

**Registration form**

**BARK BEETLES CEU TRAINING COURSE \$100.00**

**48 HOUR RUSH ORDER PROCESSING FEE ADDITIONAL \$50.00**

*Rush service does not include overnight delivery or FedEx fees.*

**Start and finish dates:** \_\_\_\_\_

*You will have 90 days from this date in order to complete this course*

**Name** \_\_\_\_\_ **Signature** \_\_\_\_\_

**(This will appear on your certificate as above)**

**Address:** \_\_\_\_\_

**City** \_\_\_\_\_ **State** \_\_\_\_\_ **Zip** \_\_\_\_\_ **Email** \_\_\_\_\_

**Phone:**

**Home** (    ) \_\_\_\_\_ **Work** (    ) \_\_\_\_\_ **Fax** (    ) \_\_\_\_\_

**License or**

**Operator ID #** \_\_\_\_\_ **Exp Date** \_\_\_\_\_

**Class/Grade** \_\_\_\_\_

**Please circle which certification you are applying the course CEU's/PDH's.**

Commercial Applicator   Residential Applicator   Industrial Applicator   Pesticide Handler   Advisor

Agricultural Applicator   Aerial Applicator   Other \_\_\_\_\_

**California Structural   California DPR   AZ Agricultural**

**Your certificate will be mailed to you in about two weeks.**

Technical Learning College  
P.O. Box 420, Payson, AZ 85547-0420  
(928) 468-0665 Toll Free (866) 557-1746  
info@tlch2o.com Fax (928) 272-0747

**Visit us on the web at [www.ABCTLC.com](http://www.ABCTLC.com)**

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**If you've paid on the Internet, please write your customer#** \_\_\_\_\_

**Referral's Name** \_\_\_\_\_



**Bark Beetle Answer Key      Name**

**Phone#**

**Address**

*Please circle the correct answer*

- |               |               |                |
|---------------|---------------|----------------|
| 1. A B C D E  | 35. T F       | 69. A B C D E  |
| 2. A B C D E  | 36. T F       | 70. A B C D E  |
| 3. A B C D E  | 37. T F       | 71. A B C D E  |
| 4. A B C D E  | 38. T F       | 72. A B C D E  |
| 5. A B C D E  | 39. T F       | 73. A B C D E  |
| 6. A B C D E  | 40. T F       | 74. A B C D E  |
| 7. A B C D E  | 41. T F       | 75. A B C D E  |
| 8. A B C D E  | 42. T F       | 76. A B C D E  |
| 9. A B C D E  | 43. T F       | 77. A B C D E  |
| 10. A B C D E | 44. T F       | 78. A B C D E  |
| 11. A B C D E | 45. T F       | 79. A B C D E  |
| 12. A B C D E | 46. T F       | 80. A B C D E  |
| 13. A B C D E | 47. T F       | 81. A B C D E  |
| 14. A B C D E | 48. T F       | 82. A B C D E  |
| 15. A B C D E | 49. T F       | 83. A B C D E  |
| 16. A B C D E | 50. T F       | 84. A B C D E  |
| 17. A B C D E | 51. A B C D E | 85. A B C D E  |
| 18. A B C D E | 52. A B C D E | 86. A B C D E  |
| 19. A B C D E | 53. A B C D E | 87. A B C D E  |
| 20. A B C D E | 54. A B C D E | 88. A B C D E  |
| 21. A B C D E | 55. A B C D E | 89. A B C D E  |
| 22. A B C D E | 56. A B C D E | 90. A B C D E  |
| 23. A B C D E | 57. A B C D E | 91. A B C D E  |
| 24. A B C D E | 58. A B C D E | 92. A B C D E  |
| 25. A B C D E | 59. A B C D E | 93. A B C D E  |
| 26. A B C D E | 60. A B C D E | 94. A B C D E  |
| 27. A B C D E | 61. A B C D E | 95. A B C D E  |
| 28. A B C D E | 62. A B C D E | 96. A B C D E  |
| 29. A B C D E | 63. A B C D E | 97. A B C D E  |
| 30. A B C D E | 64. A B C D E | 98. A B C D E  |
| 31. T F       | 65. A B C D E | 99. A B C D E  |
| 32. T F       | 66. A B C D E | 100. A B C D E |
| 33. T F       | 67. A B C D E |                |
| 34. T F       | 68. A B C D E |                |

