FOREST PEST CONTROL
Practice Study Questions

INSTRUCTIONS: Have a highlighter and a colored pen handy. As you study through the text, look for the answers to the following questions and mark them in the book or on the sheet provided. Also, as you study through the text, ask yourself, “If I know this information will I be a better applicator?” If you answer “YES” that information would also be a good question for the test. Make a note of it! In order to allow for quick grading, most questions on the test are in the form of Multiple Choice or True and False; but this is not necessarily so. Take the time to answer the study questions at the end of each Chapter. These questions have not been repeated here but would be good practice. See the separate CALIBRATION and LABEL worksheets that have been prepared. Remember that when answering TRUE/FALSE questions, it must ALL be true if TRUE. If any small part of the statement is FALSE, the answer is FALSE.

INSECTS (pages 1 - 22)
1. List SIX ways that forest insects cause losses. (pg. 1)

2. Name the primary cause of tree mortality. (pg. 2)

3. Compare the mortality from insects to diseases, fire, and weather. (pg. 2)

4. Compare the impact on tree growth (growth loss) by insects, diseases, fire, and weather. (pg. 2)

5. Name the most important initial step in the process of controlling a forest pest. (pg. 2)

6. When considering the economic aspect of any insect outbreak, including whether control strategy will pay for itself, is a control method always required? (pg. 3)

7. List the two basic types of forest pest control. (pg. 3)

8. Define natural control. (pg. 3)

9. Define applied control. (pg. 3)

10. Define direct control. (pg. 3)

11. Define indirect control. (pg. 3)

12. Define legislative control. (pg. 3)
13. Define physical or mechanical control. (pg. 4)

14. Define biological control. (pg. 4)

15. Define silvicultural control. (pg. 4)

16. Define chemical control. (pg. 4)

17. Define integrated control. (pg. 4)

18. List the various silvicultural practices that may produce conditions that will discourage insect outbreaks. (pg. 4)

19. Name the type of insects that may occur on any portion of the tree and all feed on plant juices. (pg. 5)

20. When do Texas leaf-cutting ants forage mostly during the **day** and when does foraging take place at **night**? (pg. 8)

21. Name the environmental condition that influences ant activity. (pg. 8)

22. Name the sawfly species commonly found in Texas. (pg. 8)

23. Name the part of the sawfly life cycle where the sawfly is a small, harmless, bee-like insect that cuts slits in pine needles and inserts eggs. (pg. 8)

24. Name the stage of the life cycle when sawflies, leaf miners and some butterflies and moths defoliate trees. (pg. 9-10)

25. Is the fall webworm considered an important forest pest? (pg. 9)

26. Oakworms are voracious feeders on oak tree foliage tell where they can be found. (pg. 10)

27. Do oakworms produce webs? Name an insect that does produce a web.

28. Name the most destructive forest insect pest group. (pg. 11)
29. Compare the importance of the following types of insect pests defoliators, sucking insects, bark and wood-boring insects, cone and seed infesting insects. (pg. 11 and more)

30. Name the type of insect pest that accounts for more timber losses annually than all other forest insects combined. (pg. 11)

31. Name the beetles that kill trees by constructing tunnels beneath the bark. (pg. 11)

32. Name the beetles that transport the bluestain fungus. (pg. 11)

33. Name the beetle that often introduces the blue stain fungus into pine trees. (pg. 11)

34. Name the adult beetle that seeks out host trees usually in spring and early summer. (pg. 12)

35. When do adult bark beetles seek out host trees? (pg. 12)

36. Describe the first evidence of bark beetle activity typically seen in pines. (pg. 12)

37. Name the problem pest that causes fading foliage or "red-top" in pines. (pg. 12)

38. Compare the shape of the gallery beneath the bark caused by southern pine beetles and Ips engraver beetles. (pg. 12)

39. Name the preferred method for direct suppression of the southern pine beetle. (pg. 13)

40. Describe the process of salvage and utilization. (pg. 13)

41. How long is a single generation of the long-horned beetle. (pg. 13)

42. Compare the life cycles of aphids, southern pine beetle, and Nantucket pine tip moth.

43. Name most common borer pest in the South. (pg. 14)
44. Compare the following types of borers - oak, long-horn, cottonwood, and ambrosia. (pg. 14-16)

