

*Registration form*

**Wood Destroyers \$150.00**  
**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 2. Signature is required.  
You can electronically sign with XXX

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

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

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

**Phone:**  
**Home** (\_\_\_\_) \_\_\_\_\_ **Work** (\_\_\_\_) \_\_\_\_\_

**Fax** (\_\_\_\_) \_\_\_\_\_ **Email** \_\_\_\_\_

**License or Operator ID #** \_\_\_\_\_ **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 P.O. Box 3060, Chino Valley, AZ 86323**  
**Toll Free (866) 557-1746 Fax (928) 272-0747 [info@tlch2o.com](mailto:info@tlch2o.com)**

*If you paid on the Internet, please write your 4-digit code* \_\_\_\_\_

*We will stop mailing the certificate of completion we need your e-mail address. We will e-mail the certificate to you, if no e-mail address; we will mail it to you.*

## Important Information about this Course (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 also understand that this type of study program deals with dangerous conditions and that I will not hold Technical Learning College, Technical Learning Consultants, Inc. (TLC) liable for any errors or omissions or advice contained in this CEU education training course or for any violation or injury caused by this CEU education training course material. I will 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.

This CEU course contains pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. Due to constantly changing labels and product registration, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is criticism meant for products not mentioned. The author and Technical Learning College (TLC) assume no liability resulting from the use of these recommendations.

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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**CUSTOMER SERVICE RESPONSE CARD**

**Wood Destroyers Training Course**

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

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?

\_\_\_\_\_  
\_\_\_\_\_

6. How about the price of the course?

Poor \_\_\_\_\_ Fair \_\_\_\_\_ Average \_\_\_\_\_ Good \_\_\_\_\_ Great \_\_\_\_\_

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Poor \_\_\_\_\_ Fair \_\_\_\_\_ Average \_\_\_\_\_ Good \_\_\_\_\_ Great \_\_\_\_\_

8. Any other concerns or comments.

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\_\_\_\_\_



# Wood Destroyers Control Answer Key

Name \_\_\_\_\_

Phone# \_\_\_\_\_

**You are solely responsible in ensuring that your State will accept this course for credit. Did you check with your State agency to ensure this course is accepted for credit?**

*Method of Course acceptance confirmation. Please fill this section*

Website \_\_\_ Telephone Call \_\_\_ Email \_\_\_ Spoke to \_\_\_\_\_

Did you receive the approval number, if applicable? \_\_\_\_\_

What is the course approval number, if applicable? \_\_\_\_\_

*You are responsible to ensure that TLC receives the Assignment and Registration Key. Please call us to ensure that we received it.*

**Multiple Choice. Pick only one answer per question. Exactly as in text. Circle or Mark off, Underline or Bold the answer. Please circle or underline the number of the assignment version 1 or 2 or 3 or 4 or 5**

Please complete the entire assignment before submitting the answer key

## Topic 1 Introduction to Wood

- |                |                 |
|----------------|-----------------|
| 1. A B C D E F | 6. A B C D E F  |
| 2. A B C D E F | 7. A B C D E F  |
| 3. A B C D E F | 8. A B C D E F  |
| 4. A B C D E F | 9. A B C D E F  |
| 5. A B C D E F | 10. A B C D E F |

## Topic 2 Termite Introduction

- |                 |                 |
|-----------------|-----------------|
| 1. A B C D E F  | 11. A B C D E F |
| 2. A B C D E F  | 12. A B C D E F |
| 3. A B C D E F  | 13. A B C D E F |
| 4. A B C D E F  | 14. A B C D E F |
| 5. A B C D E F  | 15. A B C D E F |
| 6. A B C D E F  | 16. A B C D E F |
| 7. A B C D E F  | 17. A B C D E F |
| 8. A B C D E F  | 18. A B C D E F |
| 9. A B C D E F  | 19. A B C D E F |
| 10. A B C D E F | 20. A B C D E F |

### Topic 3 Termite and Ant Identification

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F
6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

### Topic 4 Wood Borers

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F
6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F

### Topic 5 Wood Preservatives and Insecticides

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F
6. A B C D E F
7. A B C D E F
8. A B C D E F
9. A B C D E F
10. A B C D E F
11. A B C D E F
12. A B C D E F
13. A B C D E F
14. A B C D E F
15. A B C D E F
16. A B C D E F
17. A B C D E F
18. A B C D E F
19. A B C D E F
20. A B C D E F

### Topic 6 Fungus and Wood Fungi

1. A B C D E F
2. A B C D E F
3. A B C D E F
4. A B C D E F
5. A B C D E F
6. A B C D E F
7. A B C D E F
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13. A B C D E F
14. A B C D E F
15. A B C D E F
16. A B C D E F
17. A B C D E F
18. A B C D E F
19. A B C D E F
20. A B C D E F

When you are finished with your assignment. Please fax this answer key and your registration page along with the customer survey to TLC.

**We will require a photocopy of your driver's license.**

Fax Number (928) 272-0747

## Assignment Instructions

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following three assignments to complete. This selection process is based upon your last name. If your last name begins with an A to E, you will pick assignment number 1, if your last name begins with the letter F to L, you are to complete assignment number 2 and if your last name begins with the letter M-Q, you will pick assignment number 3 and if your last name begins with the letter R-Z, you will pick assignment number 4.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

Assignment #1 for all pest applicators whose last name begins with A-E you will find your assignment on pages 9-22.

Assignment #2 for all pest applicators whose last name begins starting with the letter F-L, your assignment is found on pages 23-37.

Assignment #3 for all pest applicators whose last name begins starting with the letter M-Q, your assignment is found on pages 39-51.

Assignment #4 for all pest applicators whose last name begins starting with the letter R-Z, your assignment is found on pages 53-65.

Assignment #5 for all repeat students or students who require the supplemental examination. Your assignment is found on pages 67-79.

**All downloads are electronically tracked and monitored for security purposes.**

## **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). This law it is now technically active and it will be enforced. Please keep in mind that the WPS covers both restricted use AND general use pesticides. This course is not for worker and/or handler training. Always follow the label and your State Pesticide Agency rules.*

*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.*



## Wood Destroyers Assignment #1 For Students Names A-E

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. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

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

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following three assignments to complete. This selection process is based upon your last name. If your last name begins with an A to E, you will pick assignment number 1, if your last name begins with the letter F to L, you are to complete assignment number 2 and if your last name begins with the letter M-Q, you will pick assignment number 3 and if your last name begins with the letter R-Z, you will pick assignment number 4.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

### Topic 1 Introduction to Wood 10 Questions

(s) means the answer may be either plural or singular in nature.

#### Understanding Wood

1. Wood, in the strict sense, is yielded by trees, which increase in diameter by the formation, between the existing wood and the inner bark, of \_\_\_\_\_ which envelop the entire stem, living branches, and roots.

- A. Sap-staining
- B. Earlywood
- C. Wooden structures
- D. New woody layers
- E. Oven-dried wood
- F. None of the Above

#### Growth Rings

2. Where there are clear seasons, growth can occur in a discrete annual or \_\_\_\_\_, leading to growth rings; these can usually be most clearly seen on the end of a log, but are also visible on the other surfaces.

- A. Protoplasmic contents
- B. Greater the water content
- C. Seasonal pattern
- D. Ultimate crushing strength
- E. Growth ring
- F. None of the Above

3. If these seasons are annual these growth rings are referred to as annual rings. Where there is no seasonal difference growth rings are likely to be \_\_\_\_\_.

- A. Sap-staining
- B. Earlywood
- C. Wooden structures
- D. Indistinct or absent
- E. Oven-dried wood
- F. None of the Above

4. If there are differences within a growth ring, then the part of a growth ring nearest the center of the tree and formed early in the growing season when growth is rapid, is usually composed of \_\_\_\_\_.

- A. Protoplasmic contents
- B. Wider elements
- C. Spalting produced
- D. Ultimate crushing strength
- E. Growth ring
- F. None of the Above

5. It is usually lighter in color than that near the outer portion of the ring, and is known as earlywood or springwood. The outer portion formed later in the season is then known as the \_\_\_\_\_. However, there are major differences, depending on the kind of wood).
- A. Sap-staining                      D. Strength of wood  
 B. Earlywood                        E. Latewood or summerwood  
 C. Wooden structures    F. None of the Above
6. The fungus beetles are not wood-damaging pests but are \_\_\_\_\_ and are a good indication that such problems are present.
- A. Hungry                              D. Associated with moisture problems  
 B. Large                                E. Most concerned  
 C. Friendly                            F. None of the Above
7. The members of these two orders develop by \_\_\_\_\_, advancing from eggs to larvae, pupae, and adults.
- A. Thin antennae                      D. Complete metamorphosis  
 B. Broad sense                        E. Most concerned  
 C. Good indication                  F. None of the Above
8. The exception to this is a species known as the \_\_\_\_\_ (Hylotrupes bajulus).
- A. Black carpenter ant                D. Conspicuous beetles  
 B. Roundheaded borers               E. Maggot-looking  
 C. Old house borer                    F. None of the Above

#### Black Carpenter Ants

9. Ants of the genus *Camponotus* often nest in wood. There are many different carpenter ant species, but only one poses a major pest problem (the \_\_\_\_\_ (*Camponotus pennsylvanicus*)).
- A. Carpenter ants                      D. Black carpenter ant  
 B. Old house borers                   E. Larvae of some species  
 C. Lay their eggs                        F. None of the Above

#### Biology

10. Carpenter ants are among the largest species that you'll find. Like other ant species, carpenter ants are social, i.e., they live in a colony and have several " \_\_\_\_\_ " or adult forms that perform different jobs in the colony.
- A. Black carpenter ant                D. Castes  
 B. Roundheaded borers               E. Queen(s)  
 C. Old house borer                    F. None of the Above

## Topic 2 Termite Introduction 20 Questions

(s) means the answer may be either plural or singular in nature.

1. There are about 2,500 termite species in the world. North America has \_\_\_\_\_, most in the southeast USA. Alaska is the only state without termites.
- A. Soft-bodied insects                D. 41 termite species  
 B. Subterranean termites           E. Termites  
 C. Protozoa (microorganisms)    F. None of the Above

#### Feeding Habits

2. Subterranean termites feed mainly on wood and wood products containing cellulose. Termites have \_\_\_\_\_ in their intestine which provide enzymes to digest cellulose.
- A. Soft-bodied insects                D. 41 termite species  
 B. Subterranean termites           E. Termites  
 C. Protozoa (microorganisms)    F. None of the Above

### Termite Reproduction

3. The female assumes a "calling" position with her abdomen elevated at a right angle to the rest of her body. She releases a \_\_\_\_\_ which attracts nearby males. Once a male encounters a calling female, she moves off.

- A. Odor
- B. Tap
- C. Call
- D. Chemical messenger (pheromone)
- E. Hormone
- F. None of the Above

### Development of the Colony

4. Development of the colony is very slow for several years. Eggs are \_\_\_\_\_. After the first group of eggs has been laid, there is a period of several months before another group is laid. This process continues for several years.

- A. White
- B. Cared for
- C. Not laid
- D. Placed in a new structure
- E. Hatched
- F. None of the Above

### Swarming

5. When swarming occurs in a relatively new structure, it is because it was built over or near a strong colony that was not \_\_\_\_\_.

- A. Considered safe
- B. Near ants
- C. For rent
- D. Relatively a new structure
- E. Maximum egg production
- F. None of the Above

### Fungi

6. Fungi also play a role in \_\_\_\_\_. Certain wood decay fungi are highly attractive to termites.

- A. Termite nutrition
- B. Cellulose for their nutrition
- C. Processing
- D. Finding a new structure
- E. Maximum egg production
- F. None of the Above

### Moisture

7. \_\_\_\_\_ to the survival of termites. Subterranean termites obtain most of their moisture from the soil. They maintain contact with the soil in order to survive.

- A. Source of nitrogen is vital
- B. Fungus spores is vital
- C. Moisture is not vital
- D. Moisture is vital
- E. Sandy soil over a clay base is vital
- F. None of the Above

### Tolerances

8. Termites have very little tolerance to \_\_\_\_\_, or extremes of hot and cold. But they often must forage far, sometimes above ground, from their initial workings to find food.

- A. Pesticides
- B. Wet conditions
- C. Dry conditions
- D. Ants
- E. Rap Music
- F. None of the Above

9. They move underground through tunnels. Whenever the termites leave the confines of the soil or the wood in which they are feeding, they \_\_\_\_\_ in which to move from the soil to the wood or the above-ground nest.

- A. Construct castles
- B. Operate equipment
- C. Develop plans
- D. Build above-ground nests
- E. Construct shelter tubes
- F. None of the Above

### Subterranean Termites

10. When subterranean termites invade the wood of a structure that is separated from the soil by intervening concrete, masonry or other impervious material, they \_\_\_\_\_ over the surface to the wood.

- A. Construct castles
- B. Operate equipment
- C. Develop plans
- D. Build above-ground nests
- E. Construct shelter tubes
- F. None of the Above

### Castles

11. Under certain conditions a fourth type of tube is constructed. Called swarming tubes or swarming "castles" they are constructed as flight platforms for swarmers and they have many turret-like projects and \_\_\_\_\_ that vaguely resemble castle towers.

- A. Attacking colonies
- B. Extend the damage
- C. Flight platforms
- D. Flattened horizontal branches
- E. Heavily guarded
- F. None of the Above

12. They usually are \_\_\_\_\_ to a height of 4 to 8 inches (10-20 cm), but sometimes are found projecting from heavily infested wood above ground.

- A. Initial shelter tunnel
- B. Constructed on the ground
- C. Is instantly recognized
- D. Built over a crawl space
- E. Might inflict on a structure
- F. None of the Above

### Severe Damage

13. Severe damage by subterranean termites is not likely to occur in the first 8 or 10 years after construction. If treatment is undertaken with the \_\_\_\_\_, very little serious structural damage is ever likely to occur.

- A. Initial shelter tunnel
- B. Projecting
- C. Instantly recognized
- D. Crawl space
- E. First evidence of infestation
- F. None of the Above

### Communication in the Colony

14. Termites primarily communicate via chemicals called pheromones. Each colony develops its \_\_\_\_\_.

- A. Attacking colonies
- B. Damage
- C. Flight platforms
- D. Own characteristic odor
- E. Own characteristic defense
- F. None of the Above

15. Any intruder is \_\_\_\_\_ and an alarm pheromone is released that triggers the soldiers to attack the intruder.

- A. Easily probed
- B. Found
- C. Perceived
- D. Instantly recognized
- E. Recognizing the signs
- F. None of the Above

Look for these signs of termite feeding:

16. Wood that \_\_\_\_\_ when it is tapped with the handle of a screwdriver.

- A. Sounds "hollow"
- B. No damage
- C. Could consume the equivalent
- D. Foods enhances recognition
- E. Actually feed on almost anything
- F. None of the Above

17. Soft wood that is \_\_\_\_\_ with a knife or screwdriver.

- A. Easily probed
- B. Easily tunneled
- C. Vibrations are perceived
- D. Hardily probed
- E. Harden
- F. None of the Above

#### Winged Termites

18. Large numbers of winged termites swarming from wood or the soil often are the first obvious sign of a \_\_\_\_\_.

- A. Termite swarmers
- B. Alates quickly
- C. Subterranean termites
- D. Alate emergence
- E. Nearby termite colony
- F. None of the Above

19. Swarming occurs in mature colonies that typically contain at least several thousand termites. A " \_\_\_\_\_ " is a group of adult male and female reproductives that leave their colony in an attempt to pair and initiate new colonies.

- A. Termite swarmers
- B. Alates quickly
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

#### Mud Tubes

20. Other signs of \_\_\_\_\_ presence include mud tubes and mud protruding from cracks between boards and beams.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

### Topic 3 Termite and Ant Identification Section 10 Questions

#### Worker Termites

1. Workers construct the distinctive shelter tubes and collect food to feed the young and other members of the colony. \_\_\_\_\_ are responsible for guarding the colony and its occupants.

- A. Subterranean termite(s)
- B. Soldier termite(s)
- C. Formosan termite(s)
- D. Worker(s)
- E. Termite(s)
- F. None of the Above

#### Damage

2. \_\_\_\_\_ most commonly live in the soil where they can avoid temperature extremes and obtain the moisture essential to their existence.

- A. Worker(s)
- B. Soldier termite(s)
- C. Formosan termite(s)
- D. Subterranean termite(s)
- E. Termite(s)
- F. None of the Above

#### Remedial Control

3. Control of subterranean termites in buildings can be difficult and expensive. \_\_\_\_\_ is a proven means of protecting buildings from further damage by subterranean termites.

- A. Insecticide
- B. Ant baits
- C. Chemical (termiticide) treatment
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

#### New Methods of Termite Control

4. An alternative method requires removing the soil from the trench and placing it on a waterproof tarp. Apply the termiticide to the soil on the tarp and mix. The treated backfill is then placed back into the trench. You could also line the trench with polyethylene prior to replacing the treated backfill. The polyethylene lining is another method of preventing movement of the \_\_\_\_\_ during an application.

Cover all treated soil according to label directions.

- A. IGRs
- B. Insecticide
- C. Termiticide
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

### **Chitin Synthesis Inhibitors**

5. Chitin synthesis inhibitors work by preventing the formation of chitin, a \_\_\_\_\_ needed to form the insect's exoskeleton. With these inhibitors, an insect grows normally until it molts. The inhibitors prevent the new exoskeleton from forming properly, causing the insect to die. Death may be quick, or take up to several days depending on the insect.