**Always call us after faxing the paperwork to ensure that we've received it.**

**CUSTOMER SERVICE RESPONSE CARD**

**BARK BEETLES CEU COURSE**

DATE: \_\_\_\_\_

NAME: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

E-MAIL \_\_\_\_\_ PHONE \_\_\_\_\_

**PLEASE COMPLETE THIS FORM BY CIRCLING THE NUMBER OF THE APPROPRIATE ANSWER IN THE AREA BELOW.**

1. Please rate the difficulty of your course.  
Very Easy   0   1   2   3   4   5   Very Difficult

2. Please rate the difficulty of the testing process.  
Very Easy   0   1   2   3   4   5   Very Difficult

3. Please rate the subject matter on the exam to your actual field or work.  
Very Similar   0   1   2   3   4   5   Very Different

4. How did you hear about this Course? \_\_\_\_\_

5. What would you do to improve the course?  
\_\_\_\_\_  
\_\_\_\_\_

Any other concerns or comments.  
\_\_\_\_\_  
\_\_\_\_\_

## Bark Beetle CEU Training Assignment

You will have 90 days from the start of this assignment to successfully complete it with a score of 70 % or better. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers.

You can e mail or fax your Answer Key along with the Registration Form to TLC. Info@tlch2o.com or fax (928) 272-0747

### First Section, Multiple Choice Insect Identification Section

1. The adult insect becomes a large grey moth.
  - A. Carpenter worm adult
  - B. Clear-winged moth
  - C. Locust borer adult
  - D. Poplar borer larva
  - E. Pine sawyer adult
2. This insect bores in trees as larvae. The adults resemble wasps in many cases.
  - A. Carpenter worm adult
  - B. Clear-winged moth
  - C. Locust borer adult
  - D. Poplar borer larva
  - E. Pine sawyer adult
3. This insect's life cycle is spent as the larva in the tree. They feed for a period of 2-4 years and bore in the heartwood and sapwood. Infested trees can be weakened and break. A related species causes galls on smaller limbs of poplars and aspens.
  - A. Carpenter worm adult
  - B. Clear-winged moth
  - C. Locust borer adult
  - D. Poplar borer larva
  - E. Pine sawyer adult
4. This insect attacks black locust trees. The strikingly colored adults emerge in the fall and can be seen feeding on goldenrod.
  - A. Carpenter worm adult
  - B. Clear-winged moth
  - C. Locust borer adult
  - D. Poplar borer larva
  - E. Pine sawyer adult
5. This insect commonly infests ash. The larvae look like those of the locust borer, only smaller. It will attack elm, linden, redbud, and oak as well as ash trees.
  - A. California laurel borer adult
  - B. Bronze birch borer adult
  - C. Red headed ash borer adult
  - D. Pine sawyer adult
  - E. Poplar and willow borer larva

6. This insect attacks pine trees and are usually found around homes as a result of being brought in with firewood. They seldom attack pine trees in residential plantings.
  - A. California laurel borer adult
  - B. Bronze birch borer adult
  - C. Red headed ash borer adult
  - D. Pine sawyer adult
  - E. Poplar and willow borer larva
  
7. This striking insect, mines in dead ash, laurel, and willow. It is not a threat to healthy trees.
  - A. California laurel borer adult
  - B. Bronze birch borer adult
  - C. Red headed ash borer adult
  - D. Pine sawyer adult
  - E. Poplar and willow borer larva
  
8. Paper birches are frequently attacked by this insect. Adults emerge in June and lay eggs in July. Note they have shorter antennae and a different shape than the California laurel borer.
  - A. California laurel borer adult
  - B. Bronze birch borer adult
  - C. Red headed ash borer adult
  - D. Pine sawyer adult
  - E. Poplar and willow borer larva
  
9. The larvae mine the sapwood. Swollen areas on limbs show where the larvae feed and frass can be seen being forced out of holes in the bark as the larva feeds.
  - A. California laurel borer adult
  - B. Bronze birch borer adult
  - C. Red headed ash borer adult
  - D. Pine sawyer adult
  - E. Poplar and willow borer larva
  