45. Name the adult stages of round-headed wood borers and flat-headed wood borers. (pg. 15)

46. Name the larval stage of the long-horned beetles. (pg. 15)

47. Name the beetle that constructs pin-holes in the sapwood and causes stains in the wood surrounding the tunnels both cause degradation of lumber products made from infested trees. (pg. 16)

48. Name the type of insects that feed on plant juices causing foliage injury, such as bleaching or yellowing, or deformations, such as curling leaves, shoots and gall formations. (pg. 16)

49. Comparing hardwoods and conifers in forest conditions, name the one that is usually more susceptible to injury by sucking insects. (pg. 16)

50. Name the type of insects that excrete large quantities of a sweet liquid known as honeydew. (pg. 16)

51. Aphid feeding slows tree growth. Do they ever cause death of the tree? (pg. 16)

52. Name the type of insect that settles on leaves, branches or stems where they insert their stylets and then form a waxy shell under which they complete their development. (pg. 16-17)

53. Compare the ease of controlling aphids and scale insects. (pg. 17)

54. Since scale insects are difficult to control, name the growth stage that must coincide with the application timing. (pg. 17)

55. Sucking insects rarely cause sufficient injury to forest trees to warrant applied control measures except possibly in which two situations. (pg. 17)

56. Name the types of insects that decrease terminal growth and/or cause deformities that affect the value of trees and timber. (pg. 17)

57. Bud, twig, and seedling insects seldom kill trees, but describe the type of injury they do cause.

58. Nantucket pine tip moth causes less damage in what type of stand? (pg. 18)
59. Since application timing is so important in obtaining effective control, name the best growth stage for control of the Nantucket pine tip moth. (pg. 19)

60. Name two injurious debarking insect found in the Piney Woods of Texas. Which of the two is overwhelmingly predominately? (pg. 19)

61. Explain how the pales weevil and the pitch-eating weevil are similar. (pg. 19)

62. Name the pine seedling insect pest that causes damage by eating and stripping bark from the stem and roots. (pg. 19)

63. What effect will delaying tree planting until weevils attracted to the cut area have completed their life cycle and dispersed have on planted seedlings? (pg. 19)

64. Name the larval stage of the May or June beetles. (pg. 20)

65. Name the most destructive pest of pine cones. (pg. 21)

66. Compare the major cone and seed-destroying insect such as coneworms, cone midges, seedworms, shieldback seedbugs, and nut weevils.

67. Name the insect that has white to orange larvae that feed between the cone scales in pine cones and cause resinosis and withering of cone scales. (pg. 21)

DISEASE (pages 22-23)

68. Is Annosus root rot caused by an insect or a fungus? (pg. 22)

69. Name the fungus described. The fruiting body of this fungus develops at the base of infected trees. These bodies commonly called conks, are honey colored on the upper surface, white on the lower surface, and usually hidden from view by accumulations of pine straw or other debris. (pg. 22)

70. Give the scientific name of the Southern fusiform rust fungus and describe its fruiting body. (pg. 22)

71. Using sodium borate or urea as directed can controlled which root rot fungus? (pg. 22)
72. Name the disease that requires oak tree hosts as well as pine to complete its life cycle. (pg. 22)

73. Can Southern fusiform rust spores from infected pines directly infect other susceptible pines? (pg. 22)

74. Describe the life cycle and infection of Southern fusiform rust.

75. Name the alternate host of fusiform rust. (pg. 22)

76. Name the fungus that causes disease symptoms that range from spindle-shaped galls on limbs to large stem cankers or swellings. (Pg. 23)

77. Name the most logical place to control fusiform rust. (pg. 23)

78. What size of pine is most threatened by Southern fusiform rust? (pg. 23)

79. Rank the various pine species from most resistant to least resistant to southern fusiform rust? (pg. 23)

80. Describe eastern gall rust symptoms and name the pine that is most susceptible.

WEED & BRUSH CONTROL (pages 26 - 33)

81. Name the first step in improving upland pine sites. (pg. 27)

82. Name the time of year when invading undesirable woody species may be controlled with individual trunk basal or cut surface treatments. (pg. 27)

83. Name two species used for cedar oil production? (pg. 27)

84. Name the type of pest that causes the most forest losses due to reduced productivity of marketable trees. (pg. 27)

85. List the four categories used to classify forest weeds. (pg. 27)
86. List the various methods of chemical control used in the forest. (pg. 28-29)

87. Do trees grow more similar to broadleaf weeds or to grasses? (pg. 28)

88. If the terminal growth points of a tree are damaged by a herbicide, will the tree stop growing in diameter or stop growing in height or both? (pg. 28)

89. It is important to know the kind of trees to be controlled so the correct herbicide and method can be used. List four characteristics used to identify trees. (pg. 28)

90. List three cut surface method of herbicide application. (pg. 29)

91. Compare and contrast each of the following herbicide application methods: trunk injection, girdling, felling, and frilling.