- A. IGRs
- B. Carbohydrate
- C. Chemical odor
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

### **Hexaflumuron**

6. Hexaflumuron (hexaflumeron) is an insect growth regulator that interferes with insects' chitin synthesis. It was registered in 1994 — the first active ingredient to be registered as a "reduced risk pesticide" through the U.S. Environmental Protection Agency's (EPA's) reduced risk program, which waives tests for new pesticides that are thought to pose fewer hazards than existing pesticides. It is registered for use on termites, and is the active ingredient in the Sentricon™ bait system. It functions by inhibiting the synthesis of \_\_\_\_\_, the material that makes up the exoskeleton of insects (Cox, 1997).

- A. IGRs
- B. Chitin
- C. Chemical odor
- D. Carbohydrates
- E. Movement of the termiticide
- F. None of the Above

### **Ant Identification Section**

7. All ants live in colonies, consisting of an egg-laying female (queen), \_\_\_\_\_, and workers (sterile females). The ants you see foraging in your garden or kitchen are workers.

- A. Workers
- B. Short-lived males
- C. Sterile females
- D. Carpenter ants
- E. Ant species
- F. None of the Above

8. Ants are thin-waisted and have elbowed antennae. \_\_\_\_\_ have thicker waists and have antennae that resemble strings of tiny beads. You may need a magnifying glass to examine antennal features.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

### **Control**

9. \_\_\_\_\_ that live outside will travel inside the home to search for food. Some species may ultimately reside in houses, discussed later in this section. To prevent both of these scenarios, follow these procedures: First, cracks and crevices should be sealed to eliminate passages into the home. If you do not seal entry points, ants will probably find their way into your house at some later time.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

10. Ant baits, described above, can again be a useful tool in eradicating inside-the-home ant nests, although \_\_\_\_\_ may not work as well with carpenter ants as the other species mentioned. Again, workers must eat the bait, take it back to the nest, and feed it to the queen and larval ants. This type of control is incompatible with treatments that prevent workers from returning to the nest with the bait.

- A. Insecticide
- B. Baits
- C. Professional pest control company
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

## Topic 4 The Wood Borers 10 Questions

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. 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
7. 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
8. This insect is a large caterpillar that grows 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
9. 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

10. 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

## Topic 5 Wood Preservatives and Insecticides 20 Questions

### Chromated Copper Arsenate (CCA)

1. Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents. EPA has classified CCA as a \_\_\_\_\_, for use only by certified pesticide applicators.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Chemical Preservatives

2. Before a wood preservative can be approved for pressure treatment of structural members, it must be evaluated to ensure that it provides the necessary durability and that it does not greatly reduce the strength properties of the wood. The EPA typically does not evaluate how well a \_\_\_\_\_ protects the wood.

- A. Heat treatment
- B. Permethrin
- C. Wood preservative
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Waterborne Preservatives

3. Copper is the \_\_\_\_\_ in many wood preservative formulations used in ground contact because of its excellent fungicidal properties and low mammalian toxicity. Because some types of fungi are copper tolerant, preservative formulations often include a co-biocide to provide further protection.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Primary biocide
- F. None of the Above

4. Water is the most common solvent carrier in \_\_\_\_\_ due to its availability and low cost. Water-borne systems do however have the drawback that they swell timber, leading to increased twisting, splitting and checking than alternatives.

- A. Heat treatment
- B. Permethrin
- C. Preservative formulations
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Chromated Copper Arsenate (CCA)

5. Chromated copper arsenate or CCA, is a chemical preservative that protects wood from rotting due to insects and microbial agents. CCA contains \_\_\_\_\_. CCA has been used to pressure treat lumber used for decks, playgrounds (playsets) and other outdoor uses since the 1930's. Since the 1970's, the majority of the wood used in residential settings was CCA-treated wood.

- A. Arsenic, chromium and copper
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above



### Pressure Treatment Process

6. In the pressure treatment process, an aqueous solution of CCA is applied using a vacuum and pressure cycle, and the treated wood is then stacked to dry. During the process, the mixture of oxides reacts to form insoluble compounds, helping with \_\_\_\_\_ problems.

- A. Heat treatment
- B. Permethrin
- C. Leaching
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Naphthenates

7. Naphthenates are the salts of naphthenic acids. These \_\_\_\_\_ have industrial applications including synthetic detergents, lubricants, corrosion inhibitors, fuel and lubricating oil additives, wood preservations, insecticides, fungicides, acaricides, wetting agents, and oil drying agents used in painting and wood surface treatment.

- A. Salts
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Other Emulsions

#### Light Organic Solvent Preservatives (LOSP)

8. This class of timber treatments use white spirit, or light oils such as kerosene, as the solvent carrier to deliver preservative compounds into timber. \_\_\_\_\_ are typically used as an insecticide, such as permethrin, bifenthrin or deltamethrin. The most common formulations use Permethrin as an insecticide, and Propaconazole and Tebuconazole as fungicides. While still using a chemical preservative, this formulation contains no heavy-metal compounds.

- A. Heat treatment
- B. Permethrin
- C. Synthetic pyrethroids
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### New Technologies

#### Glass Fortified Wood

9. Glass Fortified Wood (glass wood) is lumber that has gone through a process that intermixes a non-\_\_\_\_\_ based formula throughout the wood fibers protecting the wood from fire, rot and insect damage. With glass encapsulating the wood fibers, the lumber becomes harder and the strength is increased. Glass wood can be used for in ground contact applications; in water applications and it is Class-A fire retardant.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Toxic sodium silicate (water glass)
- E. Extractive(s)
- F. None of the Above

### Natural Preservatives

#### Naturally Rot-Resistant Woods

10. These species are resistant to decay in their natural state, due to high levels of organic chemicals called extractives, mainly \_\_\_\_\_.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

11. \_\_\_\_\_ are chemicals that are deposited in the heartwood of certain tree species as they convert sapwood to heartwood.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Extractives
- E. Solutions of waterborne preservatives
- F. None of the Above

### Heat Treatments

12. Heat treatment can also improve the properties of the wood with respect to water: lower equilibrium moisture, \_\_\_\_\_, and weather resistance. It is weather-resistant enough to be used, unprotected, in facades or in kitchen tables, where wetting is expected.

- A. Less moisture deformation
- B. Permethrin
- C. Water
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Non-Pressure Processes

13. Non-pressure methods, in general, consist of (a) surface application of preservatives by brief dipping, (b) soaking in preservative oils or steeping in solutions of waterborne preservatives, (c) diffusion processes with waterborne preservatives, (d) \_\_\_\_\_, and (e) a variety of miscellaneous processes.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Vacuum treatment
- F. None of the Above

### Brief Dipping

14. It is a common practice to treat window sash, frames, and other millwork, either before or after assembly, by dipping the item in a \_\_\_\_\_.

- A. Diffusion process
- B. Dip application
- C. Water-repellent preservative
- D. Preservative penetration
- E. Vacuum treatment
- F. None of the Above

15. \_\_\_\_\_ of the preservative applied by brief dipping is very shallow, usually less than a millimeter (a few hundredths of an inch). The exposed end surfaces at joints are the most vulnerable to decay in millwork products; therefore, good end penetration is especially advantageous.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration
- F. None of the Above

16. \_\_\_\_\_ provide very limited protection to wood used in contact with the ground or under very moist conditions, and they provide very limited protection against attack by termites. However, they do have value for exterior woodwork and millwork that is painted, not in contact with the ground, and exposed to moisture only for brief periods.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Cold Soaking and Steeping

17. The methods of cold soaking well-seasoned wood for several hours or days in low-viscosity preservative oils or steeping green or seasoned wood for several days in \_\_\_\_\_ have provided a range of success on fence posts, lumber, and timbers.

- A. Preservatives
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservatives
- E. Transverse penetration of the preservatives
- F. None of the Above

18. Preservative penetration and retention levels obtained by cold soaking lumber for several hours are considerably better than those obtained by brief dipping of similar species. However, preservative retention levels seldom equal those obtained in pressure treatment except in cases such as sapwood of pines that has become highly absorptive through \_\_\_\_\_.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Mold and stain infection
- F. None of the Above

19. Steeping with waterborne preservatives has very limited use in the United States but it has been used for many years in Europe. In treating seasoned wood, both the water and the preservative salt in the solution soak into the wood. With green wood, the preservative enters the water-saturated wood by diffusion. \_\_\_\_\_ and penetration levels vary over a wide range, and the process is not generally recommended when more reliable treatments are practical.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration of the preservative
- F. None of the Above

#### Diffusion Processes

20. In addition to the steeping process, \_\_\_\_\_ are used with green or wet wood. These processes employ waterborne preservatives that will diffuse out of the water of the treating solution or paste into the water of the wood.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Topic 6 Fungus and Wood Fungi Section 20 Questions

1. A fungus or fungi is a member of a large group of \_\_\_\_\_ that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms. These organisms are classified as a kingdom, Fungi, which is separate from plants, animals, and bacteria.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Eukaryotic organisms
- E. Molds and stain fungi
- F. None of the Above

#### Reproduction

2. Fungal reproduction is complex, reflecting the differences in lifestyles and genetic makeup within this kingdom of organisms. It is estimated that a third of \_\_\_\_\_ reproduce by different modes of propagation; for example, reproduction may occur in two well-differentiated stages within the life cycle of a species, the teleomorph and the anamorph.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. All fungi
- E. Molds and stain fungi
- F. None of the Above

#### Asexual Reproduction

3. Asexual reproduction via vegetative spores (conidia) or through mycelial fragmentation is common; it maintains clonal populations adapted to a specific niche, and allows more rapid dispersal than sexual reproduction. The " \_\_\_\_\_ " (fungi lacking the perfect or sexual stage) or Deuteromycota comprise all the species which lack an observable sexual cycle.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

#### Preventing Rot

4. The key to preventing rot is to control the wood's exposure to moisture and to employ an effective prevention and treatment program. Most wood decay fungi grow only on wood with a high moisture content, usually 20 percent or above. Green (unseasoned) lumber is a prime target for \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Decay Fungi

5. Decay fungi can cause severe structural damage to any wood member, even wood species such as redwood and cedar. All that is needed is a source of water in contact with the wood. Decay will occur in untreated wood in direct contact with ground, cement or concrete, or exposed to a source of moisture such as rain seepage, plumbing leaks or condensation. \_\_\_\_\_ kept dry will never decay!

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Molds and Stains

6. Molds and stain fungi are sometimes mistaken for decay, and while they may discolor wood, they cause no structural wood damage. The presence of molds and stains, however, is a sign that conditions are favorable for decay fungi and a preventative treatment may be necessary. In addition, molds can increase the capacity of wood to absorb moisture, opening the door to attack by \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Brown Discoloration and a Crumbly Appearance

7. In one type of rot, the decayed area has a brown discoloration and a crumbly appearance. It usually breaks up into variously-sized cubes, giving rise to the name "\_\_\_\_\_." Another type of rot results in a white or yellow discoloration, with the decayed wood being "stringy" or "spongy."

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

8. Although many \_\_\_\_\_ may grow for long periods without producing any external evidence of their presence, others produce "fruiting bodies" on the surface of decaying wood. Fruiting bodies are usually "crusts" or shelf-like "brackets" which are a few inches or so in diameter. The fruiting body of *Serpula lacrimans*, e.g., is a rust-brown, crust-like structure on the wood surface.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

### Stain Fungi

9. Also, surface molds, "\_\_\_\_\_", and stain fungi are often found growing on the surface of damp wood and can be confused with decay fungi. Although these organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms indicate that moisture is present and that decay will likely proceed if a wood-rotting fungus becomes established in the wood.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Life Cycle & Habits

10. When previously dry wood is placed in contact with moist soil, or in a location where it is subject to condensation (such as unventilated crawl space), it is likely that \_\_\_\_\_ problems will occur.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Wood decay
- F. None of the Above

### Disease Cycle of Decays

11. Refer to the life cycle of a polypore, as it is closely related to the disease cycle. Two points need to be added. First, decay occurs for many years, between the stages of plasmogamy and fruiting, and \_\_\_\_\_ may continue for many years.

- A. Mildew(s)
- B. Fruiting
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Pentachlorophenol

12. In the past, pentachlorophenol (Penta®) and copper naphthenate was used as a stop gap measure. (These chemicals had offensive smells and were not environmentally safe.) Now with a growing environmental concern, \_\_\_\_\_ do not pose a serious threat. A key valve is the absence of offensive smells sometimes associated with other common treatment methods. Also, existing moisture in the wood enhances chemical penetration.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

### Treatment of Wood Infested by Decay and/or Wood

13. Since wood can contain active beetle larvae or \_\_\_\_\_ with no surface evidence of infestation, the best method of control is to treat the entire area where an infestation has been found. This would include all of the wood in a crawl space, wall or attic showing any signs of damage.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Molds

14. Many people confuse the presence of \_\_\_\_\_ with decay fungi. Although molds are a form of fungi, they typically grow on the surface of wood and generally do not weaken the wood's strength. However, the presence of mold is a good indication that the moisture level in the wood is high enough to also support the growth of decay fungi. Moisture control methods used to prevent decay fungi will also remove conditions favorable for mold growth.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Molds
- F. None of the Above

### Fungi Kingdom

15. Molds are part of the fungi kingdom. Fungi are a diverse group of organisms within a wide range of species that include mushrooms, bracket fungi, molds and mildew. Distinguishing features of \_\_\_\_\_ are the need to extract their food from the organic materials they grow on and the ability to reproduce by way of minute spores. Fungi are a part of nature's recycling system and play an important role in breaking down materials such as plants, leaves, wood and other natural matter.

- A. Mildew(s)
- B. Fungi
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

16. \_\_\_\_\_ is the common name for many types of micro fungi. In order to grow, molds require food, suitable temperature (ideally between 70 and 85 degrees Fahrenheit), oxygen and moisture (Zabel, 1992). When these conditions are met, mold will grow and reproduce by creating spores that are released into the air.

- A. Mold
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

17. Molds are very adaptable and can grow even on \_\_\_\_\_, metal, concrete or painted surfaces if a microscopic layer of organic nutrients is available. Such nutrients can be found on household dust and soil particles.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Moisture in the wood
- E. Fungal spore(s)
- F. None of the Above

### Penetration and Retention

18. Penetration and retention requirements are equally important in determining the quality of \_\_\_\_\_.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Preservative treatment
- E. Higher preservative retention levels
- F. None of the Above

19. Penetration levels vary widely, even in pressure-treated material. In most species, heartwood is more difficult to penetrate than sapwood. In addition, species differ greatly in the degree to which their heartwood may be penetrated. Incising tends to improve penetration of preservative in many refractory species, but those highly resistant to \_\_\_\_\_ will not have deep or uniform penetration even when incised.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Penetration
- F. None of the Above

20. \_\_\_\_\_ are typically expressed on the basis of the mass of preservative per unit volume of wood within a prescribed assay zone. The retention calculation is not based on the volume of the entire pole or piece of lumber.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above



## Wood Destroyers Assignment #2 For Students Names F-L

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. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

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

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following three assignments to complete. This selection process is based upon your last name. If your last name begins with an A to E, you will pick assignment number 1, if your last name begins with the letter F to L, you are to complete assignment number 2 and if your last name begins with the letter M-Q, you will pick assignment number 3 and if your last name begins with the letter R-Z, you will pick assignment number 4.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

### Topic 1 Introduction to Wood 10 Questions

(s) means the answer may be either plural or singular in nature.

#### Black Carpenter Ants

1. Ants of the genus *Camponotus* often nest in wood. There are many different carpenter ant species, but only one poses a major pest problem (the \_\_\_\_\_ (*Camponotus pennsylvanicus*)).  
A. Carpenter ants      D. Black carpenter ant  
B. Old house borers      E. Larvae of some species  
C. Lay their eggs      F. None of the Above
2. The black carpenter ant varies from 1/8 to 1/2 inch in Length because of the presence in most colonies of \_\_\_\_\_.  
A. Black carpenter ant      D. Conspicuous beetles  
B. Roundheaded borers      E. Both "major" and "minor" workers  
C. Old house borer      F. None of the Above
3. \_\_\_\_\_ may construct their nests in hollow trees, logs, posts, porch pillars, hollow doors, and other timbers used in homes.  
A. Carpenter ants      D. Adult beetle  
B. Old house borers      E. Larvae of some species  
C. Lay their eggs      F. None of the Above
4. The \_\_\_\_\_ do not consume the wood but simply hollow it out to form cavities for the nest. They are usually attracted to damp, decaying wood, but once the nest is started, they will also excavate sound wood as they enlarge the nest.  
A. Black carpenter ant (Ants)      D. Larva  
B. Roundheaded borers      E. Maggots  
C. Old house borer      F. None of the Above



5. It is often quite common to find them nesting in existing voids that require no excavation; occasionally they start in an existing void and enlarge it as their need dictates. The presence of \_\_\_\_\_ suggests the potential for damage to wood.

- A. Carpenter ants
- B. Old house borers
- C. Lay their eggs
- D. Adult beetle
- E. Larvae of some species
- F. None of the Above

#### Biology

6. Carpenter ants are among the largest species that you'll find. Like other ant species, carpenter ants are social, i.e., they live in a colony and have several " \_\_\_\_\_ " or adult forms that perform different jobs in the colony.

- A. Black carpenter ant
- B. Roundheaded borers
- C. Old house borer
- D. Castes
- E. Queen(s)
- F. None of the Above

7. The \_\_\_\_\_ usually reaches 9/16 inch in length. The workers range in size from 1/4 to 7/16 inch. So, if you see different sized ants, they could all be from the same colony.