10. This insect is a serious pest of Poplar tree. Adults emerge and are around from June through August.
  - A. Bark beetle adults
  - B. Poplar borer
  - C. Carpenter worm
  - D. Shot-hole borer
  - E. Clear-winged moth larva
  
11. Although not true borers, this insect attacks several evergreen trees. The adults usually emerge in mid-summer and lay eggs.
  - A. Bark beetle adults
  - B. Poplar borer
  - C. Carpenter worm
  - D. Shot-hole borer
  - E. Clear-winged moth larva
  
12. This insect attacks weakened or dead trees and shrubs. They feed deeper in the wood than bark beetles. The larvae are legless grubs.
  - A. Bark beetle adults
  - B. Poplar borer
  - C. Carpenter worm
  - D. Shot-hole borer

13. This insect is a large caterpillar that grows to almost three inches long. It mines the heart wood of trees. They attack poplars and cottonwoods and can attack many other trees as well.
- A. Bark beetle adults
  - B. Poplar borer
  - C. Carpenter worm
  - D. Shot-hole borer
14. This insect can extensively mine limbs of susceptible trees. Poplars, willow, and cottonwood trees are hosts of several species.
- A. Bark beetle adults
  - B. Poplar borer
  - C. Carpenter worm
  - D. Shot-hole borer
  - E. Clear-winged moth larva
15. This insect is a pest because it mines in the ends of the new twigs of fruit trees and ornamental fruit trees. The new twigs start to grow and then wilt because these larvae are tunneling down the center of them. Adults are small grey moths.
- A. Peach twig borer larva
  - B. Poplar borer
  - C. Carpenter worm
  - D. Shot-hole borer
  - E. Clear-winged moth larva
16. There are many bark beetle genera, of which the most important with respect to forest damage are Dendroctonus, Pitch, and Acolytes.
- A. True
  - B. False
17. Adult bark beetles bore through the inner cambial to the outer bark layer, where they channel in galleries in which to lay eggs.
- A. True
  - B. False
18. Pine bark beetles in Arizona are generally of the genus Ips or Dendroctonus. However, several other genera also attack pine, including: Hylastes, Hylurgops, and Pityogenes.
- A. True
  - B. False
19. Often, several species will attack at the same time. Identification of specific beetle species can be difficult, but identification can be aided by knowing the host species attacked, time of year, and the design of the galleries (tunnels) created by the adults and larvae.
- A. True
  - B. False
20. Bark beetles contribute to the death of thousands of ponderosa pines in Arizona each year. Most often when larger trees are attacked and killed they have been weakened by drought, lightning, construction activity or they have been growing on poor sites. Of special concern is the loss of high-value trees at home sites or in developed recreation areas.
- A. True
  - B. False

21. Increased foliage in the tree is often the first sign of a beetle attack.  
A. True  
B. False
22. Trees attacked by *Ips* spp. Typically fade from the bottom of the tree, upwards while *Dendroctonus* spp. killed trees fade from the crown downwards. The needles change from green to a light green color within a few weeks to one year after attack and eventually become brown or red.  
A. True  
B. False
23. Dust caused by boring in the bark crevices and at the tree base is another sign of Bark Beetles.  
A. True  
B. False
24. Often, numerous small pitch tubes (globules of pitch <sup>3</sup>.. to 1 <sup>1</sup>..\" diameter) appear on the trunk of infested trees. The pitch tubes generally have a creamy appearance, much like crystallized honey.  
A. True  
B. False
25. A black tint may be present in the pitch. The presence of one or two pitch tubes means that a beetle was successful. Often a few pitch tubes can indicate that the tree unsuccessfully repelled the attacking beetle. Clear sap that runs down the bole (trunk) or limbs is generally from bark beetles.  
A. True  
B. False
26. Life history varies with each species; the following description is true for most. Beetles become active in August and early September. Adults emerge from trees, slash, or firewood infested the previous Spring.  
A. True  
B. False
27. Adults prefer freshly cut green trees or trees stressed from increased rainfall but when a large number of beetles are present, they attack live pines. *Ips* spp. beetles characteristically attack the lower portion of the tree, but when beetles are abundant, the entire tree can be invaded and killed.  
A. True  
B. False
28. Several species will only attack the base of the bole.  
A. True  
B. False
29. Adults bore through the inner bark and then tunnel and lay eggs in the outer bark.  
A. True  
B. False

