

2008 Wisconsin Envirothon **KEY** Forestry Exam

Answers that are correct but differ strongly from answer key must be initialized by Station Captain as an approved answer prior to delivery to score stewards.

Answer the following questions using the Tree Identification Key and the species description.

1. This tree has an opposite branching pattern and compound leaves. Each leaf has 5 to 9 leaflets and each leaflet has a petiole and a smile-shaped leaf scar extending up sides of new bud. (2pts)

What tree is this: White Ash _____ ?

2. This tree has an alternate branching pattern and simple leaves. Leaves are two to six inches long, have a rounded petiole, fine blunt teeth, with veins that are thin and branch often. (2pts)

What tree is this: Black Cherry _____ ?

3. This conifer has needles in groups of two and the needles are 3 to 4 inches long. (2pts)

What tree is this: Red Pine _____ ?

4. This tree has an opposite branching pattern with simple leaves, smooth leaf margins, and five lobes per leaf. (2pts)

What tree is this: Sugar Maple _____ ?

5. This conifer has flat, single needles that $\frac{3}{4}$ inch to $1\frac{1}{4}$ inches long and no petiole. (2pts)

What tree is this: Basalm Fir _____ ?

6. This tree has an alternate branching pattern and compound leaves that can grow up to two feet long. Each leaf has seven or more leaflets and each leaflet is pointed. (2pts)

What tree is this: Black Walnut _____ ?

7. This tree has an alternate branching pattern and simple leaves. Leaves are hairless with five to nine deep, even, rounded lobes and sinuses. (2pts)

What tree is this: White Oak _____ ?

8. This conifer has hairless twigs. The needles are single, needles that are four-sided, stiff, and sharp and can grow as long ad $\frac{3}{4}$ of an inch. (2pts)

What tree is this: White Spruce _____ ?

9. Any tree that sheds its leaves or needles in the fall of the year is known as a ... (1pt)
- leaf tree
 - coniferous tree
 - deciduous tree
 - oak tree
10. Although we usually think in term of leaves when identifying trees you can also identify trees using other parts of its anatomy including... (1pt)
- Flowers
 - Fruit
 - Bark
 - None of the above
 - All of the above
11. Forest succession is described as the orderly and progressive replacement of one plant community by another. (1pt)
- True
 - False
12. Primary succession can best be described as... (1pt)
- Advancing through elementary school grade levels.
 - Changes that occur in areas devoid of existing plant communities.
 - Moving from pioneer community to a stable climax community.
13. Aspen, which needs full sunlight and relatively warm soils to capture a site, can best be described as a pioneer species. (3 pts, 1 pt for T/F, 1 pt for each part of short answer)
- True
 - False

Why? One Point: Aspen require full sunlight to establish itself. One Point: This means that some disturbance to the existing forest community must have occurred to create conditions favorable for aspen to become established.

14. The make up of a plant community is directly related to the site's capability. What other factors besides sunlight determines species composition and succession... (3 pts)
- Soils
 - Growing season
 - Precipitation
15. The diversity of plant and animal species dramatically increases as plant communities' change from early successional to late successional (climax) communities. (3 pts, 1 pt for T/F, 1 pt for each part of short answer)
- True
 - False

Why? One Point: As the forest ecosystem becomes more complex with a greater diversity of species and structural diversity it One Point: provides a wider range of habitat for wildlife species.

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16. How does the biological diversity of the pine plantation where the soil pit is located compare to the uneven aged hardwoods stand we where are at right now? (3 pts, 1 pt for T/F, 1 pt for each part of short answer)
- Greater biological diversity
 - Less biological diversity

Why? One Point: The pine plantation is a monoculture and has little to no structural diversity. One Point: Therefore, it provides less support for other related species (plant, animal, insect, fungus, etc...)

17. What is the difference between a tree growing in the middle of a forest and a tree growing in the middle of a parking lot? (2 pts)

Forest ecosystems provide a variety of services to each individual tree that support and provide for its growth and development. A tree growing in the middle of a parking lot has to compete in a hostile environment without this support.

18. What are the three primary functions of the root system? (3 pts)

- Support
- Storage
- Water and nutrient gathering

19. Which of the following are the main macronutrients needed by trees? (please circle all that apply) (3 pts)

- Phosphorus (K)
- Iron (Fe)
- Magnesium (Mg)
- Potassium (P)
- Nitrogen (N)

20. Meristematic tissues are the places in the tree where growth occurs. Names the two types of meristematic tissues found in a tree. (2 pts)

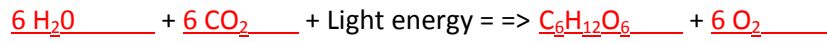
- Apical (primary acceptable)
- Lateral (secondary acceptable)

21. A nail is driven into a tree approximately 5 feet above the ground. If the tree averages 18" of height growth per year how high above the ground will the nail be in 20 years? (1 pt)

- 5 feet
- 30 feet
- 35 feet
- Doesn't matter because you won't be able to see it anyway!

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22. Complete the chemical equation for the process of photosynthesis... (4 pts)



23. Photosynthesis produces a chemical compound that is the basic building block used to create all structures in the plant. What is this compound ($\text{C}_6\text{H}_{12}\text{O}_6$)? (1pt)

Carbohydrates or sugar

24. Is the pine plantation being managed using even aged or uneven aged management practices? (3 pts, 1 pt for T/F, 2 pts for short answer)

- a. Even-aged
- b. Uneven-aged

How can you tell? One Point: All of the trees are the same approximate size. One Point: There are no other trees of any size in the stand.

