

Registration form

Bark Beetles CEU Training \$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

Print Name _____
I have read and understood the disclaimer notice found on page 6. Signature is required.
You can electronically sign with XXX

Signature _____

Address: _____

City _____ **State** _____ **Zip** _____

Phone:
Home (____) _____ **Work** (____) _____

Fax (____) _____ **Email** _____

License # _____ **Exp. Date** _____

Class/Grade _____
Please circle/check which certification you are applying the course CEU's.

Commercial Applicator _____ Residential Applicator _____ Industrial Applicator _____
Pesticide Handler _____ Agricultural Applicator _____ Adviser _____ Other _____

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

Technical Learning College PO Box 3060, Chino Valley, AZ 86323
Toll Free (866) 557-1746 Fax (928) 272-0747 info@tlch2o.com

If you've paid on the Internet, please write your Customer # _____

We will stop mailing the certificate of completion so we need your e-mail address.

Did you check with your State to see if this course was accepted for credit?

DISCLAIMER NOTICE

I understand that it is my responsibility to ensure that this CEU course is either approved or accepted in my State for CEU credit. I understand State laws and rules change on a frequent basis and I believe this course is currently accepted in my State for CEU or contact hour credit, if it is not, I will not hold Technical Learning College responsible. I fully understand that this type of study program deals with dangerous, changing conditions and various laws and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable in any fashion for any errors, omissions, advice, suggestions or neglect contained in this CEU education training course or for any violation or injury, death, neglect, damage or loss of your license or certification caused in any fashion by this CEU education training or course material suggestion or error or my lack of submitting paperwork. It is my responsibility to call or contact TLC if I need help or assistance and double-check to ensure my registration page and assignment has been received and graded. It is my responsibility to ensure all information is correct and to abide with all rules and regulations.

State Approval Listing Link, check to see if your State accepts or has pre-approved this course. Not all States are listed. Not all courses are listed. If the course is not accepted for CEU credit, we will give you the course free if you ask your State to accept it for credit.

State Approval Listing URL...

<http://www.tlch2o.com/PDF/CEU%20State%20Approvals.pdf>

You can obtain a printed version of the course manual from TLC for an additional \$59.95 plus shipping charges.

AFFIDAVIT OF EXAM COMPLETION

I affirm that I personally completed the entire text of the course. I also affirm that I completed the exam without assistance from any outside source. I understand that it is my responsibility to file or maintain my certificate of completion as required by the state or by the designation organization.

Grading Information

In order to maintain the integrity of our courses we do not distribute test scores, percentages or questions missed. Our exams are based upon pass/fail criteria with the benchmark for successful completion set at 70%. Once you pass the exam, your record will reflect a successful completion and a certificate will be issued to you.

For security purposes, please fax or e-mail a copy of your driver's license and always call us to confirm we've received your assignment and to confirm your identity.

Thank you...

All downloads are electronically tracked and monitored for security purposes.

CUSTOMER SERVICE RESPONSE CARD

Bark Beetles Training Course

DATE: _____

NAME: _____

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?

How about the price of the course? Poor ___ Fair ___ Average___ Good___ Great___

How was your customer service? Poor ___ Fair ___ Average ___ Good___ Great___

Any other concerns or comments.

Amount of Time for Course Completion – How many hours you spent on course?

Must match State Hour Requirement _____ (Hours)

Please fax or email this answer key and the registration Page to TLC.

2017 Changes to EPA's Farm Worker Protection Standard

In late 2015 the Environmental Protection Agency issued the long awaited revision to the Worker Protection Standard (WPS). Although it is now technically active it will not be enforced until 2017 but the original WPS will still be enforced until the end of 2016. Please keep in mind that the WPS covers both restricted use AND general use pesticides.

This course contains EPA's federal rule requirements. Please be aware that each state implements pesticide regulations that may be more stringent than EPA's regulations and these frequently are changed. Check with your state environmental/pesticide agency for more information.