30. Eggs hatch in about a week and larva feed on the inner bark for six to eight weeks before they pupate. It is the boring activity of the adults and larvae that kills trees by girdling in combination with stain fungi the beetles introduce. The development of larvae and pupae of some beetles is completed in the outer bark.
- A. True
  - B. False
31. Adults develop from pupae and emerge by boring out through the bark. After emergence, adults fly and attack freshly cut material or susceptible trees and start the next generation. Most beetles produce one to two generations each year but some may have three or four. The overlap of generations during the summer may produce continuous attacks.
- A. True
  - B. False
32. Freshly cut ponderosa pine slash and firewood are not subject to attack by bark beetles.
- A. True
  - B. False
33. The success of beetle attacks and production of young beetles are greatly influenced by when trees are cut. Trees cut during the late summer and fall are seldom successfully attacked, because the inner bark dries during the fall and winter. The inner bark of green trees cut from January to July remains moist and suitable for beetle habitat.
- A. True
  - B. False
34. An exception to this is the roundheaded pine beetle, which crawls during the Winter, and attacks trees at that time.
- A. True
  - B. False
35. The best way to avoid having trees attacked by bark beetles is to take preventive measures. First and foremost, lower tree density through thinning. However, at this time of year thinning may cause increases in bark beetle populations due to the increased exposure of the remaining trees to May and June's drying winds.
- A. True
  - B. False
36. Furthermore, increases in beetle attacks may occur if the newly cut trees are left on the ground for more than 30 days. If the material is hauled off the property to a landfill where the material will be buried or if it is chipped it will not cause a problem. When chipping, don't pile the chips deeper than 3 inches next to live trees as the chips may attract bark beetles. If it is necessary to create piles deeper than 3 inches, keep the piles in the open sun and as far from live trees as possible. If removal or chipping is not an option, then it may be best to wait until October to begin thinning.
- A. True
  - B. False
37. The slash and limbs of green pine trees should be buried or burned (according to safe conditions and laws) within 360 days after a tree has been cut down. The bole of the tree should receive the same treatment, unless it is needed for firewood or poles. Then the material should be piled near living pine trees and on the ground with rope.
- A. True
  - B. False

38. Bark beetles are a common presence on forested land in Arizona. Populations of bark beetle species increase and decrease from year to year. This is a common phenomenon for insect populations. During the summer of 2002 bark beetle populations increased and created a problem both for federal and state forested land and for private landowners.
- A. True
  - B. False
39. The currently recommended chemicals for this purpose are carbaryl and permethrin. You must use a product that is especially formulated for bark beetles, such as Sevin SL, Dragnet, Permethrin Plus C, or Astro. This is a protective measure only, it will not kill beetles once they enter the tree. Typical home and garden products containing carbaryl or permethrin will be ineffective.
- A. True
  - B. False
40. If correct materials are applied properly it can be effective for an entire season. Spraying should have been completed prior to October 1 to ensure a full season of protection.
- A. True
  - B. False
41. If spraying after April 1 you must be sure that the trees have been attacked. Trees can be checked for infestations by climbing, with a hydraulic lift, or with high-powered binoculars to inspect the entire trunk of the tree. Also check the bark crevices and the base of the tree for fresh boring dust. Spraying trees already infested will prove to be effective.
- A. True
  - B. False
42. The only known direct control method of infested trees is the removal of the infested trees. A good rule to remember is **"If the tree is brown cut it down, if in doubt cut it out."** If we leave dead trees standing we run the risk of the new generation of beetles leaving the tree and attacking more trees.
- A. True
  - B. False
43. Finding green-yellow boring dust in the bark crevices of a tree indicates that the tree has been successfully attacked, and the tree should be cut down even if the tree is still green at that point. Keep dead trees next to houses or other structures, they can become a beetle retracting agent.
- A. True
  - B. False
44. Insecticide injections or systemics have not proven effective against *Dendroctonus* species of bark beetles in studies conducted by U.S. Forest Service and Canadian Forestry Service researchers. Many trees have been injected with what seemed to be success. What may have happened is that the treated tree successfully pitched out the attacking beetle with resin prior to the treatment. The tree was then injected with insecticide when in fact no beetles were actually in the tree. The tree saved itself!
- A. True
  - B. False
45. Studies have shown that injecting chemicals will not kill *Dendroctonus* species of bark beetles attacking conifers and injures the tree in the process.
- A. True
  - B. False