92. Name the most economical method of controlling competing hardwoods, up to four inches in diameter at four and half feet above ground level. (pg. 29)

93. Describe the conditions necessary for prescribed burning to control brush and small trees. (pg. 30)

94. What is needed to build a hot fire or to get sufficient flame height to destroy or seriously damage the tree's cambium layer? (pg. 30)

95. Name the Texas agency that must be contacted along with the local fire department before setting a prescribed fire. (pg. 30)

96. Describe the effect of herbaceous weeds on pine seedlings establishment. (pg. 31)

97. Name a practical way to control weeds in commercial pine seedling nurseries. (pg. 31)

98. When should fumigants be used to control weeds and diseases? Explain why. (pg. 31)

99. Define reforestation. (pg. 31)

100. Define site preparation. (pg. 31)
101. Define plantation weed control. (pg. 31)

102. Define release. (pg. 31)

103. Review the 14 terms listed that may be used on labels of herbicides used in forestry. (pg. 31-32)

104. Explain the requirements for using the fell and burn site preparation practice. (pg. ? fire)

105. Explain the fell and burn system for control of hardwood competition without the use of herbicides. (Weed)

from General Manual B-5060 (You must pass the General Exam prior to taking the Forest Pest Control Exam so this material should still be fresh on your mind.)

106. Define integrated pest management to achieve safe reduction of a pest. (General 4:27-28)

107. Not all brand labels containing the same active ingredient are registered for use on the same crop so it is important to read the label before applying a herbicide. As an applicator, sometimes you must inventory more than one brand label of a herbicide containing the same active ingredient that controls a common pest in a particular crop. (General 8:80, 89 Review information found on the label)

108. Review the definitions of acute and chronic toxicity. (General 9:95)

109. Review the definitions of oral, inhalation, and dermal toxicity. (General 9:95)

110. Explain the meaning of the term LD50 which is the common measure of pesticide toxicity. (General 9:99)

111. Work clothes should be washed every day to keep them free of pesticide contamination. Review the proper method of handling and laundering clothing that has been worn while handling pesticides. (General 11:118-119)

112. Understand the relationship between soil type including the amount of soil organic matter present and the chemical properties of the pesticide on adsorption. (General 14:147-148)

113. Know the difference between adsorption and absorption. (General 14:147-148)
114. It is necessary for the applicator to know the solubility, soil absorption rate, and persistence of any pesticides being used to understand why pesticides vary in their potential for moving into groundwater. Review the discussion on leaching of pesticides to groundwater. (General 14:147, 148, 152)

115. Review the process of leaching. (General 14:148)

116. Explain the meaning of soil permeability. (General 14:148)

117. Is it correct to say that soil texture affects both the movement of water and the movement of dissolved chemicals such as pesticides through soil? (General 14:148)

118. Define the term back-siphoning. (General 15:157)

119. Explain why it is important for application equipment be properly calibrated. (General 18:183-184)

120. Explain how rate is related to the amount of product, active ingredient, or acid equivalent applied per unit area or per treatment unit is related. (General 22:214)

121. Define the term diluent. What is any gas, liquid, or solid material used to reduce the concentration of an active ingredient. (General Glossary: 222)

from Laws & Regs B-5056 (This must also be passed before taking a category exam.)

122. It is important that each applicator have a clear understanding of the Laws & Regs. For example, according to the Texas Pesticide Regulations, the applicator, the owner of the pesticide, and/or the person in control of the mixing site shall be jointly and severally liable for proper storage and disposal of pesticide containers and contents. (Laws & Regs §7.34 (f) - study the manual B-5056 - - - you must be familiar with all of the Laws & Regs that apply to your work.)