Bark Beetles Answer Key Name _____

Phone# _____

**Multiple Choice. Pick only one answer per question.
Circle or Mark, X, Underline or Bold the answer.**

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

You are finished with your assignment. Please fax this answer key and your registration page along with the customer survey to TLC. Fax Number (928) 272-0747

Important Information about this Course (Disclaimer Notice)

This CEU course has been prepared to educate pesticide applicators and operators in general safety awareness of dealing with the often-complex and various pesticide treatment sprays, devices, methods, and applications. This course (manual) will cover general laws, regulations, required procedures and accepted policies relating to the use of pesticides and herbicides. It should be noted, however, that the regulation of pesticides and hazardous materials is an ongoing process and subject to change over time. For this reason, a list of resources is provided to assist in obtaining the most up-to-date information on various subjects. This manual is not a guidance document for applicators or operators who are involved with pesticides. It is not designed to meet the requirements of the United States Environmental Protection Agency or your local State environmental protection agency or health department. This course manual will provide general pesticide safety awareness and should not be used as a basis for pesticide treatment method/device guidance. This document is not a detailed pesticide informational manual or a source or remedy for poison control.

Technical Learning College or Technical Learning Consultants, Inc. makes no warranty, guarantee or representation as to the absolute correctness or appropriateness of the information in this manual and assumes no responsibility in connection with the implementation of this information. It cannot be assumed that this manual contains all measures and concepts required for specific conditions or circumstances. This document should be used for educational purposes only and is not considered a legal document. Pesticides are poisonous. Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock.

Confine chemicals to the property or plants being treated. Avoid drift onto neighboring properties, especially gardens containing fruits and/or vegetables ready to be picked. Dispose of empty containers carefully. Follow label instructions for disposal. Never reuse containers. Make sure empty containers are not accessible to children or animals. Never dispose of containers where they may contaminate water supplies or natural waterways. Do not pour down sink or toilet. Consult your county agricultural commissioner for correct ways of disposing of excess pesticides. You should never burn pesticide containers.

Individuals who are responsible for pesticide storage, mixing and application should obtain and comply with the most recent federal, state, and local regulations relevant to these sites and are urged to consult with the EPA and other appropriate federal, state and local agencies.

USE PESTICIDES WISELY: ALWAYS READ THE ENTIRE PESTICIDE LABEL CAREFULLY, FOLLOW ALL MIXING AND APPLICATION INSTRUCTIONS AND WEAR ALL RECOMMENDED PERSONAL PROTECTIVE GEAR AND CLOTHING. CONTACT YOUR STATE DEPARTMENT OF AGRICULTURE FOR ANY ADDITIONAL PESTICIDE USE REQUIREMENTS, RESTRICTIONS OR RECOMMENDATIONS.

NOTICE: MENTION OF PESTICIDE PRODUCTS IN THIS COURSE DOES NOT CONSTITUTE ENDORSEMENT OF ANY MATERIAL OR HERB OR HERBAL SUPPLEMENT. ALWAYS FOLLOW THE PRODUCT'S LABEL INSTRUCTIONS.

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Bark Beetles CEU Training Awareness Assignment #1

You will have 90 days from the start of this course to have successfully passed this assignment with a score of 70 %. You may e mail the answers to TLC, info@tlch2o.com or fax the answers to TLC, (928) 272-0747. This assignment is available to you in a Word Format on TLC's Website. You can find online assistance for this course on the in the Search function on Adobe Acrobat PDF to help find the answers.

Write your answers on the Answer Key found in the front of this assignment.

Multiple Choice, please select one answer and mark it on the answer key. (s) means the answer is plural or singular.