- A. Queen
- B. Pupae
- C. Swarms
- D. King
- E. Reproductives
- F. None of the Above

8. All of these ants are \_\_\_\_\_ regardless of their size, so they do not grow.

- A. Adults
- B. Workers
- C. Females (queen)
- D. Species
- E. Swarms
- F. None of the Above

#### Carpenter Bees

9. The carpenter bee (*Xylocopa virginica*) \_\_\_\_\_ in that it is robust and black with some markings of yellow hair.

- A. Queen
- B. Tunnels
- C. Nesting sites
- D. Resembles a bumblebee
- E. Considered pests
- F. None of the Above

10. The dorsal surface of the abdomen lacks the yellow hair markings of \_\_\_\_\_ and is mostly devoid of any hair.

- A. Queen
- B. Tunnels
- C. Nesting sites
- D. Bumblebee(s)
- E. Considered pests
- F. None of the Above

## Topic 2 Termite Introduction 20 Questions

(s) means the answer may be either plural or singular in nature.

#### Detection of Termites

1. It is important for homeowners to recognize the signs of a subterranean termite infestation. Subterranean termites \_\_\_\_\_ of winged termites (alates or swarms), or by the presence of mud tubes and wood damage.

- A. Easily mate
- B. May eat
- C. Vibrations are perceived
- D. Amount of damage
- E. Recognize the signs
- F. None of the Above

2. Termites \_\_\_\_\_ that contains cellulose (the main component of wood), including wood paneling, paper products, cardboard boxes, art canvases, the paper covering of sheetrock, carpeting, etc.

- A. Sounds "hollow"
- B. No damage
- C. Could consume the equivalent
- D. Foods enhances recognition
- E. Actually feed on almost anything
- F. None of the Above

3. While \_\_\_\_\_, they may tunnel through non-cellulosic materials, such as plastic and foamboard.

- A. Probing
- B. They may tunnel
- C. Vibrations are perceived
- D. The amount of damage
- E. Foraging and feeding
- F. None of the Above

4. According to some research, a colony containing 60,000 workers \_\_\_\_\_ of one foot of a 2" x 4" piece of lumber in slightly over 5 months.

- A. Sounds "hollow"
- B. No damage
- C. Could consume the equivalent
- D. Foods enhances recognition
- E. Actually feed on almost anything
- F. None of the Above

5. In reality, the amount of damage that termites cause depends on many factors. In areas with cold winter temperatures, termite activity (and feeding) usually declines, but does not necessarily stop. From \_\_\_\_\_, serious termite damage usually takes about 3-8 years.

- A. Some
- B. A tunnel
- C. A practical perspective
- D. Amount of damage
- E. Recognizing the signs
- F. None of the Above

Look for these signs of termite feeding:

6. Wood that \_\_\_\_\_ when it is tapped with the handle of a screwdriver.

- A. Sounds "hollow"
- B. No damage
- C. Could consume the equivalent
- D. Foods enhances recognition
- E. Actually feed on almost anything
- F. None of the Above

7. Soft wood that is \_\_\_\_\_ with a knife or screwdriver.

- A. Easily probed
- B. Easily tunneled
- C. Vibrations are perceived
- D. Hardily probed
- E. Harden
- F. None of the Above

8. A \_\_\_\_\_ on the surface of damaged material.

- A. Sounds "hollow"
- B. No damage
- C. Could consume the equivalent
- D. Foods enhances recognition
- E. Actually feed on almost anything
- F. None of the Above

9. There is \_\_\_\_\_ the age of recently discovered damage. You need some reference point, i.e., some point in time when it was known that there was no damage to this particular wood.

- A. No accurate method for determining
- B. Easy method of determining
- C. Way to test
- D. Amount of damage
- E. Recognize the signs
- F. None of the Above

10. This is one reason why annual inspections (and keeping your records of these inspections) are invaluable. These inspections do not guarantee that there is \_\_\_\_\_ in visually-inaccessible areas, such as inside walls. However, they can reveal conditions that might suggest that damage does exist.

- A. Sounds "hollow"
- B. No damage
- C. Could consume the equivalent
- D. Foods enhances recognition
- E. Actually feed on almost anything
- F. None of the Above

### Winged Termites

11. Large numbers of winged termites swarming from wood or the soil often are the first obvious sign of a \_\_\_\_\_.

- A. Termite swarmers
- B. Alates quickly
- C. Subterranean termites
- D. Alate emergence
- E. Nearby termite colony
- F. None of the Above

12. Swarming occurs in mature colonies that typically contain at least several thousand termites. A " \_\_\_\_\_ " is a group of adult male and female reproductives that leave their colony in an attempt to pair and initiate new colonies.

- A. Termite swarmers
- B. Alates quickly
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

### Mass Emergence

13. The mass emergence of \_\_\_\_\_ in the spring is often the first sign of an infestation. In the majority of cases, they emerge in homes near sources of heat - furnaces or water heaters.

- A. Termite swarmers
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

14. The appearance of \_\_\_\_\_ means that the infestation has been around for at least 3 or 4 years. Therefore it is likely some damage has already been done, so it is important to find where the termites have been feeding, how much damage has been done, and how much repair is needed.

- A. Termite swarmers
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

15. Other means of detecting infestations include knocking on walls, floors, sub-floor wood, joists, etc. and listening for the tapping of \_\_\_\_\_, and looking for shelter tubes on the outside of the building and under the sub-floor.

- A. Termite swarmers
- B. Soldiers
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

16. Because \_\_\_\_\_ have a constant demand for water, one should closely examine areas near moist soil, such as below dripping outside faucets, leaking underground sprinkler pipes and nozzles, and below downspouts.

- A. Termite swarmers
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

### Control Objectives

17. The goal is to establish a \_\_\_\_\_ between the termite colony (usually in the ground) and the wood in a building.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. Vertical Barriers
- E. Continuous insecticide barrier
- F. None of the Above

18. Sometimes a secondary termite colony may exist above ground (in roof or other areas with a constant moisture supply) which \_\_\_\_\_.

- A. Requires additional treatment
- B. Termite control
- C. Several insecticides
- D. Even distribution of insecticide
- E. Termite activity and treatment procedures
- F. None of the Above

19. In most cases, an untrained homeowner or building manager should not attempt a \_\_\_\_\_.  
(But homeowners still try and some do a good job.)
- A. Termite treatment
  - B. Contact treated surfaces
  - C. Keep all pesticides
  - D. Vertical Barriers
  - E. Continuous insecticide barrier
  - F. None of the Above

**Pre-Construction Treatment**

20. Horizontal Barriers: In general, treat the footing trench with insecticide before pouring cement footings. After grading is completed, \_\_\_\_\_ to areas before pouring slab floors, slab-supported porches, patios, carports, and entrance platforms at the rate of 1 gallon per 10 square feet.
- A. Requires additional treatment
  - B. Termite control
  - C. Several insecticides
  - D. Even distribution of insecticide
  - E. Apply diluted insecticide
  - F. None of the Above

**Topic 3 Termite and Ant Identification Section 10 Questions**

**Worker Termites**

1. Workers construct the distinctive shelter tubes and collect food to feed the young and other members of the colony. \_\_\_\_\_ are responsible for guarding the colony and its occupants.
- A. Subterranean termite(s)
  - B. Soldier termite(s)
  - C. Formosan termite(s)
  - D. Worker(s)
  - E. Termite(s)
  - F. None of the Above

**Damage**

2. \_\_\_\_\_ most commonly live in the soil where they can avoid temperature extremes and obtain the moisture essential to their existence.
- A. Worker(s)
  - B. Soldier termite(s)
  - C. Formosan termite(s)
  - D. Subterranean termite(s)
  - E. Termite(s)
  - F. None of the Above

**Remedial Control**

3. Control of subterranean termites in buildings can be difficult and expensive. \_\_\_\_\_ is a proven means of protecting buildings from further damage by subterranean termites.
- A. Insecticide
  - B. Ant baits
  - C. Chemical (termiticide) treatment
  - D. Spraying a residual insecticide
  - E. Bait treatments and insecticides
  - F. None of the Above

**New Methods of Termite Control**

4. An alternative method requires removing the soil from the trench and placing it on a waterproof tarp. Apply the termiticide to the soil on the tarp and mix. The treated backfill is then placed back into the trench. You could also line the trench with polyethylene prior to replacing the treated backfill. The polyethylene lining is another method of preventing movement of the \_\_\_\_\_ during an application.  
Cover all treated soil according to label directions.
- A. IGRs
  - B. Insecticide
  - C. Termiticide
  - D. Insects' chitin synthesis
  - E. Movement of the termiticide
  - F. None of the Above

### **Chitin Synthesis Inhibitors**

5. Chitin synthesis inhibitors work by preventing the formation of chitin, a \_\_\_\_\_ needed to form the insect's exoskeleton. With these inhibitors, an insect grows normally until it molts. The inhibitors prevent the new exoskeleton from forming properly, causing the insect to die. Death may be quick, or take up to several days depending on the insect.

- A. IGRs
- B. Carbohydrate
- C. Chemical odor
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

### **Hexaflumuron**

6. Hexaflumuron (hexaflumeron) is an insect growth regulator that interferes with insects' chitin synthesis. It was registered in 1994 — the first active ingredient to be registered as a "reduced risk pesticide" through the U.S. Environmental Protection Agency's (EPA's) reduced risk program, which waives tests for new pesticides that are thought to pose fewer hazards than existing pesticides. It is registered for use on termites, and is the active ingredient in the Sentricon™ bait system. It functions by inhibiting the synthesis of \_\_\_\_\_, the material that makes up the exoskeleton of insects (Cox, 1997).

- A. IGRs
- B. Chitin
- C. Chemical odor
- D. Carbohydrates
- E. Movement of the termiticide
- F. None of the Above

### **Ant Identification Section**

7. All ants live in colonies, consisting of an egg-laying female (queen), \_\_\_\_\_, and workers (sterile females). The ants you see foraging in your garden or kitchen are workers.

- A. Workers
- B. Short-lived males
- C. Sterile females
- D. Carpenter ants
- E. Ant species
- F. None of the Above

8. Ants are thin-waisted and have elbowed antennae. \_\_\_\_\_ have thicker waists and have antennae that resemble strings of tiny beads. You may need a magnifying glass to examine antennal features.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

### **Control**

9. \_\_\_\_\_ that live outside will travel inside the home to search for food. Some species may ultimately reside in houses, discussed later in this section. To prevent both of these scenarios, follow these procedures: First, cracks and crevices should be sealed to eliminate passages into the home. If you do not seal entry points, ants will probably find their way into your house at some later time.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

10. Ant baits, described above, can again be a useful tool in eradicating inside-the-home ant nests, although \_\_\_\_\_ may not work as well with carpenter ants as the other species mentioned. Again, workers must eat the bait, take it back to the nest, and feed it to the queen and larval ants. This type of control is incompatible with treatments that prevent workers from returning to the nest with the bait.

- A. Insecticide
- B. Baits
- C. Professional pest control company
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

## Topic 4 The Wood Borers 10 Questions

- 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
- 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
- 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
- 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
- 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
- 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
- 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
- This insect is a large caterpillar that grows 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
- 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

10. 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

## Topic 5 Wood Preservatives and Insecticides 20 Questions

### Chromated Copper Arsenate (CCA)

1. Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents. EPA has classified CCA as a \_\_\_\_\_, for use only by certified pesticide applicators.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Chemical Preservatives

2. Before a wood preservative can be approved for pressure treatment of structural members, it must be evaluated to ensure that it provides the necessary durability and that it does not greatly reduce the strength properties of the wood. The EPA typically does not evaluate how well a \_\_\_\_\_ protects the wood.

- A. Heat treatment
- B. Permethrin
- C. Wood preservative
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Waterborne Preservatives

3. Copper is the \_\_\_\_\_ in many wood preservative formulations used in ground contact because of its excellent fungicidal properties and low mammalian toxicity. Because some types of fungi are copper tolerant, preservative formulations often include a co-biocide to provide further protection.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Primary biocide
- F. None of the Above

4. Water is the most common solvent carrier in \_\_\_\_\_ due to its availability and low cost. Water-borne systems do however have the drawback that they swell timber, leading to increased twisting, splitting and checking than alternatives.

- A. Heat treatment
- B. Permethrin
- C. Preservative formulations
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Chromated Copper Arsenate (CCA)

5. Chromated copper arsenate or CCA, is a chemical preservative that protects wood from rotting due to insects and microbial agents. CCA contains \_\_\_\_\_. CCA has been used to pressure treat lumber used for decks, playgrounds (playsets) and other outdoor uses since the 1930's. Since the 1970's, the majority of the wood used in residential settings was CCA-treated wood.

- A. Arsenic, chromium and copper
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Pressure Treatment Process

6. In the pressure treatment process, an aqueous solution of CCA is applied using a vacuum and pressure cycle, and the treated wood is then stacked to dry. During the process, the mixture of oxides reacts to form insoluble compounds, helping with \_\_\_\_\_ problems.

- A. Heat treatment
- B. Permethrin
- C. Leaching
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Naphthenates

7. Naphthenates are the salts of naphthenic acids. These \_\_\_\_\_ have industrial applications including synthetic detergents, lubricants, corrosion inhibitors, fuel and lubricating oil additives, wood preservations, insecticides, fungicides, acaricides, wetting agents, and oil drying agents used in painting and wood surface treatment.

- A. Salts
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Other Emulsions

#### Light Organic Solvent Preservatives (LOSP)

8. This class of timber treatments use white spirit, or light oils such as kerosene, as the solvent carrier to deliver preservative compounds into timber. \_\_\_\_\_ are typically used as an insecticide, such as permethrin, bifenthrin or deltamethrin. The most common formulations use Permethrin as an insecticide, and Propaconazole and Tebuconazole as fungicides. While still using a chemical preservative, this formulation contains no heavy-metal compounds.

- A. Heat treatment
- B. Permethrin
- C. Synthetic pyrethroids
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### New Technologies

#### Glass Fortified Wood

9. Glass Fortified Wood (glass wood) is lumber that has gone through a process that intermixes a non-\_\_\_\_\_ based formula throughout the wood fibers protecting the wood from fire, rot and insect damage. With glass encapsulating the wood fibers, the lumber becomes harder and the strength is increased. Glass wood can be used for in ground contact applications; in water applications and it is Class-A fire retardant.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Toxic sodium silicate (water glass)
- E. Extractive(s)
- F. None of the Above

### Natural Preservatives

#### Naturally Rot-Resistant Woods

10. These species are resistant to decay in their natural state, due to high levels of organic chemicals called extractives, mainly \_\_\_\_\_.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

11. \_\_\_\_\_ are chemicals that are deposited in the heartwood of certain tree species as they convert sapwood to heartwood.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Extractives
- E. Solutions of waterborne preservatives
- F. None of the Above



### Heat Treatments

12. Heat treatment can also improve the properties of the wood with respect to water: lower equilibrium moisture, \_\_\_\_\_, and weather resistance. It is weather-resistant enough to be used, unprotected, in facades or in kitchen tables, where wetting is expected.

- A. Less moisture deformation
- B. Permethrin
- C. Water
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Non-Pressure Processes

13. Non-pressure methods, in general, consist of (a) surface application of preservatives by brief dipping, (b) soaking in preservative oils or steeping in solutions of waterborne preservatives, (c) diffusion processes with waterborne preservatives, (d) \_\_\_\_\_, and (e) a variety of miscellaneous processes.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Vacuum treatment
- F. None of the Above

### Brief Dipping

14. It is a common practice to treat window sash, frames, and other millwork, either before or after assembly, by dipping the item in a \_\_\_\_\_.

- A. Diffusion process
- B. Dip application
- C. Water-repellent preservative
- D. Preservative penetration
- E. Vacuum treatment
- F. None of the Above

15. \_\_\_\_\_ of the preservative applied by brief dipping is very shallow, usually less than a millimeter (a few hundredths of an inch). The exposed end surfaces at joints are the most vulnerable to decay in millwork products; therefore, good end penetration is especially advantageous.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration
- F. None of the Above

16. \_\_\_\_\_ provide very limited protection to wood used in contact with the ground or under very moist conditions, and they provide very limited protection against attack by termites. However, they do have value for exterior woodwork and millwork that is painted, not in contact with the ground, and exposed to moisture only for brief periods.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Cold Soaking and Steeping

17. The methods of cold soaking well-seasoned wood for several hours or days in low-viscosity preservative oils or steeping green or seasoned wood for several days in \_\_\_\_\_ have provided a range of success on fence posts, lumber, and timbers.

- A. Preservatives
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservatives
- E. Transverse penetration of the preservatives
- F. None of the Above

18. Preservative penetration and retention levels obtained by cold soaking lumber for several hours are considerably better than those obtained by brief dipping of similar species. However, preservative retention levels seldom equal those obtained in pressure treatment except in cases such as sapwood of pines that has become highly absorptive through \_\_\_\_\_.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Mold and stain infection
- F. None of the Above

19. Steeping with waterborne preservatives has very limited use in the United States but it has been used for many years in Europe. In treating seasoned wood, both the water and the preservative salt in the solution soak into the wood. With green wood, the preservative enters the water-saturated wood by diffusion. \_\_\_\_\_ and penetration levels vary over a wide range, and the process is not generally recommended when more reliable treatments are practical.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration of the preservative
- F. None of the Above

#### Diffusion Processes

20. In addition to the steeping process, \_\_\_\_\_ are used with green or wet wood. These processes employ waterborne preservatives that will diffuse out of the water of the treating solution or paste into the water of the wood.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Topic 6 Fungus and Wood Fungi Section 20 Questions

1. A fungus or fungi is a member of a large group of \_\_\_\_\_ that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms. These organisms are classified as a kingdom, Fungi, which is separate from plants, animals, and bacteria.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Eukaryotic organisms
- E. Molds and stain fungi
- F. None of the Above

#### Reproduction

2. Fungal reproduction is complex, reflecting the differences in lifestyles and genetic makeup within this kingdom of organisms. It is estimated that a third of \_\_\_\_\_ reproduce by different modes of propagation; for example, reproduction may occur in two well-differentiated stages within the life cycle of a species, the teleomorph and the anamorph.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. All fungi
- E. Molds and stain fungi
- F. None of the Above

#### Asexual Reproduction

3. Asexual reproduction via vegetative spores (conidia) or through mycelial fragmentation is common; it maintains clonal populations adapted to a specific niche, and allows more rapid dispersal than sexual reproduction. The " \_\_\_\_\_ " (fungi lacking the perfect or sexual stage) or Deuteromycota comprise all the species which lack an observable sexual cycle.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

#### Preventing Rot

4. The key to preventing rot is to control the wood's exposure to moisture and to employ an effective prevention and treatment program. Most wood decay fungi grow only on wood with a high moisture content, usually 20 percent or above. Green (unseasoned) lumber is a prime target for \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Decay Fungi

5. Decay fungi can cause severe structural damage to any wood member, even wood species such as redwood and cedar. All that is needed is a source of water in contact with the wood. Decay will occur in untreated wood in direct contact with ground, cement or concrete, or exposed to a source of moisture such as rain seepage, plumbing leaks or condensation. \_\_\_\_\_ kept dry will never decay!