123. Be aware that laws on the books in 1990 may have changed by 2001 but similar information may be found on individual labels. For example the wording “when deciding to spray a non-volatile or low volatile herbicide in three mile per hour winds, the Texas Herbicide Regulations state that a susceptible crop should not be within 1 mile downwind or ½ mile up wind ” is no longer found in the regulations. This type of caution may be found on individual labels. (Laws & Regs 1990 §11.6 (5) - NO current reference)
Calibrations for the Forest Pest Control Category Exam ( NOT covered in Manual but necessary )

**PRACTICE PROBLEMS** (similar to exam problems but different)

**Information given that is not needed:**

\[
\text{SPEED (MPH)} = \frac{\text{DISTANCE (FEET)} \times 60}{\text{TIME (SECONDS)} \times 88}
\]

(this is NOT used)

**Information needed that is NOT given:** (learn these conversions and the formula)

1 gallon = 128 ounces  
1 mile = 5280 feet  
1 acre = 43,560 sq.ft.  
Area = Length \times Width  
ai = active ingredient  
% = \frac{\text{part/whole} \times 100}{100}

\[
\text{GPA} = \frac{\text{GPM} \times 495}{\text{MPH} \times \text{Swath}}
\]

Situation #1 - A 460 acre forest site is treated with a 80% wettable powder at 2 pounds of active ingredient per acre.

Situation #2 - A herbicide label recommends an application rate of 12 to 25 gallons per acre. A 20 pound-per-square-inch operating pressure, 5 miles-per-hour ground speed, and a 30 foot nozzle spray width are selected.

124. Using situation #2, if 640 ounces of water were collected from the nozzle in 1 minute, calculate the nozzle flow rate in gallons per minute. (Does not need information from situation #2)

125. Using situation #1, calculate the amount of adjuvant needed if 20 gallons of total spray will be applied per acre and the label calls for a 0.25% concentration.

126. Using situation #2, calculate the application rate in gallons per acre.

127. A forest site is 2.0 miles long and 0.5 mile wide, how many acres will be treated?
128. Using Situation #1, calculate how many 20 pound bags would be needed?

129. What proportion of an acre is actually sprayed if a 4 X 4 foot spot treatment is used assuming 9 X 9 foot tree spacing?

130. A sprayer with a 800 gallon tank will be used to control a specific insect pest. The sprayer is calibrated to apply 50 gallons per acre. How many gallons of insecticide product should be added to the sprayer if the formulation contains 6 pounds/gallon and the recommended rate is 1.5 pound ai per acre? (label question not in calibration part)

Forest Pest Control - Plant Pest Control - Read the Label

Use any label to answer the following questions. Most labels can be found and copied from the Web at <www.greenbook.net> (You may want to take a highlighter to mark different types of information)

Determine the species to be controlled.

Find how many pounds of active material should be used per acre to control that pest.

When treating for a particular pest can applications be repeated, if they can, how many times? (for example: only once per season, every 7 days, every 14 days, or as needed)

What specific instructions or on the label about pesticide container disposal?

Can pesticide containers be rinsed and taken to an approved sanitary landfill or recycling center?
Can pesticide containers be cleaned and then reused for other purposes?
Can pesticide containers be burned?

Given sprayer tank size and spray application in gallons per acre determine how many acres can be treated.

Find pounds active ingredient per gallon on the label, find the recommended rate per acre (pounds per acre) on the label, now determine the volume of formulated product needed per acre.

If you know the number of acres that can be treated with one tank and the amount of product needed per acre, determine the amount of product to be put into the tank.
Forest Pest Control  -  Weed Control  -  Pest Identification
see photograph or text in manual

A. bayberry
B. youpon
C. sassafras
D. sweetgum
E. red oak
F. American beauty

Forest Pest Control  -  Disease Control  -  Pest Identification.
see photograph or text in manual

A. Fomes annosus
B. fusiform Rust Gall
C. pine sawyer beetle
D. southern pine beetle

Forest Pest Control  -  Insect Control  -  Pest Identification.
see photograph or text in manual

Insects
A. tent caterpillar
B. pine sawfly larvae
C. imperial moth caterpillar
D. oakworm

Damage
A. nantucket pine tip moth damage
B. Texas leaf cutting ant damage
C. sawfly larvae damage
D. tent caterpillar damage

Forest Pest Control  -  Disease or Insect Control  -  Pest Identification.
see photograph or text in manual

A. Fomes annosus  -  disease
B. fusiform Rust Gall  -  disease
C. pine sawyer beetle  -  insect
D. southern pine beetle  -  insect