First Section, Multiple Choice Insect Identification Section

1. The adult insect becomes a large grey moth.
A. Carpenter worm adult D. Poplar moth larva
B. Clear-winged moth E. Locust moth
C. Pine sawyer moth F. None of the Above

2. This insect bores in trees as larvae. The adults resemble wasps in many cases.
A. Wasp worm adult D. Wasp larva
B. Clear-winged moth E. Locust borer adult
C. Pine sawyer adult F. None of the Above

3. This insect's life cycle is spent as the larva in the tree. They feed for a period of from 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 ant D. Poplar borer larva
B. Clear-winged larva E. Locust borer larva
C. Pine sawyer larva F. None of the Above

4. This insect attacks black locust trees. The strikingly colored adults emerge in the fall and can be seen feeding on goldenrod.
A. Carpenter bees D. Poplar borer larva
B. Black termites E. Locust borer adult
C. Pine sawyer larva F. None of the Above

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 larva D. Pine sawyer larva
B. Bronze birch borer larva E. Poplar and willow borer larva
C. Red headed ash borer adult F. None of the Above

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 D. Pine sawyer adult
B. Bronze birch borer adult E. Poplar and willow borer larva
C. Red headed ash borer adult F. None of the Above

7. This striking insect, mines in dead ash, laurel, and willow. It is not a threat to healthy trees.
A. California laurel borer adult D. Pine sawyer adult
B. Bronze birch borer adult E. Poplar and willow borer larva
C. Red headed ash borer adult F. None of the Above

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. Bark Beetle D. Pine sawyer adult
B. Bronze birch borer adult E. Poplar and willow borer larva
C. Red headed ash borer adult F. None of the Above

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 larva D. Pine sawyer larva
B. Bronze birch borer larva E. Poplar and willow borer larva
C. Red headed ash borer larva F. None of the Above

10. This insect is a serious pest of Poplar tree. Adults emerge and are around from June through August.
A. California laurel borer adult D. Pine sawyer adult
B. Bronze birch borer adult E. Poplar borer
C. Red headed ash borer adult F. None of the Above

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 D. Shot-hole borer
B. Poplar borer E. Ips Beetle larva
C. Carpenter bee F. None of the Above

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 D. Shot-hole borer
B. Poplar borer E. Termite
C. Carpenter bee F. None of the Above

13. This insect is a large caterpillar that grow to almost three inches long. They mine the heart wood of trees. They attack poplars and cottonwoods and can attack many other trees as well.
A. Bark beetle adults D. Shot-hole borer
B. Termite E. Clear-winged moth larva
C. Carpenter worm F. None of the Above

14. This insect can extensively mine limbs of susceptible trees. Poplars, willow, and cottonwood trees are hosts of several species.
A. Bark beetle adults D. Termites
B. Poplar borer E. Clear-winged moth larva
C. Ants F. None of the Above

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. Black moth
- B. Woody moth
- C. Carpenter moth
- D. Peach twig borer larva
- E. Clear-winged moth larva
- F. None of the Above

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. 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 $\frac{3}{4}$ to 1 $\frac{1}{2}$ " 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 have increased and are creating 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. True eyes
- B. Simple eyes
- C. Dorsal ocellus
- D. Compound eyes
- E. Corbicula
- F. None of the Above

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. Clavus
- B. Copularium
- C. Costal Fold
- D. Dorsal shield
- E. Dorso-central Bristles
- F. None of the Above

53. The 2 rows of bristles running along the thorax of a fly on the outer side of the acrostichal bristles.

- A. Cornicle bristles
- B. Coxa
- C. Corpora allata
- D. Cremaster bristles
- E. Dorso-central Bristles
- F. None of the Above

54. The act of slave making in ants, a species which makes a slave of another is often referred to as Dulotic.

- A. Cubitus
- B. Dulosis
- C. Cline
- D. Costal Cell
- E. Cyclorrhaphous Diptera
- F. None of the Above

55. A period of delayed development or growth accompanied by reduced metabolism and inactivity.

- A. Diapause
- B. Quapause
- C. Siesta
- D. Hibernation
- E. Soul sleep
- F. None of the Above