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Molds and Stains

6. Molds and stain fungi are sometimes mistaken for decay, and while they may discolor wood, they cause no structural wood damage. The presence of molds and stains, however, is a sign that conditions are favorable for decay fungi and a preventative treatment may be necessary. In addition, molds can increase the capacity of wood to absorb moisture, opening the door to attack by \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Brown Discoloration and a Crumbly Appearance

7. In one type of rot, the decayed area has a brown discoloration and a crumbly appearance. It usually breaks up into variously-sized cubes, giving rise to the name "\_\_\_\_\_." Another type of rot results in a white or yellow discoloration, with the decayed wood being "stringy" or "spongy."

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

8. Although many \_\_\_\_\_ may grow for long periods without producing any external evidence of their presence, others produce "fruiting bodies" on the surface of decaying wood. Fruiting bodies are usually "crusts" or shelf-like "brackets" which are a few inches or so in diameter. The fruiting body of *Serpula lacrimans*, e.g., is a rust-brown, crust-like structure on the wood surface.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

### Stain Fungi

9. Also, surface molds, "\_\_\_\_\_", and stain fungi are often found growing on the surface of damp wood and can be confused with decay fungi. Although these organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms indicate that moisture is present and that decay will likely proceed if a wood-rotting fungus becomes established in the wood.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Life Cycle & Habits

10. When previously dry wood is placed in contact with moist soil, or in a location where it is subject to condensation (such as unventilated crawl space), it is likely that \_\_\_\_\_ problems will occur.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Wood decay
- F. None of the Above

### Disease Cycle of Decays

11. Refer to the life cycle of a polypore, as it is closely related to the disease cycle. Two points need to be added. First, decay occurs for many years, between the stages of plasmogamy and fruiting, and \_\_\_\_\_ may continue for many years.

- A. Mildew(s)
- B. Fruiting
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Pentachlorophenol

12. In the past, pentachlorophenol (Penta®) and copper naphthenate was used as a stop gap measure. (These chemicals had offensive smells and were not environmentally safe.) Now with a growing environmental concern, \_\_\_\_\_ do not pose a serious threat. A key valve is the absence of offensive smells sometimes associated with other common treatment methods. Also, existing moisture in the wood enhances chemical penetration.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

### Treatment of Wood Infested by Decay and/or Wood

13. Since wood can contain active beetle larvae or \_\_\_\_\_ with no surface evidence of infestation, the best method of control is to treat the entire area where an infestation has been found. This would include all of the wood in a crawl space, wall or attic showing any signs of damage.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Molds

14. Many people confuse the presence of \_\_\_\_\_ with decay fungi. Although molds are a form of fungi, they typically grow on the surface of wood and generally do not weaken the wood's strength. However, the presence of mold is a good indication that the moisture level in the wood is high enough to also support the growth of decay fungi. Moisture control methods used to prevent decay fungi will also remove conditions favorable for mold growth.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Molds
- F. None of the Above

### Fungi Kingdom

15. Molds are part of the fungi kingdom. Fungi are a diverse group of organisms within a wide range of species that include mushrooms, bracket fungi, molds and mildew. Distinguishing features of \_\_\_\_\_ are the need to extract their food from the organic materials they grow on and the ability to reproduce by way of minute spores. Fungi are a part of nature's recycling system and play an important role in breaking down materials such as plants, leaves, wood and other natural matter.

- A. Mildew(s)
- B. Fungi
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

16. \_\_\_\_\_ is the common name for many types of micro fungi. In order to grow, molds require food, suitable temperature (ideally between 70 and 85 degrees Fahrenheit), oxygen and moisture (Zabel, 1992). When these conditions are met, mold will grow and reproduce by creating spores that are released into the air.

- A. Mold
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

17. Molds are very adaptable and can grow even on \_\_\_\_\_, metal, concrete or painted surfaces if a microscopic layer of organic nutrients is available. Such nutrients can be found on household dust and soil particles.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Moisture in the wood
- E. Fungal spore(s)
- F. None of the Above

### Penetration and Retention

18. Penetration and retention requirements are equally important in determining the quality of \_\_\_\_\_.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Preservative treatment
- E. Higher preservative retention levels
- F. None of the Above

19. Penetration levels vary widely, even in pressure-treated material. In most species, heartwood is more difficult to penetrate than sapwood. In addition, species differ greatly in the degree to which their heartwood may be penetrated. Incising tends to improve penetration of preservative in many refractory species, but those highly resistant to \_\_\_\_\_ will not have deep or uniform penetration even when incised.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Penetration
- F. None of the Above

20. \_\_\_\_\_ are typically expressed on the basis of the mass of preservative per unit volume of wood within a prescribed assay zone. The retention calculation is not based on the volume of the entire pole or piece of lumber.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above



## Wood Destroyers Assignment #3 For Students Names M-Q

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. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

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

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following three assignments to complete. This selection process is based upon your last name. If your last name begins with an A to E, you will pick assignment number 1, if your last name begins with the letter F to L, you are to complete assignment number 2 and if your last name begins with the letter M-Q, you will pick assignment number 3 and if your last name begins with the letter R-Z, you will pick assignment number 4.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

### Topic 1 Introduction to Wood 10 Questions

(s) means the answer may be either plural or singular in nature.

#### Wood Destroying Insects

1. Many insect pests are encouraged to take up residence in wooden structures by excessive \_\_\_\_\_. Termites, particularly the dampwood termites and subterranean termites, require moisture in their living quarters.  
A. Microorganisms      D. Water  
B. Fungi                      E. Soil  
C. Moisture conditions    F. None of the Above
2. If sudden temperature shifts or other factors result in the \_\_\_\_\_ within the galleries, the termites may drown.  
A. Moisture content              D. Termite fecal material  
B. Temperature shifts            E. Accumulation of water  
C. Moisture and fungus          F. None of the Above
3. A \_\_\_\_\_ are associated with excessive moisture and fungus problems in structures.  
A. Termite colony              D. Moisture and fungus  
B. Number of beetles          E. Particularly fungi  
C. Microorganisms              F. None of the Above
4. Anobiid larvae will not survive in wood with a \_\_\_\_\_. The drier the wood, the slower their growth.  
A. Moisture content              D. Moisture content below 20 percent  
B. Temperature shifts            E. Moisture content below 12 percent  
C. Moisture and fungus          F. None of the Above

5. Other families of beetles are also associated with \_\_\_\_\_ in structures, but with all these families, it is the fungus growth to which they are attracted.
- A. Termite colony      D. Moisture and fungus  
 B. Soil                      E. Excessive moisture  
 C. Microorganisms      F. None of the Above

#### Longhorned Beetles

6. Longhorned beetles are large (1/2 to 3 inches long), \_\_\_\_\_ with long, thin antennae that may be longer than their bodies.
- A. Black carpenter ant      D. Conspicuous beetles  
 B. Roundheaded borers      E. Maggot-looking  
 C. Old house borer      F. None of the Above

7. \_\_\_\_\_ usually lay their eggs on unseasoned, rough-sawn timbers or logs.
- A. Queen      D. Maggots  
 B. Pupae      E. Reproductives  
 C. Swarms      F. None of the Above

8. The \_\_\_\_\_, called roundheaded borers, feed in the wood, boring large, oval-shaped holes as they move through it. Infestation usually takes place before the timber is used in structures.
- A. Queen      D. Larvae  
 B. Pupae      E. Reproductives  
 C. Swarms      F. None of the Above

#### Life Cycle

9. In the spring, carpenter ants swarm, i.e., \_\_\_\_\_ emerge from the colony. The swarmer's sole purpose is reproduction.
- A. Queen      D. Adults  
 B. Pupae      E. Winged adults  
 C. Swarms      F. None of the Above

#### Carpenter Bees

10. The carpenter bee (*Xylocopa virginica*) \_\_\_\_\_ in that it is robust and black with some markings of yellow hair.
- A. Queen      D. Resembles a bumblebee  
 B. Tunnels      E. Considered pests  
 C. Nesting sites      F. None of the Above

## Topic 2 Termite Introduction 20 Questions

(s) means the answer may be either plural or singular in nature.

#### Winged Termites

1. Large numbers of winged termites swarming from wood or the soil often are the first obvious sign of a \_\_\_\_\_.
- A. Termite swarms      D. Alate emergence  
 B. Alates quickly      E. Nearby termite colony  
 C. Subterranean termites      F. None of the Above
2. Swarming occurs in mature colonies that typically contain at least several thousand termites. A " \_\_\_\_\_ " is a group of adult male and female reproductives that leave their colony in an attempt to pair and initiate new colonies.
- A. Termite swarms      D. Alate emergence  
 B. Alates quickly      E. Winged termites  
 C. Subterranean termites      F. None of the Above



3. \_\_\_\_\_ is stimulated when temperature and moisture conditions are favorable, usually on warm days following rainfall.

- A. Termite swarmer(s)
- B. Alates quickly
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

4. \_\_\_\_\_ typically occurs during daytime in the spring (March, April, and May), but swarms can occur indoors during other months.

- A. Termite swarmer(s)
- B. Alates quickly
- C. Subterranean termites
- D. Alate emergence
- E. Swarming
- F. None of the Above

5. Swarming occurs during a brief period (typically less than an hour), and \_\_\_\_\_ quickly shed their wings.

- A. Termite swarmer(s)
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

#### Mud Tubes

6. Other signs of \_\_\_\_\_ presence include mud tubes and mud protruding from cracks between boards and beams.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

7. \_\_\_\_\_ transport soil and water above ground to construct earthen runways (shelter tubes) that allow them to tunnel across exposed areas to reach wood.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

8. Shelter tubes protect them from the drying effects of air and from natural enemies, such as ants. These tubes usually are about 1/4 to 1 inch wide, and \_\_\_\_\_ use them as passageways between the soil and wood.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

9. To determine if an infestation is active, shelter tubes should be broken or scraped away and then monitored to determine whether the \_\_\_\_\_ repair them or construct new ones. Houses should be inspected annually for mud tubes.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

#### Mass Emergence

10. The mass emergence of \_\_\_\_\_ in the spring is often the first sign of an infestation. In the majority of cases, they emerge in homes near sources of heat - furnaces or water heaters.

- A. Termite swarmer(s)
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

11. The appearance of \_\_\_\_\_ means that the infestation has been around for at least 3 or 4 years. Therefore it is likely some damage has already been done, so it is important to find where the termites have been feeding, how much damage has been done, and how much repair is needed.

- A. Termite swarmers
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

12. Other means of detecting infestations include knocking on walls, floors, sub-floor wood, joists, etc. and listening for the tapping of \_\_\_\_\_, and looking for shelter tubes on the outside of the building and under the sub-floor.

- A. Termite swarmers
- B. Soldiers
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

13. Because \_\_\_\_\_ have a constant demand for water, one should closely examine areas near moist soil, such as below dripping outside faucets, leaking underground sprinkler pipes and nozzles, and below downspouts.

- A. Termite swarmers
- B. Alates
- C. Subterranean termites
- D. Alate emergence
- E. Winged termites
- F. None of the Above

#### Useful Information If Treatment is Necessary

14. If termite activity is suspected or found and \_\_\_\_\_ is necessary, it is important to outline the plan of the building, indicating sites of termite activity and treatment procedures.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. An insecticide treatment
- E. Continuous insecticide barrier
- F. None of the Above

#### Control Objectives

15. The goal is to establish a \_\_\_\_\_ between the termite colony (usually in the ground) and the wood in a building.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. Vertical Barriers
- E. Continuous insecticide barrier
- F. None of the Above

16. Sometimes a secondary termite colony may exist above ground (in roof or other areas with a constant moisture supply) which \_\_\_\_\_.

- A. Requires additional treatment
- B. Termite control
- C. Several insecticides
- D. Even distribution of insecticide
- E. Termite activity and treatment procedures
- F. None of the Above

17. In most cases, an untrained homeowner or building manager should not attempt a \_\_\_\_\_. (But homeowners still try and some do a good job.)

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. Vertical Barriers
- E. Continuous insecticide barrier
- F. None of the Above

18. Generally, termite treatments should be performed by professional pest control operators (PCOs). \_\_\_\_\_ special tools such as hammer drills, sub-slab injectors, rodding devices, high pressure pumps, a power supply, protective equipment.

- A. Requires additional treatment
- B. Termite control
- C. Several insecticides
- D. Termite treatment requires
- E. Termite activity and treatment procedures
- F. None of the Above

**Caution**

19. Do not apply insecticides when soil is frozen or water-soaked (saturated). Frozen or saturated soil will \_\_\_\_\_ for even distribution of insecticide.

- A. Requires additional treatment
- B. Not permit adequate absorption
- C. Several insecticides
- D. Even distribution of insecticide
- E. Termite activity and treatment procedures
- F. None of the Above

**Post-Construction Treatment**

20. \_\_\_\_\_ until locations of radiant heat pipes, water pipes, sewer lines, and electrical conduits are identified. Buildings requiring treatment generally fall into three categories: a) building on slab construction, b) building with crawl space, and c) building with a basement.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. Vertical Barriers
- E. Continuous insecticide barrier
- F. None of the Above

**Topic 3 Termite and Ant Identification Section 10 Questions****Worker Termites**

1. Workers construct the distinctive shelter tubes and collect food to feed the young and other members of the colony. \_\_\_\_\_ are responsible for guarding the colony and its occupants.

- A. Subterranean termite(s)
- B. Soldier termite(s)
- C. Formosan termite(s)
- D. Worker(s)
- E. Termite(s)
- F. None of the Above

**Damage**

2. \_\_\_\_\_ most commonly live in the soil where they can avoid temperature extremes and obtain the moisture essential to their existence.

- A. Worker(s)
- B. Soldier termite(s)
- C. Formosan termite(s)
- D. Subterranean termite(s)
- E. Termite(s)
- F. None of the Above

**Remedial Control**

3. Control of subterranean termites in buildings can be difficult and expensive. \_\_\_\_\_ is a proven means of protecting buildings from further damage by subterranean termites.

- A. Insecticide
- B. Ant baits
- C. Chemical (termiticide) treatment
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

**New Methods of Termite Control**

4. You could also line the trench with polyethylene prior to replacing the treated backfill. The polyethylene lining is another method of preventing movement of the \_\_\_\_\_ during an application.

Cover all treated soil according to label directions.

- A. IGRs
- B. Insecticide
- C. Termiticide
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

**Chitin Synthesis Inhibitors**

5. Chitin synthesis inhibitors work by preventing the formation of chitin, a \_\_\_\_\_ needed to form the insect's exoskeleton.

- A. IGRs
- B. Carbohydrate
- C. Chemical odor
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

### Hexaflumuron

6. Hexaflumuron (hexaflumeron) is an insect growth regulator that interferes with insects' chitin synthesis. It was registered in 1994 — the first active ingredient to be registered as a "reduced risk pesticide" through the U.S. Environmental Protection Agency's (EPA's) reduced risk program, which waives tests for new pesticides that are thought to pose fewer hazards than existing pesticides. It is registered for use on termites, and is the active ingredient in the Sentricon™ bait system. It functions by inhibiting the synthesis of \_\_\_\_\_, the material that makes up the exoskeleton of insects (Cox, 1997).

- A. IGRs
- B. Chitin
- C. Chemical odor
- D. Carbohydrates
- E. Movement of the termiticide
- F. None of the Above

### Ant Identification Section

7. All ants live in colonies, consisting of an egg-laying female (queen), \_\_\_\_\_, and workers (sterile females). The ants you see foraging in your garden or kitchen are workers.

- A. Workers
- B. Short-lived males
- C. Sterile females
- D. Carpenter ants
- E. Ant species
- F. None of the Above

8. Ants are thin-waisted and have elbowed antennae. \_\_\_\_\_ have thicker waists and have antennae that resemble strings of tiny beads. You may need a magnifying glass to examine antennal features.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

### Control

9. \_\_\_\_\_ that live outside will travel inside the home to search for food. Some species may ultimately reside in houses, discussed later in this section. To prevent both of these scenarios, follow these procedures: First, cracks and crevices should be sealed to eliminate passages into the home. If you do not seal entry points, ants will probably find their way into your house at some later time.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

10. Ant baits, described above, can again be a useful tool in eradicating inside-the-home ant nests, although \_\_\_\_\_ may not work as well with carpenter ants as the other species mentioned. Again, workers must eat the bait, take it back to the nest, and feed it to the queen and larval ants. This type of control is incompatible with treatments that prevent workers from returning to the nest with the bait.