46. The western pine beetle WPB and ips species are insects capable of attacking and killing ponderosa pine and pinion pine. Periodic epidemics are capable of causing heavy mortality in drought stressed and dense stands of pine. Many situations exist where high-value pines require protection from uncontrolled beetle pressures nearby.
- A. True
  - B. False
47. An organism is declared to be a pest under circumstances that make it deleterious to man or the environment, if it is: Any vertebrate animal other than man;
- A. True
  - B. False
48. An organism is declared to be a pest under circumstances that make it deleterious to man or the environment, if it is Any invertebrate animal, including but not limited to, any insect, other arthropod, nematode, or mollusk such as a slug and snail, but excluding any internal parasite of living man or other living animals;
- A. True
  - B. False
49. An organism is declared to be a pest under circumstances that make it deleterious to man or the environment, if it is Any plant growing where not wanted, including any moss, alga, liverwort, or other plant of any higher order, and any plant part such as a root; or
- A. True
  - B. False
50. An organism is declared to be a pest under circumstances that make it deleterious to man or the environment, if it is Any fungus, bacterium, virus, or other microorganisms, except for those on or in living man or other living animals and those on or in processed food or processed animal feed, beverages, drugs (as defined in FFDCa sec. 201(g)(1)) and cosmetics (as defined in FFDCa sec. 201(i)).
- A. True
  - B. False
51. The simple eye in adult insects and in nymphs and naiads.
- A. Diapause
  - B. Dulosis
  - C. Dorso-central Bristles
  - D. Dorsal shield
  - E. Dorsal ocellus
52. The scutum or sclerotized plate covering all or most of the dorsal surface in males and the anterior portion in females, nymphs, and larvae of hard-backed ticks.
- A. Diapause
  - B. Dulosis
  - C. Dorso-central Bristles
  - D. Dorsal shield
  - E. Dorsal ocellus
53. The 2 rows of bristles running along the thorax of a fly on the outer side of the acrostichal bristles.
- A. Diapause
  - B. Dulosis
  - C. Dorso-central Bristles

54. The act of slave making in ants, a species which makes a slave of another is often referred to as Dulotic or ?
- Diapause
  - Dulosis
  - Dorso-central Bristles
  - Dorsal shield
  - Dorsal ocellus
55. A period of delayed development or growth accompanied by reduced metabolism and inactivity.
- Diapause
  - Dulosis
  - Dorso-central Bristles
  - Dorsal shield
  - Dorsal ocellus
56. The molting process, by which a young insect changes its outer skin or pupal case.
- Eclosion
  - Ecdysis
  - Elateriform larva
  - Ectoderm
  - Ectohormone
57. Emergence of the adult or imago from the pupa?
- Eclosion
  - Ecdysis
  - Elateriform larva
  - Ectoderm
  - Ectohormone
58. The outer embryological layer which gives rise to the nervous system, integument, and several other parts of an insect.
- Eclosion
  - Ecdysis
  - Elateriform larva
  - Ectoderm
  - Ectohormone
59. A substance secreted by an animal to the outside of its body causing a specific reaction, such as determination of physiological development, in a receiving individual of the same species.
- Eclosion
  - Ecdysis
  - Elateriform larva
  - Ectoderm
  - Ectohormone
60. A parasite that lives on the outside of its host.
- Ambrosia
  - Elytron
  - Elateriform larva
  - Egg pod
  - Ectoparasite

