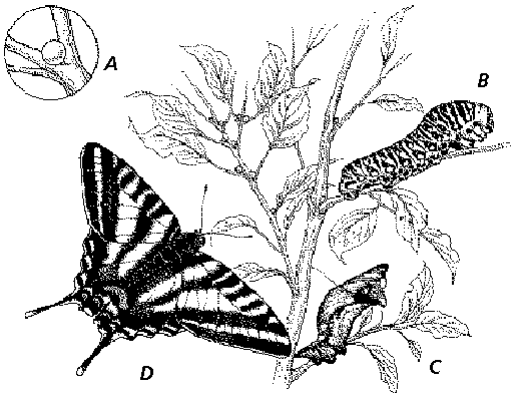

Figure 28-6

____ 34. What type of metamorphosis is shown in Figure 28-6?
a. partial
b. complete
c. incomplete
d. nymph

____ 35. What stages of metamorphosis shown in Figure 28-6 have no exoskeleton?
a. A and B
b. B and C
c. C and D
d. A and C

____ 36. What stage of metamorphosis shown in Figure 28-6 does the most eating take place?
a. A
b. B
c. C
d. D

____ 37. What stage of metamorphosis shown in Figure 28-6 contains the youngest organism?
a. A
b. B
c. C
d. D

____ 38. In what stage of metamorphosis shown in Figure 28-6 does the organism have recognizable insect characteristics like three segments and jointed appendages?
a. A
b. B
c. C
d. D

____ 39. What stage of metamorphosis shown in Figure 28-6 has characteristics of chilopoda and diplopoda?
a. A
b. B
c. C
d. D

Completion
Complete each statement.

40. Prior to molting, a new exoskeleton forms _____ the old one.
41. Many arthropods have three distinct body sections: a(n) _____, a(n) _____, and a(n) _____.
42. In arthropods that have a _____, the head and thorax are fused.

Essay

43. What is the most distinguishing arthropod characteristic?
44. Explain the advantage of having appendages with joints.
45. List three functions of an arthropod exoskeleton.
46. What are the major reasons for the widespread success of arthropods?
47. From what animal group did arthropods probably evolve?
48. List three adaptations that have evolved in arthropods.

Matching

Match each item with the correct statement below.

a. mandible
b. appendage
c. spinneret
d. pheromone
e. tracheal tubes
f. Malpighian tubule
g. parthenogenesis
h. spiracles
i. book lung
j. cephalothorax
k. molting

____ 49. movable structure used by a spider to turn silk into thread
____ 50. jaw of an arthropod
____ 51. shedding of the old exoskeleton
____ 52. chamber that contains leaflike plates that serve for gas exchange
____ 53. excretory organ of terrestrial arthropods
____ 54. fused head and thorax region in some arthropods
____ 55. any structure, such as a leg, that grows out of the body of an animal
____ 56. openings through which air enters and leaves the tracheal tubes
____ 57. form of asexual reproduction in which an organism develops from an unfertilized egg
____ 58. chemical odor signal given off by an animal
____ 59. branching networks of hollow passages that carry air throughout the body

Short Answer

60. Compare and contrast *chelicerae* and *pedipalps*.
61. Compare and contrast *simple eye* and *compound eye*.
62. When natural disasters strike natural areas, often the only animals to survive are the insects. Explain why this might happen.
63. How does living in colonies contribute to the survival of bees?
64. Insects have well-developed nervous systems. How is this an adaptive advantage for insects?
65. Describe an insect that has adapted to a windy, dry climate. Explain its adaptations.
66. It is believed that arthropods evolved from the annelids. What differences, present in the arthropod structure, make arthropods better adapted to their environment?
67. How do web-spinning spiders create their webs?
68. How do compound eyes aid arthropods?
69. What are four uses of the jointed appendages of arthropods? Give examples.
70. How are insects adapted to living on land?
71. Suppose a new species of insect is introduced into an area as a natural control to rid the area of other insect pests. What are some possible advantages and disadvantages of doing this?
72. Many barnacles live on rocks in the ocean and strain plankton from the water. Other barnacles that also feed on plankton live on the backs of gray whales. Which group do you think has better feeding opportunities, those on rocks or those on whales?
73. Why do arthropods lack muscle strength after molting?
74. How are their different modes of feeding reflected in the mouthparts of insects?
75. Fossils reveal that the horseshoe crab has remained almost unchanged for 500 million years. Why would an arthropod such as the horseshoe crab fail to evolve? What can you infer about the rate of change of its seaside environment?