- A. Insecticide
- B. Baits
- C. Professional pest control company
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

## Topic 4 The Wood Borers 10 Questions

- 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
- 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
- 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
- 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
- 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
- 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
- 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
- This insect is a large caterpillar that grows 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
- 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

10. 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

## Topic 5 Wood Preservatives and Insecticides 20 Questions

### Chromated Copper Arsenate (CCA)

1. Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents. EPA has classified CCA as a \_\_\_\_\_, for use only by certified pesticide applicators.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Chemical Preservatives

2. Before a wood preservative can be approved for pressure treatment of structural members, it must be evaluated to ensure that it provides the necessary durability and that it does not greatly reduce the strength properties of the wood. The EPA typically does not evaluate how well a \_\_\_\_\_ protects the wood.

- A. Heat treatment
- B. Permethrin
- C. Wood preservative
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Waterborne Preservatives

3. Copper is the \_\_\_\_\_ in many wood preservative formulations used in ground contact because of its excellent fungicidal properties and low mammalian toxicity. Because some types of fungi are copper tolerant, preservative formulations often include a co-biocide to provide further protection.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Primary biocide
- F. None of the Above

4. Water is the most common solvent carrier in \_\_\_\_\_ due to its availability and low cost. Water-borne systems do however have the drawback that they swell timber, leading to increased twisting, splitting and checking than alternatives.

- A. Heat treatment
- B. Permethrin
- C. Preservative formulations
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Chromated Copper Arsenate (CCA)

5. Chromated copper arsenate or CCA, is a chemical preservative that protects wood from rotting due to insects and microbial agents. CCA contains \_\_\_\_\_. CCA has been used to pressure treat lumber used for decks, playgrounds (playsets) and other outdoor uses since the 1930's. Since the 1970's, the majority of the wood used in residential settings was CCA-treated wood.

- A. Arsenic, chromium and copper
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Pressure Treatment Process

6. In the pressure treatment process, an aqueous solution of CCA is applied using a vacuum and pressure cycle, and the treated wood is then stacked to dry. During the process, the mixture of oxides reacts to form insoluble compounds, helping with \_\_\_\_\_ problems.

- A. Heat treatment
- B. Permethrin
- C. Leaching
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Naphthenates

7. Naphthenates are the salts of naphthenic acids. These \_\_\_\_\_ have industrial applications including synthetic detergents, lubricants, corrosion inhibitors, fuel and lubricating oil additives, wood preservations, insecticides, fungicides, acaricides, wetting agents, and oil drying agents used in painting and wood surface treatment.

- A. Salts
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Other Emulsions

#### Light Organic Solvent Preservatives (LOSP)

8. This class of timber treatments use white spirit, or light oils such as kerosene, as the solvent carrier to deliver preservative compounds into timber. \_\_\_\_\_ are typically used as an insecticide, such as permethrin, bifenthrin or deltamethrin. The most common formulations use Permethrin as an insecticide, and Propaconazole and Tebuconazole as fungicides. While still using a chemical preservative, this formulation contains no heavy-metal compounds.

- A. Heat treatment
- B. Permethrin
- C. Synthetic pyrethroids
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### New Technologies

#### Glass Fortified Wood

9. Glass Fortified Wood (glass wood) is lumber that has gone through a process that intermixes a non-\_\_\_\_\_ based formula throughout the wood fibers protecting the wood from fire, rot and insect damage. With glass encapsulating the wood fibers, the lumber becomes harder and the strength is increased. Glass wood can be used for in ground contact applications; in water applications and it is Class-A fire retardant.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Toxic sodium silicate (water glass)
- E. Extractive(s)
- F. None of the Above

### Natural Preservatives

#### Naturally Rot-Resistant Woods

10. These species are resistant to decay in their natural state, due to high levels of organic chemicals called extractives, mainly \_\_\_\_\_.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

11. \_\_\_\_\_ are chemicals that are deposited in the heartwood of certain tree species as they convert sapwood to heartwood.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Extractives
- E. Solutions of waterborne preservatives
- F. None of the Above

### Heat Treatments

12. Heat treatment can also improve the properties of the wood with respect to water: lower equilibrium moisture, \_\_\_\_\_, and weather resistance. It is weather-resistant enough to be used, unprotected, in facades or in kitchen tables, where wetting is expected.

- A. Less moisture deformation
- B. Permethrin
- C. Water
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Non-Pressure Processes

13. Non-pressure methods, in general, consist of (a) surface application of preservatives by brief dipping, (b) soaking in preservative oils or steeping in solutions of waterborne preservatives, (c) diffusion processes with waterborne preservatives, (d) \_\_\_\_\_, and (e) a variety of miscellaneous processes.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Vacuum treatment
- F. None of the Above

### Brief Dipping

14. It is a common practice to treat window sash, frames, and other millwork, either before or after assembly, by dipping the item in a \_\_\_\_\_.

- A. Diffusion process
- B. Dip application
- C. Water-repellent preservative
- D. Preservative penetration
- E. Vacuum treatment
- F. None of the Above

15. \_\_\_\_\_ of the preservative applied by brief dipping is very shallow, usually less than a millimeter (a few hundredths of an inch). The exposed end surfaces at joints are the most vulnerable to decay in millwork products; therefore, good end penetration is especially advantageous.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration
- F. None of the Above

16. \_\_\_\_\_ provide very limited protection to wood used in contact with the ground or under very moist conditions, and they provide very limited protection against attack by termites. However, they do have value for exterior woodwork and millwork that is painted, not in contact with the ground, and exposed to moisture only for brief periods.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Cold Soaking and Steeping

17. The methods of cold soaking well-seasoned wood for several hours or days in low-viscosity preservative oils or steeping green or seasoned wood for several days in \_\_\_\_\_ have provided a range of success on fence posts, lumber, and timbers.

- A. Preservatives
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservatives
- E. Transverse penetration of the preservatives
- F. None of the Above

18. Preservative penetration and retention levels obtained by cold soaking lumber for several hours are considerably better than those obtained by brief dipping of similar species. However, preservative retention levels seldom equal those obtained in pressure treatment except in cases such as sapwood of pines that has become highly absorptive through \_\_\_\_\_.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Mold and stain infection
- F. None of the Above



19. Steeping with waterborne preservatives has very limited use in the United States but it has been used for many years in Europe. In treating seasoned wood, both the water and the preservative salt in the solution soak into the wood. With green wood, the preservative enters the water-saturated wood by diffusion. \_\_\_\_\_ and penetration levels vary over a wide range, and the process is not generally recommended when more reliable treatments are practical.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration of the preservative
- F. None of the Above

#### Diffusion Processes

20. In addition to the steeping process, \_\_\_\_\_ are used with green or wet wood. These processes employ waterborne preservatives that will diffuse out of the water of the treating solution or paste into the water of the wood.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Topic 6 Fungus and Wood Fungi Section 20 Questions

1. A fungus or fungi is a member of a large group of \_\_\_\_\_ that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms. These organisms are classified as a kingdom, Fungi, which is separate from plants, animals, and bacteria.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Eukaryotic organisms
- E. Molds and stain fungi
- F. None of the Above

#### Reproduction

2. Fungal reproduction is complex, reflecting the differences in lifestyles and genetic makeup within this kingdom of organisms. It is estimated that a third of \_\_\_\_\_ reproduce by different modes of propagation; for example, reproduction may occur in two well-differentiated stages within the life cycle of a species, the teleomorph and the anamorph.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. All fungi
- E. Molds and stain fungi
- F. None of the Above

#### Asexual Reproduction

3. Asexual reproduction via vegetative spores (conidia) or through mycelial fragmentation is common; it maintains clonal populations adapted to a specific niche, and allows more rapid dispersal than sexual reproduction. The " \_\_\_\_\_ " (fungi lacking the perfect or sexual stage) or Deuteromycota comprise all the species which lack an observable sexual cycle.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

#### Preventing Rot

4. The key to preventing rot is to control the wood's exposure to moisture and to employ an effective prevention and treatment program. Most wood decay fungi grow only on wood with a high moisture content, usually 20 percent or above. Green (unseasoned) lumber is a prime target for \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Decay Fungi

5. Decay fungi can cause severe structural damage to any wood member, even wood species such as redwood and cedar. All that is needed is a source of water in contact with the wood. Decay will occur in untreated wood in direct contact with ground, cement or concrete, or exposed to a source of moisture such as rain seepage, plumbing leaks or condensation. \_\_\_\_\_ kept dry will never decay!

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Molds and Stains

6. Molds and stain fungi are sometimes mistaken for decay, and while they may discolor wood, they cause no structural wood damage. The presence of molds and stains, however, is a sign that conditions are favorable for decay fungi and a preventative treatment may be necessary. In addition, molds can increase the capacity of wood to absorb moisture, opening the door to attack by \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Brown Discoloration and a Crumbly Appearance

7. In one type of rot, the decayed area has a brown discoloration and a crumbly appearance. It usually breaks up into variously-sized cubes, giving rise to the name "\_\_\_\_\_." Another type of rot results in a white or yellow discoloration, with the decayed wood being "stringy" or "spongy."

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

8. Although many \_\_\_\_\_ may grow for long periods without producing any external evidence of their presence, others produce "fruiting bodies" on the surface of decaying wood. Fruiting bodies are usually "crusts" or shelf-like "brackets" which are a few inches or so in diameter. The fruiting body of *Serpula lacrimans*, e.g., is a rust-brown, crust-like structure on the wood surface.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

### Stain Fungi

9. Also, surface molds, "\_\_\_\_\_", and stain fungi are often found growing on the surface of damp wood and can be confused with decay fungi. Although these organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms indicate that moisture is present and that decay will likely proceed if a wood-rotting fungus becomes established in the wood.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Life Cycle & Habits

10. When previously dry wood is placed in contact with moist soil, or in a location where it is subject to condensation (such as unventilated crawl space), it is likely that \_\_\_\_\_ problems will occur.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Wood decay
- F. None of the Above

### Disease Cycle of Decays

11. Refer to the life cycle of a polypore, as it is closely related to the disease cycle. Two points need to be added. First, decay occurs for many years, between the stages of plasmogamy and fruiting, and \_\_\_\_\_ may continue for many years.

- A. Mildew(s)
- B. Fruiting
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Pentachlorophenol

12. In the past, pentachlorophenol (Penta®) and copper naphthenate was used as a stop gap measure. (These chemicals had offensive smells and were not environmentally safe.) Now with a growing environmental concern, \_\_\_\_\_ do not pose a serious threat. A key valve is the absence of offensive smells sometimes associated with other common treatment methods. Also, existing moisture in the wood enhances chemical penetration.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

### Treatment of Wood Infested by Decay and/or Wood

13. Since wood can contain active beetle larvae or \_\_\_\_\_ with no surface evidence of infestation, the best method of control is to treat the entire area where an infestation has been found. This would include all of the wood in a crawl space, wall or attic showing any signs of damage.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Molds

14. Many people confuse the presence of \_\_\_\_\_ with decay fungi. Although molds are a form of fungi, they typically grow on the surface of wood and generally do not weaken the wood's strength. However, the presence of mold is a good indication that the moisture level in the wood is high enough to also support the growth of decay fungi. Moisture control methods used to prevent decay fungi will also remove conditions favorable for mold growth.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Molds
- F. None of the Above

### Fungi Kingdom

15. Molds are part of the fungi kingdom. Fungi are a diverse group of organisms within a wide range of species that include mushrooms, bracket fungi, molds and mildew. Distinguishing features of \_\_\_\_\_ are the need to extract their food from the organic materials they grow on and the ability to reproduce by way of minute spores. Fungi are a part of nature's recycling system and play an important role in breaking down materials such as plants, leaves, wood and other natural matter.

- A. Mildew(s)
- B. Fungi
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

16. \_\_\_\_\_ is the common name for many types of micro fungi. In order to grow, molds require food, suitable temperature (ideally between 70 and 85 degrees Fahrenheit), oxygen and moisture (Zabel, 1992). When these conditions are met, mold will grow and reproduce by creating spores that are released into the air.

- A. Mold
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

17. Molds are very adaptable and can grow even on \_\_\_\_\_, metal, concrete or painted surfaces if a microscopic layer of organic nutrients is available. Such nutrients can be found on household dust and soil particles.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Moisture in the wood
- E. Fungal spore(s)
- F. None of the Above

### Penetration and Retention

18. Penetration and retention requirements are equally important in determining the quality of \_\_\_\_\_.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Preservative treatment
- E. Higher preservative retention levels
- F. None of the Above

19. Penetration levels vary widely, even in pressure-treated material. In most species, heartwood is more difficult to penetrate than sapwood. In addition, species differ greatly in the degree to which their heartwood may be penetrated. Incising tends to improve penetration of preservative in many refractory species, but those highly resistant to \_\_\_\_\_ will not have deep or uniform penetration even when incised.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Penetration
- F. None of the Above

20. \_\_\_\_\_ are typically expressed on the basis of the mass of preservative per unit volume of wood within a prescribed assay zone. The retention calculation is not based on the volume of the entire pole or piece of lumber.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

## Wood Destroyers Assignment #4 For Students Names R-Z

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. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

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

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following three assignments to complete. This selection process is based upon your last name. If your last name begins with an A to E, you will pick assignment number 1, if your last name begins with the letter F to L, you are to complete assignment number 2 and if your last name begins with the letter M-Q, you will pick assignment number 3 and if your last name begins with the letter R-Z, you will pick assignment number 4.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

### Topic 1 Introduction to Wood 10 Questions

(s) means the answer may be either plural or singular in nature.

#### Rot-Producing Fungi

1. Certain rot-producing fungi impart to \_\_\_\_\_ which thus become symptomatic of weakness; however an attractive effect known as spalting produced by this process is often considered a desirable characteristic.  
A. Protoplasmic contents      D. Ultimate crushing strength  
B. The water content      E. Wood characteristic colors  
C. Spalting produced      F. None of the Above

#### Water Content

2. Water occurs in living wood in three conditions, namely: (1) in the cell walls, (2) in the protoplasmic contents of the cells, and (3) as free water in the \_\_\_\_\_ and spaces. In heartwood it occurs only in the first and last forms.  
A. Protoplasmic contents      D. Cell cavities  
B. Water content      E. Growth ring  
C. Spalting      F. None of the Above

#### Longhorned Beetles

3. Longhorned beetles are large (1/2 to 3 inches long), \_\_\_\_\_ with long, thin antennae that may be longer than their bodies.  
A. Black carpenter ant      D. Conspicuous beetles  
B. Roundheaded borers      E. Maggot-looking  
C. Old house borer      F. None of the Above
4. \_\_\_\_\_ usually lay their eggs on unseasoned, rough-sawn timbers or logs.  
A. Queen      D. Maggots  
B. Pupae      E. Reproductives  
C. Swarmers      F. None of the Above

### Life Cycle

5. In the spring, carpenter ants swarm, i.e., \_\_\_\_\_ emerge from the colony. The swarmer's sole purpose is reproduction.
- A. Queen
  - B. Pupae
  - C. Swarmers
  - D. Adults
  - E. Winged adults
  - F. None of the Above
6. Shortly after mating, the female (queen) loses her wings and searches out a cavity in wood or soil where she begins to lay eggs and produce \_\_\_\_\_.
- A. Her colony's first workers
  - B. Workers
  - C. Female (queen)
  - D. The species
  - E. Swarmers
  - F. None of the Above

### Carpenter Bees

7. The carpenter bee (*Xylocopa virginica*) \_\_\_\_\_ in that it is robust and black with some markings of yellow hair.
- A. Queen
  - B. Tunnels
  - C. Nesting sites
  - D. Resembles a bumblebee
  - E. Considered pests
  - F. None of the Above
8. The dorsal surface of the abdomen lacks the yellow hair markings of \_\_\_\_\_ and is mostly devoid of any hair.
- A. Queen
  - B. Tunnels
  - C. Nesting sites
  - D. Bumblebee(s)
  - E. Considered pests
  - F. None of the Above
9. These bees are \_\_\_\_\_ of wood because they excavate tunnels in softwood as sites for producing their brood.
- A. Queen-less
  - B. Tunnel makers
  - C. Nest makers
  - D. Not a risk
  - E. Considered pests
  - F. None of the Above
10. Common \_\_\_\_\_ are posts, fence railings, porch support posts, wall siding, eaves, wooden shingles, windowsills, doors, wooden porch furniture, etc.
- A. Insects
  - B. Tunnels
  - C. Nesting sites
  - D. Wood
  - E. Mating sites
  - F. None of the Above

## Topic 2 Termite Introduction 20 Questions

(s) means the answer may be either plural or singular in nature.

Look for these signs of termite feeding:

1. Wood that \_\_\_\_\_ when it is tapped with the handle of a screwdriver.
- A. Sounds "hollow"
  - B. No damage
  - C. Could consume the equivalent
  - D. Foods enhances recognition
  - E. Actually feed on almost anything
  - F. None of the Above
2. Soft wood that is \_\_\_\_\_ with a knife or screwdriver.
- A. Easily probed
  - B. Easily tunneled
  - C. Vibrations are perceived
  - D. Hardily probed
  - E. Harden
  - F. None of the Above

3. A \_\_\_\_\_ on the surface of damaged material.
- |                                 |                                     |
|---------------------------------|-------------------------------------|
| A. Sounds "hollow"              | D. Foods enhances recognition       |
| B. No damage                    | E. Actually feed on almost anything |
| C. Could consume the equivalent | F. None of the Above                |

4. There is \_\_\_\_\_ the age of recently discovered damage. You need some reference point, i.e., some point in time when it was known that there was no damage to this particular wood.

- |                                       |                        |
|---------------------------------------|------------------------|
| A. No accurate method for determining | D. Amount of damage    |
| B. Easy method of determining         | E. Recognize the signs |
| C. Way to test                        | F. None of the Above   |

5. This is one reason why annual inspections (and keeping your records of these inspections) are invaluable. These inspections do not guarantee that there is \_\_\_\_\_ in visually-inaccessible areas, such as inside walls. However, they can reveal conditions that might suggest that damage does exist.