61. A capsule which encloses the egg mass of grasshoppers and which is formed through the cementing of soil particles together by secretions of the ovipositing female.
- A. Ambrosia
  - B. Elytron
  - C. Elateriform larva
  - D. Egg pod
  - E. Ectoparasite
62. A larva with the form of a wireworm; i.e. long and slender, heavily sclerotized, with short thoracic legs, and with few body hairs.
- A. Ambrosia
  - B. Elytron
  - C. Elateriform larva
  - D. Egg pod
  - E. Ectoparasite
63. The tough, horny forewing of a beetle or an earwig (See also Hemi-elytron)
- A. Ambrosia
  - B. Elytron
  - C. Elateriform larva
  - D. Egg pod
  - E. Ectoparasite
64. The fungus cultivated by wood-boring beetles of the family Scolytidae?
- A. Ambrosia
  - B. Elytron
  - C. Elateriform larva
  - D. Egg pod
  - E. Ectoparasite
65. The insects which develop without metamorphosis, namely the Protura, Thysanura, and Collembola.
- A. Anterior
  - B. Antenna
  - C. Anasa wilt
  - D. Ametabola
  - E. Annulate
66. A wilt disease of cucurbits caused solely by the feeding of the squash bug, no parasitic microorganism involved.
- A. Anterior
  - B. Antenna
  - C. Anasa wilt
  - D. Ametabola
  - E. Annulate
67. Formed in ring-like segments or with ring-like markings.
- A. Anterior
  - B. Antenna
  - C. Anasa wilt
  - D. Ametabola
  - E. Annulate

68. Pair of segmented appendages located on the head and usually sensory in function - the '**feelers**'.
- A. Anterior
  - B. Antenna
  - C. Anasa wilt
  - D. Ametabola
  - E. Annulate
69. At or concerning the tip or furthest part of any organ: apical cells, for example, are at the wing-tip.
- A. Apical
  - B. Apical area
  - C. Arachnida
  - D. Aster yellows
  - E. Attractants
70. Of the forewing, the area just inside of and contiguous with the apex.
- A. Apical
  - B. Apical area
  - C. Arachnida
  - D. Aster yellows
  - E. Attractants
71. A class of arthropods which include the scorpions, spiders, mites, ticks, among others.
- A. Apical
  - B. Apical area
  - C. Arachnida
  - D. Aster yellows
  - E. Attractants
72. A virus disease of many kinds of plants transmitted by the six spotted leaf hopper and characterized by stunting of plants, sterility, and chlorosis in foliage.
- A. Apical
  - B. Apical area
  - C. Arachnida
  - D. Aster yellows
  - E. Attractants
73. Substances which elicit a positive directional response; chemicals having positive attraction for animals such as insects, usually in low concentration and at considerable distances.
- A. Apical
  - B. Apical area
  - C. Arachnida
  - D. Aster yellows
  - E. Attractants
74. The process of a nerve cell that conducts impulses away from the cell body.
- A. Alates
  - B. Anthocorids
  - C. Axon
  - D. Aphid
  - E. Basal

75. Winged forms of insects.
- Alates
  - Anthocorids
  - Axon
  - Aphid
  - Basal
76. A true bug in the family Anthocoridae.
- Alates
  - Anthocorids
  - Axon
  - Aphid
  - Basal
77. An insect in the family Aphidiidae which are sometimes called plant lice.
- Alates
  - Anthocorids
  - Axon
  - Aphid
  - Basal
78. Concerning the base of a structure - that part nearest the body. Basal cells in Diptera are generally small cells near the base of the wing.
- Alates
  - Anthocorids
  - Axon
  - Aphid
  - Basal
79. The 1st segment of the tarsus - usually the largest.
- Benzene hexachloride
  - Biological control
  - Basitarsus
  - Batumen
  - Bipectinate
80. A protective layer of propolis or hard cerumen that encloses the nest cavity of a stingless bee colony.
- Benzene hexachloride
  - Biological control
  - Basitarsus
  - Batumen
  - Bipectinate
81. A synthetic insecticide, a chlorinated hydrocarbon, 1,2,3,4,5,6-hexachlorocyclohexane of mixed isomers; slightly more toxic to mammals than DDT, acute oral LD50 for rats about 200 mg/kg; phytotoxicity: more toxic than DDT, interferes with germination, suppresses growth and reduces yields except at low concentration; certain crop plants, as potato absorb crude BHC with consequent tainting of tubers.
- Benzene hexachloride
  - Biological control
  - Basitarsus
  - Batumen

