

## Wisconsin Envirothon 2007 Forestry Exam

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

1. This tree has fan-like branches and scaly, flattened needles.  
***Eastern White Cedar***
2. This tree has a single flat needle that is ½ inch long with no petiole.  
***Eastern Hemlock***
3. This tree has an opposite branching pattern with simple leaves, smooth leaf margins, and five lobes per leaf.  
***Sugar maple***
4. This tree has an opposite branching pattern with compound leaves. There are 5 to 9 leaflets per leaf.  
***White ash***
5. 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.  
***Black walnut***
6. This tree has an alternate branching pattern and simple leaves. Leaves are hairless with pointed lobes and sinuses that extend half-way to the mid-vein.  
***Red oak***
7. A dichotomous key will always give two choices in each step until you are left with only one possibility.  
a. **True**  
b. False
8. Although we usually think in term of leaves when identifying trees you can also identify trees using other parts of its anatomy including...  
a. Flowers  
b. Fruit  
c. Bark  
d. None of the above  
e. **All of the above**

9. Forest succession is described as the orderly and progressive replacement of one plant community by another.
- a. True
  - b. False
10. Primary succession can best be described as...
- a. Advancing through elementary school grade levels.
  - b. Changes that occur in areas devoid of existing plant communities.
  - c. Moving from pioneer community to a stable climax community
11. Aspen, which needs full sunlight and relatively warm soils to capture a site, can best be described as a pioneer species.
- a. True
  - b. False
12. 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 points)
- a. Soils
  - b. Growing season
  - c. Precipitation
13. The diversity of plant and animal species dramatically increases as plant communities change from early successional to late successional (climax) communities.
- a. True
  - b. False
14. How does the biological diversity of a pine plantation compare to that of the hardwood stand?
- a. Greater biological diversity
  - b. Less biological diversity
15. Which component(s) of vertical structure are missing from the hardwood stand?
- a. upper canopy
  - b. lower canopy
  - c. Mid-story layer
  - d. shrub layer
  - e. ground layer
16. What is the difference between a forest and a tree? (2 points) Forests have processes that support the individual tree and the individual tree supports the forest. A lone urban tree lacks the support of the forest and does not have the same forest processes to rely on for its growth and health.

17. What are the three primary functions of the root system? (3 points)

- a. Support
- b. Storage
- c. Water and nutrient gathering

18. Which of the following are the main macronutrients needed by trees?

- a. Phosphorus (K)
- b. Iron (Fe)
- c. Magnesium (Mg)
- d. Potassium (P)
- e. Nitrogen (N)

19. The xylem is the part of the tree where...

- a. Cells divide and grow.
- b. Water and minerals are transported from the roots up the trunk and branches to the leaves.
- c. Sugars from the leaves are transported to the rest of the tree.

20. Complete the chemical equation for the process of photosynthesis... (4 points)



21. Explain what is meant by the term high-grading? Take the best and leave the rest

22. Explain what is meant by the term clear-cut?

A method used to regenerate a stand by the removal of most or all woody vegetation during the harvest creating a completely open area leading to the establishment of an even-aged stand.

23. Is the hardwood stand being managed using even aged or uneven aged management practices? (2 points)

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

c. How can you tell? Stands managed under uneven-aged systems are normally comprised of three or more age classes. These cover types are adapted to regenerate under partial canopies (shade).

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24. Would it be appropriate to manage the pine plantation using a clear-cut harvest? (2 points)
- Yes
  - No
  - Why? Even-age management with periodic thinnings based on basal area control.  
Less commonly, all-age management in extremely sensitive aesthetic areas.
25. Would it be appropriate to manage the hardwood stand using a clear-cut harvest? (2 points)
- Yes
  - No
  - Why? Shelterwood or uneven-aged systems will provide the best possible chance to regenerate and maintain oaks.
26. The main greenhouse gas that is responsible for global warming is CO<sup>2</sup>. Assuming that this is a real threat that will continue to cause increases in average global temperature... (2 points)
- How will this affect trees species currently found in Wisconsin? Some current species will be marginalized and replaced by trees better adapted to warmer climates
  - How will this affect annual growth? Annual growth rates should increase unless rainfall becomes a limiting factor
27. What are the three pillars of sustainable forestry?
- Ecological sustainability
  - Economic sustainability
  - Social sustainability
28. Which form of ethanol is cheaper and more efficient to produce? Ethanol from agricultural crops like corn and soybeans or cellulosic ethanol from woody biomass?
- its all the same
  - cellulosic ethanol from woody biomass
  - ethanol for agricultural crops
29. Name three types of fuels that can be produced from biomass (forest products)?
- Cellulosic ethanol
  - Biodiesel
  - Burning as feedstock

30. Strategically placed shade trees can save energy through cooling during the hotter months and reduce air conditioning costs up to 30 percent.
- a. True
  - b. False
31. 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?
- a) 13
  - b) 15
  - c) 17
  - d) 19
32. A dominant red pine in this stand reaches a height of 75 feet in 50 years. What is the site index for this species on this site?
- a. 25
  - b. 50
  - c. 62.5
  - d. 75
33. 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?
- a) 5 feet
  - b) 30 feet
  - c) 35 feet
  - d) Doesn't matter because you won't be able to see it anyway!

Team \_\_\_\_\_

The following questions must be answered using the identified trees and available equipment. Everything that you need to answer these questions has been provided.

34. 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 trees. Answer must be within +/- 10 feet of the correct answer to receive credit.
  - e. Using the Merritt Hypsometer and 100' tape to estimate the number of merchantable 16 foot logs (to the nearest 1/2 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.

Tree	Species	DBH Biltmore stick	DBH D-tape	Total Height	Merchantable logs (1/2 log)	Volume (Board feet)
1	White pine	22 inches	23 inches	90 - 110	5	691
2	Red pine	14 inches	14 inches	40 - 60	3	174
3	Red oak	18 inches	19 inches	50 - 70	2	233

35. Which of the three marked trees is commonly used for pulp? **Red pine**

36. Which of the three marked trees is commonly used for lumber? **Red oak**

37. Use the prism to determine if the trees following trees, marked by a ribbon, are "in" or if they are "out" for the purpose of determining estimates using a point sampling methodology.

- a. Red ribbon tree? **Out**
- b. Blue ribbon tree? **In**

38. DBH is one of the most useful measurements in the practice of forestry. What does DBH stand for? **Diameter at breast height**