- |                                 |                                     |
|---------------------------------|-------------------------------------|
| A. Sounds "hollow"              | D. Foods enhances recognition       |
| B. No damage                    | E. Actually feed on almost anything |
| C. Could consume the equivalent | F. None of the Above                |

#### Winged Termites

6. Large numbers of winged termites swarming from wood or the soil often are the first obvious sign of a \_\_\_\_\_.

- |                          |                          |
|--------------------------|--------------------------|
| A. Termite swarmers      | D. Alate emergence       |
| B. Alates quickly        | E. Nearby termite colony |
| C. Subterranean termites | F. None of the Above     |

7. Swarming occurs in mature colonies that typically contain at least several thousand termites. A " \_\_\_\_\_ " is a group of adult male and female reproductives that leave their colony in an attempt to pair and initiate new colonies.

- |                          |                      |
|--------------------------|----------------------|
| A. Termite swarmers      | D. Alate emergence   |
| B. Alates quickly        | E. Winged termites   |
| C. Subterranean termites | F. None of the Above |

#### Mass Emergence

8. The mass emergence of \_\_\_\_\_ in the spring is often the first sign of an infestation. In the majority of cases, they emerge in homes near sources of heat - furnaces or water heaters.

- |                          |                      |
|--------------------------|----------------------|
| A. Termite swarmers      | D. Alate emergence   |
| B. Alates                | E. Winged termites   |
| C. Subterranean termites | F. None of the Above |

#### Evidence of Termite Infestations

9. Wood damaged by \_\_\_\_\_ can be readily penetrated with a screwdriver, ice pick, or knife. The wood easily breaks apart, revealing mud tubes attached to wood galleries or tunnels in an irregular pattern. The tunnels may contain broken mud particles with fecal materials. In the case of an active colony, white termites may be found in infested wood.

- |                          |                      |
|--------------------------|----------------------|
| A. Swarmer(s)            | D. Females           |
| B. Alates                | E. Termite(s)        |
| C. Subterranean termites | F. None of the Above |

10. The presence of \_\_\_\_\_, females, or their shed wings, particularly when the adults fly inside the building, indicates an infestation in the building.

- |                          |                      |
|--------------------------|----------------------|
| A. Swarmer(s)            | D. Females           |
| B. Alates                | E. Termite(s)        |
| C. Subterranean termites | F. None of the Above |

11. Another indication is the presence of mud or shelter tubes extending from the ground to woodwork or on foundation walls. \_\_\_\_\_ travel periodically via shelter tubes to their colony to obtain moisture and perform feeding duties.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

12. \_\_\_\_\_ build mud or shelter tubes from soil and wood particles, and coat them with a glue-like substance that they secrete. Each mud tube is about the diameter of a lead pencil.

- A. Swarmer(s)
- B. Workers
- C. Subterranean termites
- D. Females
- E. Termite(s)
- F. None of the Above

#### Useful Information If Treatment is Necessary

13. If termite activity is suspected or found and \_\_\_\_\_ is necessary, it is important to outline the plan of the building, indicating sites of termite activity and treatment procedures.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. An insecticide treatment
- E. Continuous insecticide barrier
- F. None of the Above

#### Control Objectives

14. The goal is to establish a \_\_\_\_\_ between the termite colony (usually in the ground) and the wood in a building.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. Vertical Barriers
- E. Continuous insecticide barrier
- F. None of the Above

15. Sometimes a secondary termite colony may exist above ground (in roof or other areas with a constant moisture supply) which \_\_\_\_\_.

- A. Requires additional treatment
- B. Termite control
- C. Several insecticides
- D. Even distribution of insecticide
- E. Termite activity and treatment procedures
- F. None of the Above

#### Pre-Construction Treatment

16. Horizontal Barriers: In general, treat the footing trench with insecticide before pouring cement footings. After grading is completed, \_\_\_\_\_ to areas before pouring slab floors, slab-supported porches, patios, carports, and entrance platforms at the rate of 1 gallon per 10 square feet.

- A. Requires additional treatment
- B. Termite control
- C. Several insecticides
- D. Even distribution of insecticide
- E. Apply diluted insecticide
- F. None of the Above

17. Vertical Barriers: Establish a \_\_\_\_\_ in areas such as around the bases of foundations, plumbing, utility entrances, and backfilled soil against foundation walls.

- A. Termite treatment
- B. Contact treated surfaces
- C. Chemical barrier
- D. Vertical Barriers
- E. Continuous insecticide barrier
- F. None of the Above

18. Treat crawl space areas either by \_\_\_\_\_. To produce a vertical barrier in soil, apply insecticide at the rate of 4 gallons per 10 linear feet per foot of depth. After treatment, cover the crawl space area with a layer of untreated soil or polyethylene sheeting.

- A. Termite treatment
- B. Contact treated surfaces
- C. Keep all pesticides
- D. Vertical Barriers
- E. Rodding or trenching procedures
- F. None of the Above



#### Post-Construction Treatment

19. \_\_\_\_\_ until locations of radiant heat pipes, water pipes, sewer lines, and electrical conduits are identified. Buildings requiring treatment generally fall into three categories: a) building on slab construction, b) building with crawl space, and c) building with a basement.
- A. Termite treatment
  - B. Contact treated surfaces
  - C. Keep all pesticides
  - D. Vertical Barriers
  - E. Continuous insecticide barrier
  - F. None of the Above

#### Wood Treatment

20. In addition to \_\_\_\_\_, it may be necessary to treat infested wood with insecticide spray or injection.
- A. Rodding
  - B. Treat
  - C. Insecticide spray
  - D. Soil treatment
  - E. Broadcast spray
  - F. None of the Above

### Topic 3 Termite and Ant Identification Section 10 Questions

#### Worker Termites

1. Workers construct the distinctive shelter tubes and collect food to feed the young and other members of the colony. \_\_\_\_\_ are responsible for guarding the colony and its occupants.
- A. Subterranean termite(s)
  - B. Soldier termite(s)
  - C. Formosan termite(s)
  - D. Worker(s)
  - E. Termite(s)
  - F. None of the Above

#### Damage

2. \_\_\_\_\_ most commonly live in the soil where they can avoid temperature extremes and obtain the moisture essential to their existence.
- A. Worker(s)
  - B. Soldier termite(s)
  - C. Formosan termite(s)
  - D. Subterranean termite(s)
  - E. Termite(s)
  - F. None of the Above

#### Remedial Control

3. Control of subterranean termites in buildings can be difficult and expensive. \_\_\_\_\_ is a proven means of protecting buildings from further damage by subterranean termites.
- A. Insecticide
  - B. Ant baits
  - C. Chemical (termiticide) treatment
  - D. Spraying a residual insecticide
  - E. Bait treatments and insecticides
  - F. None of the Above

#### New Methods of Termite Control

4. An alternative method requires removing the soil from the trench and placing it on a waterproof tarp. Apply the termiticide to the soil on the tarp and mix. The treated backfill is then placed back into the trench. You could also line the trench with polyethylene prior to replacing the treated backfill. The polyethylene lining is another method of preventing movement of the \_\_\_\_\_ during an application.

Cover all treated soil according to label directions.

- A. IGRs
- B. Insecticide
- C. Termiticide
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

### **Chitin Synthesis Inhibitors**

5. Chitin synthesis inhibitors work by preventing the formation of chitin, a \_\_\_\_\_ needed to form the insect's exoskeleton. With these inhibitors, an insect grows normally until it molts. The inhibitors prevent the new exoskeleton from forming properly, causing the insect to die. Death may be quick, or take up to several days depending on the insect.

- A. IGRs
- B. Carbohydrate
- C. Chemical odor
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

### **Hexaflumuron**

6. Hexaflumuron (hexaflumeron) is an insect growth regulator that interferes with insects' chitin synthesis. It was registered in 1994 — the first active ingredient to be registered as a "reduced risk pesticide" through the U.S. Environmental Protection Agency's (EPA's) reduced risk program, which waives tests for new pesticides that are thought to pose fewer hazards than existing pesticides. It is registered for use on termites, and is the active ingredient in the Sentricon™ bait system. It functions by inhibiting the synthesis of \_\_\_\_\_, the material that makes up the exoskeleton of insects (Cox, 1997).

- A. IGRs
- B. Chitin
- C. Chemical odor
- D. Carbohydrates
- E. Movement of the termiticide
- F. None of the Above

### **Ant Identification Section**

7. All ants live in colonies, consisting of an egg-laying female (queen), \_\_\_\_\_, and workers (sterile females). The ants you see foraging in your garden or kitchen are workers.

- A. Workers
- B. Short-lived males
- C. Sterile females
- D. Carpenter ants
- E. Ant species
- F. None of the Above

8. Ants are thin-waisted and have elbowed antennae. \_\_\_\_\_ have thicker waists and have antennae that resemble strings of tiny beads. You may need a magnifying glass to examine antennal features.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

### **Control**

9. \_\_\_\_\_ that live outside will travel inside the home to search for food. Some species may ultimately reside in houses, discussed later in this section. To prevent both of these scenarios, follow these procedures: First, cracks and crevices should be sealed to eliminate passages into the home. If you do not seal entry points, ants will probably find their way into your house at some later time.

- A. Workers
- B. Ants
- C. Sterile females
- D. Termites
- E. Ant species
- F. None of the Above

10. Ant baits, described above, can again be a useful tool in eradicating inside-the-home ant nests, although \_\_\_\_\_ may not work as well with carpenter ants as the other species mentioned. Again, workers must eat the bait, take it back to the nest, and feed it to the queen and larval ants. This type of control is incompatible with treatments that prevent workers from returning to the nest with the bait.

- A. Insecticide
- B. Baits
- C. Professional pest control company
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

## Topic 4 The Wood Borers 10 Questions

- The adult insect becomes a large grey moth.
  - Carpenter worm adult
  - Clear-winged moth
  - Pine sawyer moth
  - Poplar moth larva
  - Locust moth
  - None of the Above
- This insect bores in trees as larvae. The adults resemble wasps in many cases.
  - Wasp worm adult
  - Clear-winged moth
  - Pine sawyer adult
  - Wasp larva
  - Locust borer adult
  - None of the Above
- 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.
  - Carpenter ant
  - Clear-winged larva
  - Pine sawyer larva
  - Poplar borer larva
  - Locust borer larva
  - None of the Above
- This insect attacks black locust trees. The strikingly colored adults emerge in the fall and can be seen feeding on goldenrod.
  - Carpenter bees
  - Black termites
  - Pine sawyer larva
  - Poplar borer larva
  - Locust borer adult
  - None of the Above
- 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.
  - California laurel borer larva
  - Bronze birch borer larva
  - Red headed ash borer adult
  - Pine sawyer larva
  - Poplar and willow borer larva
  - None of the Above
- Although not true borers, this insect attacks several evergreen trees. The adults usually emerge in mid-summer and lay eggs.
  - Bark beetle adults
  - Poplar borer
  - Carpenter bee
  - Shot-hole borer
  - Ips Beetle larva
  - None of the Above
- This insect attacks weakened or dead trees and shrubs. They feed deeper in the wood than bark beetles. The larvae are legless grubs.
  - Bark beetle adults
  - Poplar borer
  - Carpenter bee
  - Shot-hole borer
  - Termite
  - None of the Above
- This insect is a large caterpillar that grows 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.
  - Bark beetle adults
  - Termite
  - Carpenter worm
  - Shot-hole borer
  - Clear-winged moth larva
  - None of the Above
- This insect can extensively mine limbs of susceptible trees. Poplars, willow, and cottonwood trees are hosts of several species.
  - Bark beetle adults
  - Poplar borer
  - Ants
  - Termites
  - Clear-winged moth larva
  - None of the Above

10. 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

## Topic 5 Wood Preservatives and Insecticides 20 Questions

### Chromated Copper Arsenate (CCA)

1. Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents. EPA has classified CCA as a \_\_\_\_\_, for use only by certified pesticide applicators.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Chemical Preservatives

2. Before a wood preservative can be approved for pressure treatment of structural members, it must be evaluated to ensure that it provides the necessary durability and that it does not greatly reduce the strength properties of the wood. The EPA typically does not evaluate how well a \_\_\_\_\_ protects the wood.

- A. Heat treatment
- B. Permethrin
- C. Wood preservative
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Waterborne Preservatives

3. Copper is the \_\_\_\_\_ in many wood preservative formulations used in ground contact because of its excellent fungicidal properties and low mammalian toxicity. Because some types of fungi are copper tolerant, preservative formulations often include a co-biocide to provide further protection.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Primary biocide
- F. None of the Above

4. Water is the most common solvent carrier in \_\_\_\_\_ due to its availability and low cost. Water-borne systems do however have the drawback that they swell timber, leading to increased twisting, splitting and checking than alternatives.

- A. Heat treatment
- B. Permethrin
- C. Preservative formulations
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Chromated Copper Arsenate (CCA)

5. Chromated copper arsenate or CCA, is a chemical preservative that protects wood from rotting due to insects and microbial agents. CCA contains \_\_\_\_\_. CCA has been used to pressure treat lumber used for decks, playgrounds (playsets) and other outdoor uses since the 1930's. Since the 1970's, the majority of the wood used in residential settings was CCA-treated wood.

- A. Arsenic, chromium and copper
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Pressure Treatment Process

6. In the pressure treatment process, an aqueous solution of CCA is applied using a vacuum and pressure cycle, and the treated wood is then stacked to dry. During the process, the mixture of oxides reacts to form insoluble compounds, helping with \_\_\_\_\_ problems.

- A. Heat treatment
- B. Permethrin
- C. Leaching
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Naphthenates

7. Naphthenates are the salts of naphthenic acids. These \_\_\_\_\_ have industrial applications including synthetic detergents, lubricants, corrosion inhibitors, fuel and lubricating oil additives, wood preservations, insecticides, fungicides, acaricides, wetting agents, and oil drying agents used in painting and wood surface treatment.

- A. Salts
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

### Other Emulsions

#### Light Organic Solvent Preservatives (LOSP)

8. This class of timber treatments use white spirit, or light oils such as kerosene, as the solvent carrier to deliver preservative compounds into timber. \_\_\_\_\_ are typically used as an insecticide, such as permethrin, bifenthrin or deltamethrin. The most common formulations use Permethrin as an insecticide, and Propaconazole and Tebuconazole as fungicides. While still using a chemical preservative, this formulation contains no heavy-metal compounds.

- A. Heat treatment
- B. Permethrin
- C. Synthetic pyrethroids
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### New Technologies

#### Glass Fortified Wood

9. Glass Fortified Wood (glass wood) is lumber that has gone through a process that intermixes a non-\_\_\_\_\_ based formula throughout the wood fibers protecting the wood from fire, rot and insect damage. With glass encapsulating the wood fibers, the lumber becomes harder and the strength is increased. Glass wood can be used for in ground contact applications; in water applications and it is Class-A fire retardant.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Toxic sodium silicate (water glass)
- E. Extractive(s)
- F. None of the Above

### Natural Preservatives

#### Naturally Rot-Resistant Woods

10. These species are resistant to decay in their natural state, due to high levels of organic chemicals called extractives, mainly \_\_\_\_\_.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

11. \_\_\_\_\_ are chemicals that are deposited in the heartwood of certain tree species as they convert sapwood to heartwood.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Extractives
- E. Solutions of waterborne preservatives
- F. None of the Above

### Heat Treatments

12. Heat treatment can also improve the properties of the wood with respect to water: lower equilibrium moisture, \_\_\_\_\_, and weather resistance. It is weather-resistant enough to be used, unprotected, in facades or in kitchen tables, where wetting is expected.

- A. Less moisture deformation
- B. Permethrin
- C. Water
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

### Non-Pressure Processes

13. Non-pressure methods, in general, consist of (a) surface application of preservatives by brief dipping, (b) soaking in preservative oils or steeping in solutions of waterborne preservatives, (c) diffusion processes with waterborne preservatives, (d) \_\_\_\_\_, and (e) a variety of miscellaneous processes.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Vacuum treatment
- F. None of the Above

### Brief Dipping

14. It is a common practice to treat window sash, frames, and other millwork, either before or after assembly, by dipping the item in a \_\_\_\_\_.

- A. Diffusion process
- B. Dip application
- C. Water-repellent preservative
- D. Preservative penetration
- E. Vacuum treatment
- F. None of the Above

15. \_\_\_\_\_ of the preservative applied by brief dipping is very shallow, usually less than a millimeter (a few hundredths of an inch). The exposed end surfaces at joints are the most vulnerable to decay in millwork products; therefore, good end penetration is especially advantageous.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration
- F. None of the Above

16. \_\_\_\_\_ provide very limited protection to wood used in contact with the ground or under very moist conditions, and they provide very limited protection against attack by termites. However, they do have value for exterior woodwork and millwork that is painted, not in contact with the ground, and exposed to moisture only for brief periods.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Cold Soaking and Steeping

17. The methods of cold soaking well-seasoned wood for several hours or days in low-viscosity preservative oils or steeping green or seasoned wood for several days in \_\_\_\_\_ have provided a range of success on fence posts, lumber, and timbers.