Many invertebrates, from hydrozoans to mollusks and arthropods, have specialized sense organs for monitoring gravity. This sensitivity is related to their sense of equilibrium. Arthropods can sense when they are upright and when they are turned over. The organ that senses changes with respect to gravity is the statocyst, located at the base of each antennule of the crayfish. A statocyst is a chamber that contains sensory neurons with hairlike fibers and a solid mass of sand grains or hardened calcium salts, shown in Figure 28-1. These grains push against the hair cells, which then trigger signals in associated sensory neurons.

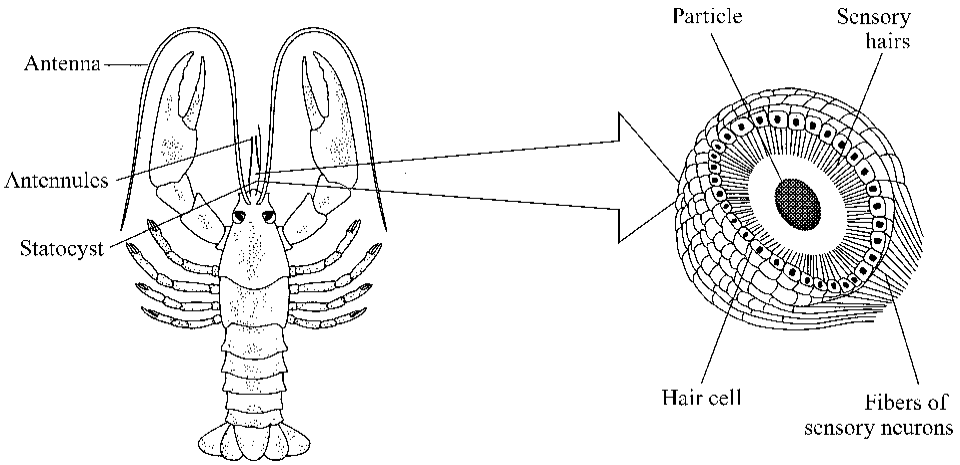

Figure 28-1

76. Suppose that scientists on board a space shuttle wanted to investigate the effects of microgravity on the uprighting reflex of crayfishes. What experiment might be proposed? You may refer to Figure 28-1.
77. Hypothesize how the statocyst functions to keep a crayfish upright. Refer to Figure 28-1.
78. What could scientists do if their hypothesis were not supported by the data? Refer to Figure 28-1.
79. Referring to Figure 28-1, what would be the control in the experiment?
80. Referring to Figure 28-1, which variable of the experiment would be tested?

Bio-10-Q3W3--Arthropods-Qs. Bank
Answer Section

TRUE/FALSE

1. ANS: T PTS: 1
2. ANS: F PTS: 1
3. ANS: T PTS: 1
4. ANS: F PTS: 1
5. ANS: T PTS: 1 DIF: B OBJ: 28-2
   NAT: C3 | C5 | C6
6. ANS: F PTS: 1 DIF: B OBJ: 28-2
   NAT: C3 | C5 | C6
7. ANS: T PTS: 1 DIF: B OBJ: 28-2
   NAT: C3 | C5 | C6
8. ANS: T PTS: 1 DIF: B OBJ: 28-2
   NAT: C3 | C5 | C6
9. ANS: F PTS: 1 DIF: B OBJ: 28-2
   NAT: C3 | C5 | C6
10. ANS: F PTS: 1 DIF: B OBJ: 28-2
    NAT: C3 | C5 | C6
11. ANS: T PTS: 1 DIF: B OBJ: 28-2
    NAT: C3 | C5 | C6
12. ANS: T PTS: 1 DIF: B OBJ: 28-2
    NAT: C3 | C5 | C6