56. The molting process, by which a young insect changes its outer skin or pupal case.
- A. Eclosion D. Elateriform
 B. Ecdysis E. Ectohormone
 C. Ectoderm F. None of the Above
57. Emergence of the adult or imago from the pupa
- A. Eclosion D. Elateriform
 B. Ecdysis E. Ectohormone
 C. Ectoderm F. None of the Above
58. The outer embryological layer which gives rise to the nervous system, integument, and several other parts of an insect.
- A. Tymbal D. Clypeus
 B. Vertex E. Coarctate
 C. Ectoderm F. None of the Above
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.
- A. Sperm D. Tegmen
 B. Ecdyhormone E. Ectohormone
 C. Ectosperm F. None of the Above
60. A parasite that lives on the outside of its host.
- A. Triungulin parasite D. Elateriform parasite
 B. Cleptoparasitism E. Vertex parasite
 C. Ectoparasite F. None of the Above
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. Egg raft D. Claustral Foundation
 B. Egg deposit E. Egg pod
 C. Transverse Suture F. None of the Above
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. Clavate larva D. Elateriform larva
 B. Truncate larva E. Vestigial larva
 C. Ectoparasite larva F. None of the Above
63. The tough, horny forewing of a beetle or an earwig (See also Hemi-elytron)
- A. Thorax D. Elateriform Tegula
 B. Elytron E. Tergite
 C. Tibia F. None of the Above
64. The fungus cultivated by wood-boring beetles of the family Scolytidae
- A. Ambrosia D. Black rot
 B. Mushroom E. Fungi
 C. Ectoparasite F. None of the Above

65. The insects which develop without metamorphosis, namely the Protura, Thysanura, and Collembola.
- A. Viviparous D. Ametabola
 B. Cocoon E. Tympanum
 C. Totipotency F. None of the Above
66. A wilt disease of cucurbits caused solely by the feeding of the squash bug, no parasitic microorganism involved.
- A. Trochanter D. Systemic
 B. Vermiform E. Anasa wilt
 C. Commissure F. None of the Above
67. Formed in ring-like segments or with ring-like markings.
- A. Venation D. Vibrissae
 B. Comb E. Anasa wilt
 C. Annulate F. None of the Above
68. Pair of segmented appendages located on the head and usually sensory in function - the 'feelers'.
- A. Tergum D. Visceral muscle
 B. Antenna E. Tarsus
 C. Veins F. None of the Above
69. At or concerning the tip or furthest part of any organ: apical cells, for example are at the wing-tip.
- A. Apical D. Haemolymph
 B. Epithelium E. Gregarious
 C. Epinotum F. None of the Above
70. Of the forewing, the area just inside of and contiguous with the apex.
- A. Envelope D. Glabrous
 B. Apical area E. Habitus
 C. Filament F. None of the Above
71. A class of arthropods which include the scorpions, spiders, mites, ticks, among others.
- A. Exarate D. Endoparasite
 B. Fossorial E. Entomogenous
 C. Arachnida F. None of the Above
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 D. Aster yellows
 B. Holometabola E. Heteromorous
 C. Eusocial F. None of the Above
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 D. Aster yellows
 B. Apical area E. Attractants
 C. Arachnida F. None of the Above

74. The process of a nerve cell that conducts impulses away from the cell body.
 A. Filament D. Ganglion
 B. Flabellate E. Basal
 C. Axon F. None of the Above
75. Winged forms of insects.
 A. Alates D. Adults
 B. Gaster E. Larva
 C. Grub F. None of the Above
76. A true bug in the family Anthocoridae.
 A. Ants D. Aphids
 B. Anthocorids E. Spiders
 C. Beetles F. None of the Above
77. An insect in the family Aphidiidae which are sometimes called plant lice.
 A. Alates D. Aphid
 B. Anthocorids E. Fleas
 C. Beetles F. None of the Above
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.
 A. Galea D. Gastric caeca
 B. Genitalia E. Basal
 C. Axon F. None of the Above
79. The 1st segment of the tarsus - usually the largest.
 A. Eruciform D. Girdle
 B. Exocuticle E. Ergatogyne
 C. Basitarsus F. None of the Above
80. A protective layer of propolis or hard cerumen that encloses the nest cavity of a stingless bee colony.
 A. Batumen D. Holometabola
 B. Hamuli E. Genal Comb
 C. Haltere F. None of the Above
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 LD51 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.
 A. Bayer D. Benzene hexachloride
 B. Termidor E. Suspend
 C. Boric acid F. None of the Above
82. The control of pests by employing predators, parasites, or disease; the natural enemies are encouraged and disseminated by man.
 A. Treatment D. Benzene hexachloride
 B. Poison E. Biological control
 C. Suspend F. None of the Above