- A. Preservatives
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservatives
- E. Transverse penetration of the preservatives
- F. None of the Above

18. Preservative penetration and retention levels obtained by cold soaking lumber for several hours are considerably better than those obtained by brief dipping of similar species. However, preservative retention levels seldom equal those obtained in pressure treatment except in cases such as sapwood of pines that has become highly absorptive through \_\_\_\_\_.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Mold and stain infection
- F. None of the Above

19. Steeping with waterborne preservatives has very limited use in the United States but it has been used for many years in Europe. In treating seasoned wood, both the water and the preservative salt in the solution soak into the wood. With green wood, the preservative enters the water-saturated wood by diffusion. \_\_\_\_\_ and penetration levels vary over a wide range, and the process is not generally recommended when more reliable treatments are practical.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration of the preservative
- F. None of the Above

#### Diffusion Processes

20. In addition to the steeping process, \_\_\_\_\_ are used with green or wet wood. These processes employ waterborne preservatives that will diffuse out of the water of the treating solution or paste into the water of the wood.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

### Topic 6 Fungus and Wood Fungi Section 20 Questions

1. A fungus or fungi is a member of a large group of \_\_\_\_\_ that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms. These organisms are classified as a kingdom, Fungi, which is separate from plants, animals, and bacteria.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Eukaryotic organisms
- E. Molds and stain fungi
- F. None of the Above

#### Reproduction

2. Fungal reproduction is complex, reflecting the differences in lifestyles and genetic makeup within this kingdom of organisms. It is estimated that a third of \_\_\_\_\_ reproduce by different modes of propagation; for example, reproduction may occur in two well-differentiated stages within the life cycle of a species, the teleomorph and the anamorph.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. All fungi
- E. Molds and stain fungi
- F. None of the Above

#### Asexual Reproduction

3. Asexual reproduction via vegetative spores (conidia) or through mycelial fragmentation is common; it maintains clonal populations adapted to a specific niche, and allows more rapid dispersal than sexual reproduction. The " \_\_\_\_\_ " (fungi lacking the perfect or sexual stage) or Deuteromycota comprise all the species which lack an observable sexual cycle.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

#### Preventing Rot

4. The key to preventing rot is to control the wood's exposure to moisture and to employ an effective prevention and treatment program. Most wood decay fungi grow only on wood with a high moisture content, usually 20 percent or above. Green (unseasoned) lumber is a prime target for \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Decay Fungi

5. Decay fungi can cause severe structural damage to any wood member, even wood species such as redwood and cedar. All that is needed is a source of water in contact with the wood. Decay will occur in untreated wood in direct contact with ground, cement or concrete, or exposed to a source of moisture such as rain seepage, plumbing leaks or condensation. \_\_\_\_\_ kept dry will never decay!

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Molds and Stains

6. Molds and stain fungi are sometimes mistaken for decay, and while they may discolor wood, they cause no structural wood damage. The presence of molds and stains, however, is a sign that conditions are favorable for decay fungi and a preventative treatment may be necessary. In addition, molds can increase the capacity of wood to absorb moisture, opening the door to attack by \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

### Brown Discoloration and a Crumbly Appearance

7. In one type of rot, the decayed area has a brown discoloration and a crumbly appearance. It usually breaks up into variously-sized cubes, giving rise to the name "\_\_\_\_\_." Another type of rot results in a white or yellow discoloration, with the decayed wood being "stringy" or "spongy."

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

8. Although many \_\_\_\_\_ may grow for long periods without producing any external evidence of their presence, others produce "fruiting bodies" on the surface of decaying wood. Fruiting bodies are usually "crusts" or shelf-like "brackets" which are a few inches or so in diameter. The fruiting body of *Serpula lacrimans*, e.g., is a rust-brown, crust-like structure on the wood surface.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

### Stain Fungi

9. Also, surface molds, "\_\_\_\_\_", and stain fungi are often found growing on the surface of damp wood and can be confused with decay fungi. Although these organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms indicate that moisture is present and that decay will likely proceed if a wood-rotting fungus becomes established in the wood.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Life Cycle & Habits

10. When previously dry wood is placed in contact with moist soil, or in a location where it is subject to condensation (such as unventilated crawl space), it is likely that \_\_\_\_\_ problems will occur.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Wood decay
- F. None of the Above



### Disease Cycle of Decays

11. Refer to the life cycle of a polypore, as it is closely related to the disease cycle. Two points need to be added. First, decay occurs for many years, between the stages of plasmogamy and fruiting, and \_\_\_\_\_ may continue for many years.

- A. Mildew(s)
- B. Fruiting
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Pentachlorophenol

12. In the past, pentachlorophenol (Penta®) and copper naphthenate was used as a stop gap measure. (These chemicals had offensive smells and were not environmentally safe.) Now with a growing environmental concern, \_\_\_\_\_ do not pose a serious threat. A key valve is the absence of offensive smells sometimes associated with other common treatment methods. Also, existing moisture in the wood enhances chemical penetration.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

### Treatment of Wood Infested by Decay and/or Wood

13. Since wood can contain active beetle larvae or \_\_\_\_\_ with no surface evidence of infestation, the best method of control is to treat the entire area where an infestation has been found. This would include all of the wood in a crawl space, wall or attic showing any signs of damage.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

### Molds

14. Many people confuse the presence of \_\_\_\_\_ with decay fungi. Although molds are a form of fungi, they typically grow on the surface of wood and generally do not weaken the wood's strength. However, the presence of mold is a good indication that the moisture level in the wood is high enough to also support the growth of decay fungi. Moisture control methods used to prevent decay fungi will also remove conditions favorable for mold growth.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Molds
- F. None of the Above

### Fungi Kingdom

15. Molds are part of the fungi kingdom. Fungi are a diverse group of organisms within a wide range of species that include mushrooms, bracket fungi, molds and mildew. Distinguishing features of \_\_\_\_\_ are the need to extract their food from the organic materials they grow on and the ability to reproduce by way of minute spores. Fungi are a part of nature's recycling system and play an important role in breaking down materials such as plants, leaves, wood and other natural matter.

- A. Mildew(s)
- B. Fungi
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

16. \_\_\_\_\_ is the common name for many types of micro fungi. In order to grow, molds require food, suitable temperature (ideally between 70 and 85 degrees Fahrenheit), oxygen and moisture (Zabel, 1992). When these conditions are met, mold will grow and reproduce by creating spores that are released into the air.

- A. Mold
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

17. Molds are very adaptable and can grow even on \_\_\_\_\_, metal, concrete or painted surfaces if a microscopic layer of organic nutrients is available. Such nutrients can be found on household dust and soil particles.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Moisture in the wood
- E. Fungal spore(s)
- F. None of the Above

### Penetration and Retention

18. Penetration and retention requirements are equally important in determining the quality of \_\_\_\_\_.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Preservative treatment
- E. Higher preservative retention levels
- F. None of the Above

19. Penetration levels vary widely, even in pressure-treated material. In most species, heartwood is more difficult to penetrate than sapwood. In addition, species differ greatly in the degree to which their heartwood may be penetrated. Incising tends to improve penetration of preservative in many refractory species, but those highly resistant to \_\_\_\_\_ will not have deep or uniform penetration even when incised.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Penetration
- F. None of the Above

20. \_\_\_\_\_ are typically expressed on the basis of the mass of preservative per unit volume of wood within a prescribed assay zone. The retention calculation is not based on the volume of the entire pole or piece of lumber.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

## Wood Destroyers Assignment #5 For Return Students

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. Once you have paid the course fee, you will be provided complete course support from Student Services (928) 468-0665.

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

1. We will require all students to fax or e-mail a copy of their driver's license with the registration form.
2. You will need to pick one of the following three assignments to complete. This selection process is based upon your last name. If your last name begins with an A to E, you will pick assignment number 1, if your last name begins with the letter F to L, you are to complete assignment number 2 and if your last name begins with the letter M-Q, you will pick assignment number 3 and if your last name begins with the letter R-Z, you will pick assignment number 4.

Multiple Choice, Please select one answer and mark it on the answer key. The answer must come from the course text. (s) Means answer can be plural or singular.

### Topic 1 Introduction to Wood 10 Questions

(s) means the answer may be either plural or singular in nature.

1. The retention of moisture is not the \_\_\_\_\_ in the life of the termite.  
A. Moisture content                      D. Termite fecal material  
B. Temperature shifts                      E. Bringing moisture  
C. Moisture and fungus                      F. None of the Above
2. The warm, moist conditions that prevail within the closed system of the nest provide an ideal site for the growth of \_\_\_\_\_, particularly fungi, which provide a source of protein and vitamins essential to the termite.  
A. Termite colony                      D. Moisture and fungus  
B. Soil                                      E. Particularly fungi  
C. Microorganisms                      F. None of the Above
3. The accumulation of termite fecal material in the nest, in turn, helps to promote the \_\_\_\_\_.  
A. Moisture content                      D. Growth of the fungi  
B. Temperature shifts                      E. Bringing moisture  
C. Moisture and fungus                      F. None of the Above
4. Certain rot-producing fungi impart to \_\_\_\_\_ which thus become symptomatic of weakness; however an attractive effect known as spalting produced by this process is often considered a desirable characteristic.  
A. Protoplasmic contents                      D. Ultimate crushing strength  
B. The water content                      E. Wood characteristic colors  
C. Spalting produced                      F. None of the Above
5. Ordinary sap-staining is due to fungous growth, but does not necessarily produce a \_\_\_\_\_.  
A. Sap-staining                      D. Strength of wood  
B. Earlywood                      E. Oven-dried wood  
C. Weakening effect                      F. None of the Above

6. There are \_\_\_\_\_, behavior, and nutrition among these groups, and these differences have led to the separation of the families.
- A. Few changes      D. No changes  
 B. Beetles that show      E. Certain differences in structure  
 C. Good indications      F. None of the Above
7. The \_\_\_\_\_ of some species take more than one year to complete their development, so they may still be feeding in the wood after it becomes part of a structure.
- A. Queen      D. Larvae  
 B. Pupae      E. Reproductives  
 C. Swarms      F. None of the Above
8. The \_\_\_\_\_ is about 3/4 inch long and grayish brown to black with two white patches on its wing covers.
- A. Black carpenter ant      D. Conspicuous beetles  
 B. Roundheaded borers      E. Adult  
 C. Old house borer      F. None of the Above
9. \_\_\_\_\_ may construct their nests in hollow trees, logs, posts, porch pillars, hollow doors, and other timbers used in homes.
- A. Carpenter ants      D. Adult beetle  
 B. Old house borers      E. Larvae of some species  
 C. Lay their eggs      F. None of the Above
10. The \_\_\_\_\_, the species that most commonly nests in homes, is primarily black in color. Other carpenter ant species may be more reddish-brown to yellow in color.
- A. Black carpenter ant      D. Castes  
 B. Roundheaded borers      E. Queen(s)  
 C. Old house borer      F. None of the Above

## Topic 2 Termite Introduction 20 Questions

(s) means the answer may be either plural or singular in nature.

1. When swarming occurs in a relatively new structure, it is because it was built over or near a strong colony that was not \_\_\_\_\_.  
A. Considered safe      D. Relatively a new structure  
B. Near ants              E. Maximum egg production  
C. For rent                F. None of the Above
2. Applications are made to inaccessible areas by drilling and then injecting the \_\_\_\_\_.  
A. Insecticide solution      D. Cover the treated soil  
B. Treat                      E. Broadcast spray  
C. Insecticide spray        F. None of the Above
3. He follows close behind and they search for a suitable site for the establishment of a nest. As soon as the pair has located a suitable site, they excavate (with their jaws) a small chamber large enough for the two of them and then \_\_\_\_\_.  
A. Young queen matures      D. Find a suitable site  
B. Start a new colony        E. Start dispersal flights  
C. Seal the entrance        F. None of the Above
4. The pair continues to \_\_\_\_\_, and they usually mate periodically. The first eggs are laid within one to several weeks after mating, depending on the nutrition available to the female. When the first eggs hatch, the new nymphs are cared for by the young pair.  
A. Live together for life      D. Relatively new structure  
B. Mate                        E. Maximum egg production  
C. Fight                        F. None of the Above
5. Development of the colony is very slow for several years. Eggs are \_\_\_\_\_. After the first group of eggs has been laid, there is a period of several months before another group is laid. This process continues for several years.  
A. White                      D. Placed in a new structure  
B. Cared for                  E. Hatched  
C. Not laid                  F. None of the Above
6. As the colony becomes even older a greater number of swarmers are produced each year. It requires a minimum of 3 to 4 years--and as much as 8 to 10 years--for a colony of our native subterranean termites to become large enough and strong enough to \_\_\_\_\_.  
A. Mate                        D. Look for a suitable site  
B. Start a new colony        E. Start dispersal flights  
C. Molt                        F. None of the Above
7. The judgment and experience of the termite specialist is important when selecting the \_\_\_\_\_ that best suits the particular type of construction and the soil conditions.  
A. Permethrin                D. Pyrethroids  
B. Bifenthrin                E. Cyfluthrin  
C. Cypermethrin              F. None of the Above
8. The pyrethroids are a large family of modern synthetic insecticides similar to the naturally derived \_\_\_\_\_.  
A. Permethrin                D. Botanical pyrethrins  
B. Bifenthrin                E. Cyfluthrin  
C. Cypermethrin              F. None of the Above

9. Because \_\_\_\_\_ have a constant demand for water, one should closely examine areas near moist soil, such as below dripping outside faucets, leaking underground sprinkler pipes and nozzles, and below downspouts.
- A. Termite swarmers                      D. Alate emergence  
 B. Alates                                      E. Winged termites  
 C. Subterranean termites              F. None of the Above
10. Horizontal Barriers: In general, treat the footing trench with insecticide before pouring cement footings. After grading is completed, \_\_\_\_\_ to areas before pouring slab floors, slab-supported porches, patios, carports, and entrance platforms at the rate of 1 gallon per 10 square feet.
- A. Requires additional treatment      D. Even distribution of insecticide  
 B. Termite control                          E. Apply diluted insecticide  
 C. Several insecticides                    F. None of the Above
11. Apply the diluted insecticide to the \_\_\_\_\_ at the rate of 4 gallons per 10 linear feet. Cover treated soil in the trench with a thin layer of untreated soil. For an inside barrier, drill slab and space holes about 1 foot apart and 6 inches from the wall.
- A. All holes                                  D. Continuous chemical barrier  
 B. Masonry voids                          E. Load-bearing wall  
 C. Trench and soil                         F. None of the Above
12. The detection of \_\_\_\_\_ is best left to professionals who have the experience to do it thoroughly and accurately. Professionals like you.
- A. Swarmer(s)                                D. Termite infestations  
 B. Alates                                        E. Termite(s)  
 C. Subterranean termites                F. None of the Above
13. Wood damaged by \_\_\_\_\_ can be readily penetrated with a screwdriver, ice pick, or knife. The wood easily breaks apart, revealing mud tubes attached to wood galleries or tunnels in an irregular pattern. The tunnels may contain broken mud particles with fecal materials. In the case of an active colony, white termites may be found in infested wood.
- A. Swarmer(s)                                D. Females  
 B. Alates                                        E. Termite(s)  
 C. Subterranean termites                F. None of the Above
14. Another indication is the presence of mud or shelter tubes extending from the ground to woodwork or on foundation walls. \_\_\_\_\_ travel periodically via shelter tubes to their colony to obtain moisture and perform feeding duties.
- A. Swarmer(s)                                D. Females  
 B. Workers                                     E. Termite(s)  
 C. Subterranean termites                F. None of the Above
15. In most cases, an untrained homeowner or building manager should not attempt a \_\_\_\_\_. (But homeowners still try and some do a good job.)
- A. Termite treatment                      D. Vertical Barriers  
 B. Contact treated surfaces                E. Continuous insecticide barrier  
 C. Keep all pesticides                      F. None of the Above
16. Do not \_\_\_\_\_ in treated soil.
- A. Termite treatment                      D. Vertical Barriers  
 B. Contact treated surfaces                E. Continuous insecticide barrier  
 C. Keep all pesticides                      F. None of the Above

17. Establish \_\_\_\_\_ by rodding and/or trenching procedures. A shallow trench should not be wider than 6 inches.

- A. All holes
- B. Masonry voids
- C. Vertical barriers
- D. Continuous chemical barrier
- E. Load-bearing wall
- F. None of the Above

18. Space rod holes about 1 to 1 1/2 feet apart. Apply insecticide at the rate of 4 gallons per 10 linear feet per foot of depth. Do not treat soil in \_\_\_\_\_ with a broadcast insecticide spray.

- A. Foundation
- B. Basement
- C. Crawl space area
- D. Exterior of foundation walls
- E. Untreated soil
- F. None of the Above

19. They are highly repellent to termites, which may contribute to the effectiveness of the \_\_\_\_\_. They have been modified to increase their stability in the natural environment. They are widely used in agriculture, homes, and gardens.

- A. Rodding
- B. Termiticide barrier
- C. Insecticide spray
- D. Cover the treated soil
- E. Broadcast spray
- F. None of the Above

20. \_\_\_\_\_ have been synthesized to be similar to pyrethrins yet more stable in the environment. Evidence suggests that they have a very large margin of safety when used as directed by the label.

- A. Permethrin
- B. Bifenthrin
- C. Cypermethrin
- D. Pyrethroids
- E. Pyrethrins
- F. None of the Above

### Topic 3 Termite and Ant Identification Section 10 Questions

1. Chitin synthesis inhibitors work by preventing the formation of chitin, a \_\_\_\_\_ needed to form the insect's exoskeleton. With these inhibitors, an insect grows normally until it molts. The inhibitors prevent the new exoskeleton from forming properly, causing the insect to die. Death may be quick, or take up to several days depending on the insect.

- A. IGRs
- B. Carbohydrate
- C. Chemical odor
- D. Insects' chitin synthesis
- E. Movement of the termiticide
- F. None of the Above

2. Ant baits, described above, can again be a useful tool in eradicating inside-the-home ant nests, although \_\_\_\_\_ may not work as well with carpenter ants as the other species mentioned. Again, workers must eat the bait, take it back to the nest, and feed it to the queen and larval ants. This type of control is incompatible with treatments that prevent workers from returning to the nest with the bait.

- A. Insecticide
- B. Baits
- C. Professional pest control company
- D. Spraying a residual insecticide
- E. Bait treatments and insecticides
- F. None of the Above

3. It is registered for use on termites, and is the active ingredient in the Sentricon™ bait system. It functions by inhibiting the synthesis of \_\_\_\_\_, the material that makes up the exoskeleton of insects (Cox, 1997).