MULTIPLE CHOICE

13. ANS: C PTS: 1
14. ANS: A PTS: 1
15. ANS: B PTS: 1
16. ANS: D PTS: 1
17. ANS: C PTS: 1
18. ANS: D PTS: 1
19. ANS: A PTS: 1 DIF: B OBJ: 28-3
    NAT: C3 | C4 | F4
20. ANS: D PTS: 1 DIF: B OBJ: 28-4
    NAT: C3 | C4 | F1
21. ANS: C PTS: 1 DIF: B OBJ: 28-3
    NAT: C3 | C4 | F4
22. ANS: A PTS: 1 DIF: B OBJ: 28-3
    NAT: C3 | C4 | F4
23. ANS: C PTS: 1 DIF: B OBJ: 28-4
    NAT: C3 | C4 | F1
24. ANS: A PTS: 1 DIF: B OBJ: 28-3
    NAT: C3 | C4 | F4

25. ANS: A PTS: 1 DIF: B OBJ: 28-3
NAT: C3 | C4 | F4
26. ANS: D PTS: 1 DIF: B OBJ: 28-3
NAT: C3 | C4 | F4
27. ANS: B PTS: 1 DIF: B OBJ: 28-1
NAT: C3 | C5 | C6
28. ANS: D PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
29. ANS: C PTS: 1 DIF: B OBJ: 28-3
NAT: C3 | C4 | F4
30. ANS: B PTS: 1 DIF: A OBJ: 28-1
NAT: C3 | C5 | C6
31. ANS: A PTS: 1 DIF: A OBJ: 28-1
NAT: C3 | C5 | C6
32. ANS: D PTS: 1 DIF: A OBJ: 28-1
NAT: C3 | C5 | C6
33. ANS: C PTS: 1 DIF: A OBJ: 28-1
NAT: C3 | C5 | C6
34. ANS: B PTS: 1 DIF: B OBJ: 28-4
NAT: C3 | C4 | F1
35. ANS: D PTS: 1 DIF: A OBJ: 28-4
NAT: C3 | C4 | F1
36. ANS: B PTS: 1 DIF: B OBJ: 28-4
NAT: C3 | C4 | F1
37. ANS: A PTS: 1 DIF: A OBJ: 28-4
NAT: C3 | C4 | F1
38. ANS: D PTS: 1 DIF: A OBJ: 28-4
NAT: C3 | C4 | F1
39. ANS: B PTS: 1 DIF: A OBJ: 28-4
NAT: C3 | C4 | F1

COMPLETION

40. ANS: beneath

PTS: 1
41. ANS: head, thorax, abdomen

PTS: 1
42. ANS: cephalothorax

PTS: 1

ESSAY

43. ANS:
jointed appendages

PTS: 1

44. ANS:
Joints allow for more powerful movements during locomotion, and they make certain types of appendages multifunctional.

PTS: 1

45. ANS:
(1) protects and supports internal tissues; (2) provides places for muscles to attach; (3) helps prevent water loss

PTS: 1

46. ANS:
As a group, they can exploit just about every type of food source available.

PTS: 1

47. ANS:
from ancient annelids

PTS: 1

48. ANS:
(1) reduced number of body segments; (2) specialization of body segments; (3) greater development of nervous tissue in the head

PTS: 1

MATCHING

49. ANS: C PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
50. ANS: A PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
51. ANS: K PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
52. ANS: I PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
53. ANS: F PTS: 1 DIF: B OBJ: 28-1
NAT: C3 | C5 | C6
54. ANS: J PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
55. ANS: B PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
56. ANS: H PTS: 1 DIF: B OBJ: 28-1
NAT: C3 | C5 | C6
57. ANS: G PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
58. ANS: D PTS: 1 DIF: B OBJ: 28-2
NAT: C3 | C5 | C6
59. ANS: E PTS: 1 DIF: B OBJ: 28-1
NAT: C3 | C5 | C6

SHORT ANSWER

60. ANS:
Chelicerae are the two biting appendages of arachnids; pedipalps are appendages for handling food and for sensing.

PTS: 1 DIF: A OBJ: 28-2 NAT: C3 | C5 | C6

61. ANS:
A simple eye is a visual structure with only one lens; a compound eye is a visual structure with many lenses.

PTS: 1 DIF: A OBJ: 28-2 NAT: C3 | C5 | C6

62. ANS:
Insects have adaptations that enable them to survive unfavorable conditions, while other animals may not be able to withstand them.

PTS: 1 DIF: A OBJ: 28-4 NAT: C3 | C4 | F1

63. ANS:
Certain bees in a colony perform specific jobs to help all bees survive.

PTS: 1 DIF: A OBJ: 28-4 NAT: C3 | C4 | F1

64. ANS:
Insect nervous systems are developed to make the animals extremely sensitive to a wide variety of stimuli. Sense organs for hearing, sight, taste, and smell make insects well equipped to survive in their environment.