82. The control of pests by employing predators, parasites, or disease; the natural enemies are encouraged and disseminated by man.
- A. Benzene hexachloride
  - B. Biological control
  - C. Basitarsus
  - D. Batumen
  - E. Bipectinate
83. Feathery, with branches growing out on both sides of the main axis: applied mainly to antennae.
- A. Cephalic
  - B. Cephalothorax
  - C. Bivoltine
  - D. Cellulose
  - E. None of the Above
84. An inert carbohydrate, the chief component of the solid framework or woody part of many plants.
- A. Cephalic
  - B. Cephalothorax
  - C. Bivoltine
  - D. Cellulose
  - E. Cement layer
85. A thin layer on the surface of insect cuticles formed by the hardened secretion of the dermal glands.
- A. Cephalic
  - B. Cephalothorax
  - C. Bivoltine
  - D. Cellulose
  - E. Cement layer
86. Of or pertaining to the head.
- A. Cephalic
  - B. Cephalothorax
  - C. Bivoltine
  - D. Cellulose
  - E. Cement layer
87. A body region consisting of head and thoracic segments, as in spiders.
- A. Cephalic
  - B. Cephalothorax
  - C. Bivoltine
  - D. Cellulose
  - E. Cement layer
88. The paired appendages, often very long, which spring from the tip of the abdomen in many insects.
- A. Cerci
  - B. Cerumen
  - C. Cervical
  - D. Chaetae
  - E. Blastogenesis

89. A mixture of wax and propolis used by social bees in nest construction.
- A. Cerci
  - B. Cerumen
  - C. Cervical
  - D. Chaetae
  - E. Blastogenesis
90. Concerning the neck region, just behind the head.
- A. Cerci
  - B. Cerumen
  - C. Cervical
  - D. Chaetae
  - E. Blastogenesis
91. Stiff hairs or bristles (singular: chaeta).
- A. Cerci
  - B. Cerumen
  - C. Cervical
  - D. Chaetae
  - E. Blastogenesis
92. The origination of different castes, within a species, from the egg by means other than genetic.
- A. Cerci
  - B. Cerumen
  - C. Cervical
  - D. Chaetae
  - E. Blastogenesis
93. The hindmost of the three main body divisions of an insect.
- A. Alate
  - B. Alar Squama
  - C. Abdomen
  - D. Aestivation
  - E. Alitrunk
94. Summer dormancy, entered into when conditions are unfavorable for active life i.e. it is too hot or too dry.
- A. Alate
  - B. Alar Squama
  - C. Abdomen
  - D. Aestivation
  - E. Alitrunk
95. The middle of three flap-like outgrowths at the base of the wing in various flies.
- A. Alate
  - B. Alar Squama
  - C. Abdomen
  - D. Aestivation
  - E. Alitrunk

96. Winged; having wings.  
A. Alate  
B. Alar Squama  
C. Abdomen  
D. Aestivation  
E. Alitrunk
97. Name given to the thorax and propodeum of '*wasp-waisted*' hymenopterans.  
A. Alate  
B. Alar Squama  
C. Abdomen  
D. Aestivation  
E. Alitrunk
98. A synthetic insecticide; a chlorinated hydrocarbon of not less than 95 per cent 1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene; moderately toxic to mammals, acute oral LD<sub>50</sub> for rats 44 mg/kg; phytotoxicity: none when properly formulated, but some crops are sensitive to solvents in certain formulations.  
A. Book lung  
B. Altruistic  
C. Alula  
D. Aldrin  
E. Alloparental
99. Self-destructive. or potentially self-destructive behaviour performed for the benefit of others.  
A. Book lung  
B. Altruistic  
C. Alula  
D. Aldrin  
E. Alloparental
100. A respiratory cavity containing a series of leaf like folds.  
A. Book lung  
B. Altruistic  
C. Alula  
D. Aldrin  
E. Alloparental

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