- A. IGRs
- B. Chitin
- C. Chemical odor
- D. Carbohydrates
- E. Movement of the termiticide
- F. None of the Above

4. All ants live in colonies, consisting of an egg-laying female (queen), \_\_\_\_\_, and workers (sterile females). The ants you see foraging in your garden or kitchen are workers.
- A. Workers                      D. Carpenter ants  
 B. Short-lived males        E. Ant species  
 C. Sterile females            F. None of the Above
5. Ants are thin-waisted and have elbowed antennae. \_\_\_\_\_ have thicker waists and have antennae that resemble strings of tiny beads. You may need a magnifying glass to examine antennal features.
- A. Workers                      D. Termites  
 B. Ants                            E. Ant species  
 C. Sterile females            F. None of the Above
6. Workers construct the distinctive shelter tubes and collect food to feed the young and other members of the colony. \_\_\_\_\_ are responsible for guarding the colony and its occupants.
- A. Subterranean termite(s)    D. Worker(s)  
 B. Soldier termite(s)            E. Termite(s)  
 C. Formosan termite(s)         F. None of the Above
7. An alternative method requires removing the soil from the trench and placing it on a waterproof tarp. Apply the termiticide to the soil on the tarp and mix. The treated backfill is then placed back into the trench. You could also line the trench with polyethylene prior to replacing the treated backfill. The polyethylene lining is another method of preventing movement of the \_\_\_\_\_ during an application.  
 Cover all treated soil according to label directions.
- A. IGRs                            D. Insects' chitin synthesis  
 B. Insecticide                    E. Movement of the termiticide  
 C. Termiticide                    F. None of the Above
8. \_\_\_\_\_ that live outside will travel inside the home to search for food. Some species may ultimately reside in houses, discussed later in this section. To prevent both of these scenarios, follow these procedures: First, cracks and crevices should be sealed to eliminate passages into the home. If you do not seal entry points, ants will probably find their way into your house at some later time.
- A. Workers                      D. Termites  
 B. Ants                            E. Ant species  
 C. Sterile females            F. None of the Above
9. \_\_\_\_\_ most commonly live in the soil where they can avoid temperature extremes and obtain the moisture essential to their existence.
- A. Worker(s)                      D. Subterranean termite(s)  
 B. Soldier termite(s)            E. Termite(s)  
 C. Formosan termite(s)         F. None of the Above
10. Control of subterranean termites in buildings can be difficult and expensive. \_\_\_\_\_ is a proven means of protecting buildings from further damage by subterranean termites.
- A. Insecticide                      D. Spraying a residual insecticide  
 B. Ant baits                        E. Bait treatments and insecticides  
 C. Chemical (termiticide) treatment    F. None of the Above



## Topic 4 The Wood Borers 10 Questions

1. 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 bee
- D. Shot-hole borer
- E. Ips Beetle larva
- F. None of the Above

2. 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 bee
- D. Shot-hole borer
- E. Termite
- F. None of the Above

3. This insect is a large caterpillar that grows 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
- B. Termite
- C. Carpenter worm
- D. Shot-hole borer
- E. Clear-winged moth larva
- F. None of the Above

4. The adult insect becomes a large grey moth.

- A. Carpenter worm adult
- B. Clear-winged moth
- C. Pine sawyer moth
- D. Poplar moth larva
- E. Locust moth
- F. None of the Above

5. This insect attacks black locust trees. The strikingly colored adults emerge in the fall and can be seen feeding on goldenrod.

- A. Carpenter bees
- B. Black termites
- C. Pine sawyer larva
- D. Poplar borer larva
- E. Locust borer adult
- F. None of the Above

6. 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
- B. Bronze birch borer larva
- C. Red headed ash borer adult
- D. Pine sawyer larva
- E. Poplar and willow borer larva
- F. None of the Above

7. 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. Ants
- D. Termites
- E. Clear-winged moth larva
- F. None of the Above

8. 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

9. This insect bores in trees as larvae. The adults resemble wasps in many cases.

- A. Wasp worm adult
- B. Clear-winged moth
- C. Pine sawyer adult
- D. Wasp larva
- E. Locust borer adult
- F. None of the Above

10. 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
- B. Clear-winged larva
- C. Pine sawyer larva
- D. Poplar borer larva
- E. Locust borer larva
- F. None of the Above

## Topic 5 Wood Preservatives and Insecticides 20 Questions

1. Chromated copper arsenate (CCA) is a chemical wood preservative containing chromium, copper and arsenic. CCA is used in pressure treated wood to protect wood from rotting due to insects and microbial agents. EPA has classified CCA as a \_\_\_\_\_, for use only by certified pesticide applicators.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

2. Heat treatment can also improve the properties of the wood with respect to water: lower equilibrium moisture, \_\_\_\_\_, and weather resistance. It is weather-resistant enough to be used, unprotected, in facades or in kitchen tables, where wetting is expected.

- A. Less moisture deformation
- B. Permethrin
- C. Water
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

3. Non-pressure methods, in general, consist of (a) surface application of preservatives by brief dipping, (b) soaking in preservative oils or steeping in solutions of waterborne preservatives, (c) diffusion processes with waterborne preservatives, (d) \_\_\_\_\_, and (e) a variety of miscellaneous processes.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Vacuum treatment
- F. None of the Above

4. Water is the most common solvent carrier in \_\_\_\_\_ due to its availability and low cost. Water-borne systems do however have the drawback that they swell timber, leading to increased twisting, splitting and checking than alternatives.

- A. Heat treatment
- B. Permethrin
- C. Preservative formulations
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

5. Chromated copper arsenate or CCA, is a chemical preservative that protects wood from rotting due to insects and microbial agents. CCA contains \_\_\_\_\_. CCA has been used to pressure treat lumber used for decks, playgrounds (playsets) and other outdoor uses since the 1930's. Since the 1970's, the majority of the wood used in residential settings was CCA-treated wood.

- A. Arsenic, chromium and copper
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

6. In the pressure treatment process, an aqueous solution of CCA is applied using a vacuum and pressure cycle, and the treated wood is then stacked to dry. During the process, the mixture of oxides reacts to form insoluble compounds, helping with \_\_\_\_\_ problems.

- A. Heat treatment
- B. Permethrin
- C. Leaching
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

7. The methods of cold soaking well-seasoned wood for several hours or days in low-viscosity preservative oils or steeping green or seasoned wood for several days in \_\_\_\_\_ have provided a range of success on fence posts, lumber, and timbers.

- A. Preservatives
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservatives
- E. Transverse penetration of the preservatives
- F. None of the Above

8. Preservative penetration and retention levels obtained by cold soaking lumber for several hours are considerably better than those obtained by brief dipping of similar species. However, preservative retention levels seldom equal those obtained in pressure treatment except in cases such as sapwood of pines that has become highly absorptive through \_\_\_\_\_.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Mold and stain infection
- F. None of the Above

9. It is a common practice to treat window sash, frames, and other millwork, either before or after assembly, by dipping the item in a \_\_\_\_\_.

- A. Diffusion process
- B. Dip application
- C. Water-repellent preservative
- D. Preservative penetration
- E. Vacuum treatment
- F. None of the Above

10. Before a wood preservative can be approved for pressure treatment of structural members, it must be evaluated to ensure that it provides the necessary durability and that it does not greatly reduce the strength properties of the wood. The EPA typically does not evaluate how well a \_\_\_\_\_ protects the wood.

- A. Heat treatment
- B. Permethrin
- C. Wood preservative
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

11. Copper is the \_\_\_\_\_ in many wood preservative formulations used in ground contact because of its excellent fungicidal properties and low mammalian toxicity. Because some types of fungi are copper tolerant, preservative formulations often include a co-biocide to provide further protection.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Primary biocide
- F. None of the Above

12. Steeping with waterborne preservatives has very limited use in the United States but it has been used for many years in Europe. In treating seasoned wood, both the water and the preservative salt in the solution soak into the wood. With green wood, the preservative enters the water-saturated wood by diffusion. \_\_\_\_\_ and penetration levels vary over a wide range, and the process is not generally recommended when more reliable treatments are practical.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration of the preservative
- F. None of the Above

13. In addition to the steeping process, \_\_\_\_\_ are used with green or wet wood. These processes employ waterborne preservatives that will diffuse out of the water of the treating solution or paste into the water of the wood.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

14. Naphthenates are the salts of naphthenic acids. These \_\_\_\_\_ have industrial applications including synthetic detergents, lubricants, corrosion inhibitors, fuel and lubricating oil additives, wood preservations, insecticides, fungicides, acaricides, wetting agents, and oil drying agents used in painting and wood surface treatment.

- A. Salts
- B. Chemical preservative
- C. Restricted use product
- D. Wood preservations, insecticides, fungicides
- E. Extractive(s)
- F. None of the Above

15. \_\_\_\_\_ of the preservative applied by brief dipping is very shallow, usually less than a millimeter (a few hundredths of an inch). The exposed end surfaces at joints are the most vulnerable to decay in millwork products; therefore, good end penetration is especially advantageous.

- A. Preservative retention
- B. Waterborne preservatives
- C. Non-pressure methods
- D. Low-viscosity preservative
- E. Transverse penetration
- F. None of the Above

16. \_\_\_\_\_ provide very limited protection to wood used in contact with the ground or under very moist conditions, and they provide very limited protection against attack by termites. However, they do have value for exterior woodwork and millwork that is painted, not in contact with the ground, and exposed to moisture only for brief periods.

- A. Diffusion processes
- B. Dip applications
- C. Water-repellent preservative
- D. Preservative penetration and retention levels
- E. Vacuum treatment
- F. None of the Above

17. This class of timber treatments use white spirit, or light oils such as kerosene, as the solvent carrier to deliver preservative compounds into timber. \_\_\_\_\_ are typically used as an insecticide, such as permethrin, bifenthrin or deltamethrin. The most common formulations use Permethrin as an insecticide, and Propaconazole and Tebuconazole as fungicides. While still using a chemical preservative, this formulation contains no heavy-metal compounds.

- A. Heat treatment
- B. Permethrin
- C. Synthetic pyrethroids
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

18. Glass Fortified Wood (glass wood) is lumber that has gone through a process that intermixes a non-\_\_\_\_\_ based formula throughout the wood fibers protecting the wood from fire, rot and insect damage. With glass encapsulating the wood fibers, the lumber becomes harder and the strength is increased. Glass wood can be used for in ground contact applications; in water applications and it is Class-A fire retardant.

- A. Co-biocide
- B. Chemical preservative
- C. Restricted use product
- D. Toxic sodium silicate (water glass)
- E. Extractive(s)
- F. None of the Above

19. These species are resistant to decay in their natural state, due to high levels of organic chemicals called extractives, mainly \_\_\_\_\_.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Necessary durability
- E. Solutions of waterborne preservatives
- F. None of the Above

20. \_\_\_\_\_ are chemicals that are deposited in the heartwood of certain tree species as they convert sapwood to heartwood.

- A. Heat treatment
- B. Permethrin
- C. Polyphenols
- D. Extractives
- E. Solutions of waterborne preservatives
- F. None of the Above

## Topic 6 Fungus and Wood Fungi Section 20 Questions

1. A fungus or fungi is a member of a large group of \_\_\_\_\_ that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms. These organisms are classified as a kingdom, Fungi, which is separate from plants, animals, and bacteria.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Eukaryotic organisms
- E. Molds and stain fungi
- F. None of the Above

2. Many people confuse the presence of \_\_\_\_\_ with decay fungi. Although molds are a form of fungi, they typically grow on the surface of wood and generally do not weaken the wood's strength. However, the presence of mold is a good indication that the moisture level in the wood is high enough to also support the growth of decay fungi. Moisture control methods used to prevent decay fungi will also remove conditions favorable for mold growth.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Molds
- F. None of the Above

3. Molds are part of the fungi kingdom. Fungi are a diverse group of organisms within a wide range of species that include mushrooms, bracket fungi, molds and mildew. Distinguishing features of \_\_\_\_\_ are the need to extract their food from the organic materials they grow on and the ability to reproduce by way of minute spores. Fungi are a part of nature's recycling system and play an important role in breaking down materials such as plants, leaves, wood and other natural matter.

- A. Mildew(s)
- B. Fungi
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

4. Fungal reproduction is complex, reflecting the differences in lifestyles and genetic makeup within this kingdom of organisms. It is estimated that a third of \_\_\_\_\_ reproduce by different modes of propagation; for example, reproduction may occur in two well-differentiated stages within the life cycle of a species, the teleomorph and the anamorph.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. All fungi
- E. Molds and stain fungi
- F. None of the Above

5. Penetration levels vary widely, even in pressure-treated material. In most species, heartwood is more difficult to penetrate than sapwood. In addition, species differ greatly in the degree to which their heartwood may be penetrated. Incising tends to improve penetration of preservative in many refractory species, but those highly resistant to \_\_\_\_\_ will not have deep or uniform penetration even when incised.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Penetration
- F. None of the Above

6. In one type of rot, the decayed area has a brown discoloration and a crumbly appearance. It usually breaks up into variously-sized cubes, giving rise to the name "\_\_\_\_\_." Another type of rot results in a white or yellow discoloration, with the decayed wood being "stringy" or "spongy."

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

7. The key to preventing rot is to control the wood's exposure to moisture and to employ an effective prevention and treatment program. Most wood decay fungi grow only on wood with a high moisture content, usually 20 percent or above. Green (unseasoned) lumber is a prime target for \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

8. Penetration and retention requirements are equally important in determining the quality of \_\_\_\_\_.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Preservative treatment
- E. Higher preservative retention levels
- F. None of the Above

9. Since wood can contain active beetle larvae or \_\_\_\_\_ with no surface evidence of infestation, the best method of control is to treat the entire area where an infestation has been found. This would include all of the wood in a crawl space, wall or attic showing any signs of damage.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

10. \_\_\_\_\_ is the common name for many types of micro fungi. In order to grow, molds require food, suitable temperature (ideally between 70 and 85 degrees Fahrenheit), oxygen and moisture (Zabel, 1992). When these conditions are met, mold will grow and reproduce by creating spores that are released into the air.

- A. Mold
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

11. Molds are very adaptable and can grow even on \_\_\_\_\_, metal, concrete or painted surfaces if a microscopic layer of organic nutrients is available. Such nutrients can be found on household dust and soil particles.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Moisture in the wood
- E. Fungal spore(s)
- F. None of the Above

12. Although many \_\_\_\_\_ may grow for long periods without producing any external evidence of their presence, others produce "fruiting bodies" on the surface of decaying wood. Fruiting bodies are usually "crusts" or shelf-like "brackets" which are a few inches or so in diameter. The fruiting body of *Serpula lacrimans*, e.g., is a rust-brown, crust-like structure on the wood surface.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Fruiting bodies
- F. None of the Above

13. Also, surface molds, "\_\_\_\_\_", and stain fungi are often found growing on the surface of damp wood and can be confused with decay fungi. Although these organisms may discolor the wood, they do not break down wood fibers and thus do not weaken its structure. However, these organisms indicate that moisture is present and that decay will likely proceed if a wood-rotting fungus becomes established in the wood.

- A. Mildew(s)
- B. Brown cubical rot
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

14. Decay fungi are living organisms which send minute threads called "hyphae" through damp wood, taking their food from the wood as they grow. Gradually, the wood is decomposed and its strength is lost. Such damage is often inconspicuous until its final stages, and in a few instances homeowners have suddenly found floors breaking through or doors falling from their hinges due to wood rot. When previously dry wood is placed in contact with moist soil, or in a location where it is subject to condensation (such as unventilated crawl space), it is likely that \_\_\_\_\_ problems will occur.

- A. Micro fungi
- B. Decay fungi
- C. Wood rot
- D. Moisture in the wood
- E. Wood decay
- F. None of the Above

15. \_\_\_\_\_ are typically expressed on the basis of the mass of preservative per unit volume of wood within a prescribed assay zone. The retention calculation is not based on the volume of the entire pole or piece of lumber.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

16. Decay fungi can cause severe structural damage to any wood member, even wood species such as redwood and cedar. All that is needed is a source of water in contact with the wood. Decay will occur in untreated wood in direct contact with ground, cement or concrete, or exposed to a source of moisture such as rain seepage, plumbing leaks or condensation. \_\_\_\_\_ kept dry will never decay!

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

17. Molds and stain fungi are sometimes mistaken for decay, and while they may discolor wood, they cause no structural wood damage. The presence of molds and stains, however, is a sign that conditions are favorable for decay fungi and a preventative treatment may be necessary. In addition, molds can increase the capacity of wood to absorb moisture, opening the door to attack by \_\_\_\_\_.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above

18. Refer to the life cycle of a polypore, as it is closely related to the disease cycle. Two points need to be added. First, decay occurs for many years, between the stages of plasmogamy and fruiting, and \_\_\_\_\_ may continue for many years.

- A. Mildew(s)
- B. Fruiting
- C. Decay
- D. Mold(s)
- E. Fungal spore(s)
- F. None of the Above

19. In the past, pentachlorophenol (Penta®) and copper naphthenate was used as a stop gap measure. (These chemicals had offensive smells and were not environmentally safe.) Now with a growing environmental concern, \_\_\_\_\_ do not pose a serious threat.

- A. Penetration level(s)
- B. Complete penetration
- C. Preservative retention(s)
- D. Penetration and retention requirement(s)
- E. Higher preservative retention levels
- F. None of the Above

20. The " \_\_\_\_\_ " (fungi lacking the perfect or sexual stage) or Deuteromycota comprise all the species which lack an observable sexual cycle.

- A. Fungi
- B. Fungi imperfecti
- C. Decay fungi
- D. Rot
- E. Molds and stain fungi
- F. None of the Above