PTS: 1 DIF: A OBJ: 28-4 NAT: C3 | C4 | F1

65. ANS:
Answers will vary. Legs might have large, hooklike structures for attachment to surfaces and large pads for digging. It might be small and compact like a beetle with no parts that could catch the wind. It might be wingless, live in the soil, and feed on plant roots.

PTS: 1 DIF: A OBJ: 28-1 NAT: C3 | C5 | C6

66. ANS:
Arthropod segments are fewer and are adapted to functions such as locomotion, feeding, and sensing. Arthropod segments show more complex organization. The arthropod shows greater development of nerve tissue and sensory organs, such as well-developed eyes. The exoskeleton of arthropods is harder and provides more protection than the cuticle of annelids.

PTS: 1 DIF: A OBJ: 28-1 NAT: C3 | C5 | C6

67. ANS:
Spider silk is secreted by silk glands in the abdomen. The silk passes through many small tubes before being spun into thread by the spinnerets, which are structures at the rear of the spider.

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4

68. ANS:
The image formed from compound eyes is a composite of many partial images, one for each lens. This type of image is good for detecting motion. Even the slightest movement of prey, mates, or predators can be detected.

PTS: 1 DIF: A OBJ: 28-1 NAT: C3 | C5 | C6

69. ANS:
Jointed appendages are adapted for sensing, walking, feeding, and mating. Spiders use the second pair of appendages—the pedipalps—for sensing and mating. Scorpions use their pedipalps for seizing prey. Lobsters use their swimmerets for swimming. Many arthropods use their jointed appendages for walking.

PTS: 1 DIF: A OBJ: 28-2 NAT: C3 | C5 | C6

70. ANS:
Their thinner exoskeleton allows more freedom to fly and jump; the exoskeleton is covered by a waxy layer that protects against water loss. Most insects breathe through tracheal tubes. The flight and landing mechanisms are also adaptive advantages for land.

PTS: 1 DIF: A OBJ: 28-4 NAT: C3 | C4 | F1

71. ANS:
An advantage of introducing insect predators is that they will control pests without polluting soil and water with harmful chemicals. A possible disadvantage is that they might not have natural enemies in the area, leading to a population explosion of the new insect that could upset the ecological balance and food chain.

PTS: 1 DIF: A OBJ: 28-4 NAT: C3 | C4 | F1

72. ANS:
Answers will vary but may include that because the whale also feeds on plankton, the barnacles on whales will be continuously carried to fresh sources of plankton.

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4

73. ANS:
After molting, the new exoskeleton is soft and does not provide the resistance needed to pull the body when the muscles contract.

PTS: 1 DIF: A OBJ: 28-2 NAT: C3 | C5 | C6

74. ANS:
Insects that draw blood have needlelike mouthparts. Those that suck nectar have a rolled-up sucking tube. Those that lap up food have a spongelike tongue. Insects that chew have mouthparts for handling and chewing food.

PTS: 1 DIF: A OBJ: 28-4 NAT: C3 | C4 | F1

75. ANS:
The horseshoe crab might be well-adapted for movement, protection, and feeding in its environment. You can infer that its seaside environment must have changed very little.

PTS: 1 DIF: A OBJ: 28-2 NAT: C3 | C5 | C6

76. ANS:
Answers will vary. They might include placing crayfish in several positions to observe their ability to turn themselves upright again. Scientists may try to find out whether the effects of microgravity are felt more by larger crayfish than by smaller crayfish. They may also investigate whether microgravity affects crayfish that are in a dry environment more than those that are in water.

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4

77. ANS:
Hypotheses will vary but should include that when a crayfish is on its back, the mass of sand grains falls away from its accustomed place on the hairs. This would signal the crayfish to turn upright again.

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4

78. ANS:
check the experimental procedure, check the data, or change the hypothesis

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4

79. ANS:
Answers will vary but may include a control group of similar crayfish kept on the ground at normal gravity conditions.

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4

80. ANS:
Answers will depend on the experiment but will most likely relate to the position of the crayfish.

PTS: 1 DIF: A OBJ: 28-3 NAT: C3 | C4 | F4