25. Would it be appropriate to manage the pine plantation using a clear-cut harvest? (3 pts, 1 pt for T/F, 1 pt for each part of short answer)

- a. Yes
- b. No

Why? One Point: Red pine is a pioneer species. One Point: It needs full sunlight to grow. A clear-cut would provide the required conditions.

26. Would it be appropriate to manage the hardwood stand using a clear-cut harvest? (3 pts, 1 pt for T/F, 1 pt for each part of short answer)

- a. Yes
- b. No

Why? One Point: The hardwood stand is made up of many different species and many different ages. One Point: To maintain plant and stand structural diversity, it should be managed using an un-even aged system.

27. There are six different greenhouse gases that are largely responsible for global warming. Name which one of these can be sequestered (removed from the atmosphere) by trees? (1 pt)

- a. NO_x
- b. CO_2
- c. SO_x
- d. Methane

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28. Assuming that global warming is a real and serious threat that will continue to cause increases in average global temperature... (4 pts, 2 pts for each answer, 1 pt for each part of answer)

How will this affect trees species currently found in Wisconsin? One Point: Some current species will be marginalized One Point: and replaced by trees better adapted to warmer climates

How will this affect annual growth? One Point: Annual growth rates should increase One Point: unless rainfall becomes a limiting factor.

29. Strategically placed shade trees can save energy through cooling during the hotter months and reduce air conditioning costs up to 30 percent. (3 pts, 1 pt for T/F, 1 pt for each part of short answer)

- a. True
- b. False

Why? One Point: Shade cast in the summer will reduce cooling costs. One Point: Screening the home from winter winds will reduce winter heating costs.

30. Forest recreation is a major component of Wisconsin's tourism industry. (1pt)

- a. True
- b. False

31. Wisconsin's public forest lands are highly desired for motorized recreation. Is motorized recreation a compatible use of these forest lands? (3 pts, 1 pt for Y/N, 1 pt for each part of short answer)

- a. Yes
- b. No

Why? Ecological Fragmentation. Maintained forest trails separate large blocks of forest into smaller blocks which can in some circumstances alter natural forest process to favor early successional or invasive species in the transportation corridor.

32. Not all forms of motorized and non-motorized recreation are competitive. Provide two examples of motorized recreation that are not competitive and explain why. (4 pts, 1 pt for each example, 1 pt for each part of short answer)

Example a) Snowmobiling

Example b) ATVs

Why? One Point: They provide similar recreational opportunities One Point: and each use can potentially use the same trails but during different seasons.

33. Foresters use tree cores as one way to determine the age of a tree. Using one of the tree cores provided determine the age of the tree this sample was taken from. How old is this tree? (1 pt)
- a. 12 (answers will be provided day of exam)
 - b. 14
 - c. 16
 - d. 18

34. A dominant red pine in the pine plantation reaches a height of 60 feet in 50 years. What is the site index for this species on this site? (1 pt)
- a. 30
 - b. 50
 - c. 60
 - d. 12

Questions 35-38 must be answered using the identified trees and available equipment. *Everything that you need to answer these questions has been provided.*

35. For each of the following trees (18 points – 1 point for each correct answer)
- a. Identify the correct species
 - b. Use the Biltmore stick to estimate the DBH (to the nearest 2" diameter class) of the designated tree(s).
 - c. Use a D-tape to estimate the DBH (to the nearest 1" diameter class) of the designated tree(s).
 - d. Use a clinometer to determine the height of the designated tree(s)
 - e. Using the Merritt Hypsometer and 100' tape to estimate the number of merchantable 16 foot logs (to the nearest ½ log) in each tree.
 - f. Use a Biltmore stick to determine the volume of the designated tree. For your calculations you should measure the height of the tree to the nearest 1/2 log.

(answers will be provided day of exam) (*=range of acceptable answers)

Tree	Species	DBH Biltmore stick	DBH D-tape	Total Height	Merchantable logs (1/2 log)	Volume
White	White Pine	22	22	110 (100-120)*	5 6	626 684
Blue	Red Oak	28	29	100 (90-110)*	4 28 29	959 1042
Red	Red Pine	21	20	115 (105-125)*	5 20 21	486 556

36. Which of the three marked trees is commonly used for pulp? (2 pts, 1 pt each part) Red Tree/Red Pine

Why? Diameter (size) and/or species is appropriate for that market

37. Which of the three marked trees is commonly used for lumber? (2 pts, 1 pt each part) Blue Tree/Red Oak

Why? Diameter (size) and/or species is appropriate for that market

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38. Use the prism to determine if the following trees, marked by a ribbon, are "in" or if they are "out" for the purpose of determining estimates using a point sampling methodology. (3 pts, 1 pt each part)
(answer will be provided day of exam)

a. White ribbon tree? In

b. Blue ribbon tree? In

c. Red ribbon tree? In

TIE BREAKER

All of the forest measurement tools you used are calibrated using equal triangles and require you to be a certain distance away for the tree to make accurate measurements. What happens if you are closer to the tree than required to get an accurate measurement?

You will over-estimate the true measure.

____ / 3

Running Total: 100