83. Feathery, with branches growing out on both sides of the main axis: applied mainly to antennae.
- A. Hemimetabola D. Hemimetabolous
 B. Histosiphon E. Haustellate
 C. Holoptic F. None of the Above
84. An inert carbohydrate, the chief component of the solid framework or woody part of many plants.
- A. Fabric D. Honey
 B. Fiber E. Wax
 C. Cellulose F. None of the Above
85. A thin layer on the surface of insect cuticles formed by the hardened secretion of the dermal glands.
- A. Cephalic D. Cement layer
 B. Fascicle E. Genital claspers
 C. Facet F. None of the Above
86. Of or pertaining to the head.
- A. Cephalic D. Embolium
 B. Bivoltine E. Epicuticle
 C. Epipharynx F. None of the Above
87. A body region consisting of head and thoracic segments, as in spiders.
- A. Endocuticle D. Cephalothorax
 B. Bivoltine E. Episternum
 C. Eye-cap F. None of the Above
88. The paired appendages, often very long, which spring from the tip of the abdomen in many insects.
- A. Cerci D. Frontal Bristles
 B. Cerumen E. Fronto-orbital Bristles
 C. Frons F. None of the Above
89. A mixture of wax and propolis used by social bees in nest construction.
- A. Honey D. Chaetae
 B. Cerumen E. Blastogenesis
 C. Wax F. None of the Above
90. Concerning the neck region, just behind the head.
- A. Furcula D. Hematophagous
 B. Epiproct E. Frenulum
 C. Cervical F. None of the Above
91. Stiff hairs or bristles (singular: chaeta).
- A. Empodium D. Chaetae
 B. Cerumen E. Gnathosoma
 C. Fuscous F. None of the Above

92. The origination of different castes, within a species, from the egg by means other than genetic.
- A. Endopterygote D. Foveola
 B. Gynandromorph E. Blastogenesis
 C. Filiform F. None of the Above
93. The hindmost of the three main body divisions of an insect.
- A. Epimeron D. Exoskeleton
 B. Alar Squama E. Exopterygote
 C. Abdomen F. None of the Above
94. Summer dormancy, entered into when conditions are unfavorable for active life i.e. it is too hot or too dry.
- A. Summer D. Aestivation
 B. Hiberation E. Dormancy
 C. Late stage F. None of the Above
95. The middle of three flap-like outgrowths at the base of the wing in various flies.
- A. Holotype D. Alar Squama
 B. Epiproct E. Haemolymph
 C. Grub F. None of the Above
96. Winged; having wings.
- A. Homologous D. Genuiculate
 B. Hemi-elytron E. Epigaeic
 C. Alate F. None of the Above
97. Name given to the thorax and propodeum of 'wasp-waisted' hymenopterans.
- A. Endocuticle D. Denticulate
 B. Alar Squama E. Alitrunk
 C. Epinotum F. None of the Above
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 LD₅₀ for rats 44 mg/kg; phytotoxicity: none when properly formulated, but some crops are sensitive to solvents in certain formulations.
- A. Suspend D. Aldrin
 B. Termidor E. Dichloro diphenyl trichloroethane
 C. Boric Acid F. None of the Above
99. Self-destructive or potentially self-destructive behavior performed for the benefit of others.
- A. Cryptobiotic D. Diapause
 B. Altruistic E. Alloparental
 C. Dimorphism F. None of the Above
100. A respiratory cavity containing a series of leaf like folds.
- A. Book lung D. Lung fold
 B. Racial lung E. Breathing cavity
 C. Respiratory cell F. None of the Above

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