Watch out for “typos” - don’t let an errant letter here and there throw you.
There is nothing in the manual about calibration but there is calibration on the Exam.
Some questions come from the General Manual (B-5060) and the Laws & Regs Manual (B-5056) rather than the Forestry Manual (B-5065).
Calibrations for the Forest Pest Control Category Exam ( NOT covered in Manual but necessary )

PRACTICE PROBLEM SOLUTIONS

Information given that is not needed:

\[
\text{SPEED (MPH)} = \frac{\text{DISTANCE (FEET)} \times 60}{\text{TIME (SECONDS)} \times 88}
\]

(this is NOT used)

Information needed that is NOT given:

- 1 gallon = 128 ounces
- 1 mile = 5280 feet
- 1 acre = 43,560 sq.ft.
- ai = active ingredient
- % = part/whole \( \times 100 \)
- GPA = \( \frac{\text{GPM} \times 495}{\text{MPH} \times \text{Swath}} \)

Situation #1 - A 460 acre forest site is treated with a 80% wettable powder at 2 pounds of active ingredient per acre.

Situation #2 - A herbicide label recommends an application rate of 12 to 25 gallons per acre. A 20 pound-per-square-inch operating pressure, 5 miles-per-hour ground speed, and a 30 foot nozzle spray width are selected.

124. Using situation #2, if 640 ounces of water were collected from the nozzle in 1 minute, calculate the nozzle flow rate in gallons per minute. (Does not need information from situation #2)

\[
\frac{640 \text{ ounces}}{1 \text{ minute}} \times \frac{1 \text{ gallon}}{128 \text{ ounces}} = 5.0 \text{ GPM}
\]

125. Using situation #1, calculate the amount of adjuvant needed if 20 gallons of total spray will be applied per acre and the label calls for a 0.25% concentration.

\[
\frac{20 \text{ gallons}}{\text{acre}} \times \frac{460 \text{ acres}}{\text{Total}} \times 0.0025 = 23 \text{ gallons}
\]

126. Using situation #2, calculate the application rate in gallons per acre.

\[
5 \text{ miles-per-hour} \times 30 \text{ foot nozzle spray width} \times 5.0 \text{ GPM} \times \frac{\text{GPA}}{\text{MPH} \times \text{Swath}} = 16.5 \text{ GPA}
\]

127. A forest site is 2.0 miles long and 0.5 mile wide, how many acres will be treated?

- 1 mile = 5280 feet
- 1 acre = 43,560 sq.ft.
- A = L \times W
- 2.0 miles \times 5280 feet/mile = 10,560 feet
- 0.5 mile \times 5280 feet/mile = 2640 feet
- 10,560 feet \times 2640 feet = 27,878,400 sq. ft.
- 27,878,400 sq. ft / 43560 sq. ft./acre = 640 acres
128. Using Situation #1, calculate how many 20 pound bags would be needed?

- 460 acre
- 2 lb/A(ai)
- 80% WP
- \(2 \text{lb/A} / 0.80 = 2.5 \text{ lb product/acre}\)

\[
460 \text{ acre} \times 2.5 \text{ lb/acre} = 1150 \text{ lb.}
\]

\[
1150 \text{ lb} / 20 \text{ lb/bag} = 57.5 \text{ bags}
\]

129. What proportion of an acre is actually sprayed if a 4 X 4 foot spot treatment is used assuming 9 X 9 foot tree spacing?

- Spot treated: \(4 \times 4 = 16\)
- Tree spacing: \(9 \times 9 = 81\)

\[
\% = \frac{\text{part}}{\text{whole}}\]
\[
\frac{16}{81} = \frac{1}{6} = 19.75 \%
\]

130. A sprayer with a 800 gallon tank will be used to control a specific insect pest. The sprayer is calibrated to apply 50 gallons per acre. How many gallons of insecticide product should be added to the sprayer if the formulation contains 6 pounds/gallon and the recommended rate is 1.5 pound ai per acre?

(label question not in calibration part)

- \(800 \text{ gallon tank} = 16 \text{ acres/tank} \times 1.5 \text{ lb/A} = 24 \text{ lb/tank}\)
- \(50 \text{ gallons/acre}\)

\[
24 \text{ lb/tank} / 6 \text{ lb/gallon formulation} = 4 \text{ gallons formulation/tank}
\]