

FULL-LENGTH PRACTICE TESTS

PRACTICE TEST 6 - 100 QUESTIONS

1. What is the primary function of phloem tissue in trees?
 - A. Water transport from roots to leaves
 - B. Structural support of the trunk
 - C. Sugar transport from leaves to other plant parts
 - D. Gas exchange with the atmosphere

2. When pruning near electrical lines, what is the minimum approach distance for unqualified workers from conductors below 50 kV?
 - A. 5 feet
 - B. 10 feet
 - C. 15 feet
 - D. 20 feet

3. Which soil particle size is the largest?
 - A. Clay
 - B. Silt
 - C. Colloid
 - D. Sand

4. A tree with a single main trunk that extends to the top of the crown exhibits what growth form?

- A. Excurrent growth form
- B. Decurrent growth form
- C. Shrub form
- D. Multi-stemmed form

5. According to ANSI Z133, what is required before felling any tree?

- A. Written permission from the property owner
- B. Evaluation of the tree and surrounding area for hazards
- C. Notification of all neighbors
- D. Soil testing to determine root anchorage

6. Which type of pruning cut removes a branch back to a parent branch or trunk?

- A. Heading cut
- B. Stub cut
- C. Thinning cut
- D. Topping cut

7. The ability of soil particles to attract and hold positively charged ions is measured by what property?

- A. Soil porosity
- B. Soil texture
- C. Soil pH
- D. Cation exchange capacity

8. What does the "C" in CODIT represent?

- A. Compartmentalization
- B. Closure
- C. Callus
- D. Cambium

9. An arborist observes white mycelial fans beneath the bark at the base of a declining oak. This sign is characteristic of what pathogen?

- A. Dutch elm disease
- B. Oak wilt
- C. Armillaria root rot
- D. Anthracnose

10. What is the minimum breaking strength required for arborist climbing lines according to ANSI Z133?

- A. 4,000 pounds
- B. 5,400 pounds
- C. 6,000 pounds
- D. 3,500 pounds

11. The movement of sugars from source to sink through phloem is explained by what mechanism?

- A. Cohesion-tension theory
- B. Capillary action
- C. Root pressure
- D. Pressure flow (mass flow) hypothesis

12. What is the recommended mulch-free zone around a tree trunk?

- A. 3 to 6 inches from the trunk
- B. Mulch should contact the trunk for moisture
- C. 12 inches from the trunk
- D. No gap is necessary

13. Which leaf shape has lobes that radiate from a central point like fingers on a hand?

- A. Pinnately lobed
- B. Palmately lobed
- C. Entire margin
- D. Serrate margin

14. Bracket fungi (shelf fungi) growing on a tree trunk indicate what condition?

- A. Beneficial mycorrhizal activity
- B. Surface-only fungal colonization
- C. Internal wood decay
- D. Improved tree vigor

15. When installing a cable support system, at what height in the tree should the cable typically be placed?

- A. At the base of the weak attachment
- B. At the midpoint between attachment and branch ends
- C. As close to branch tips as possible
- D. Approximately two-thirds the distance from the weak attachment to branch ends

16. What distinguishes a brace from a cable in tree support systems?

- A. A brace is a rigid rod providing direct support at the attachment point
- B. A brace is flexible and installed in the upper crown
- C. A cable provides rigid support at the attachment
- D. There is no difference between braces and cables

17. The Casparian strip is found in what root tissue?

- A. Epidermis
- B. Endodermis
- C. Cortex
- D. Pericycle

18. Which plant hormone is primarily associated with cell elongation and apical dominance?

- A. Cytokinin
- B. Ethylene
- C. Auxin
- D. Abscisic acid

19. What is the standard height for measuring trunk diameter (DBH)?

- A. Ground level
- B. 3 feet above ground
- C. 6 feet above ground
- D. 4.5 feet (54 inches) above ground

20. What type of insects feed by sucking plant fluids and often excrete honeydew?

- A. Aphids and scale insects
- B. Defoliating caterpillars
- C. Wood-boring beetles
- D. Leaf miners

21. What is the recommended treatment for a fresh pruning wound on a healthy tree?

- A. Apply wound dressing immediately
- B. Leave untreated to heal naturally
- C. Cover with latex paint
- D. Apply fungicide paste

22. Bacterial leaf scorch is caused by what pathogen and affects what tissue?

- A. A fungus affecting leaf tissue
- B. A virus affecting phloem
- C. A bacterium affecting root tissue
- D. *Xylella fastidiosa*, a bacterium affecting xylem

23. In tree risk assessment, what represents the "target"?

- A. The defect being evaluated
- B. The tree species
- C. People, property, or activities that could be harmed by tree failure
- D. The assessment method being used

24. The tissue that becomes the outer bark and provides protection for the tree is derived from what meristem?

- A. Cork cambium (phellogen)
- B. Vascular cambium
- C. Apical meristem
- D. Pericycle

25. When a tree develops a pronounced lean after a storm with soil heaving on one side, what condition is indicated?

- A. Normal response to wind
- B. Root failure with high likelihood of complete uprooting
- C. Trunk bending that will self-correct
- D. Improved anchorage from root movement

26. Photosynthesis in leaves primarily occurs in what cell layer?

- A. Upper epidermis
- B. Lower epidermis
- C. Cuticle
- D. Mesophyll (palisade and spongy layers)

27. What is the primary purpose of a tree protection plan during construction?

- A. To speed up construction activities
- B. To ensure trees are removed efficiently
- C. To prevent damage to trees from construction activities
- D. To calculate tree replacement costs

28. A tree showing chlorosis on youngest leaves while older leaves remain green is most likely deficient in what type of nutrient?

- A. An immobile nutrient such as iron or manganese
- B. Nitrogen
- C. Potassium
- D. Phosphorus

29. What factor most influences a tree's ability to close wounds effectively?

- A. The type of wound dressing applied
- B. Tree vigor and growth rate
- C. The season when the wound occurred
- D. The compass direction the wound faces

30. Synthetic burlap and strapping materials on balled-and-burlapped trees should be handled how at planting?

- A. Left intact to support the root ball
- B. Buried deeper for additional support
- C. Treated with chemicals to speed decomposition
- D. Completely removed because they do not decompose

31. Compaction of soil in the root zone primarily reduces tree health by limiting what?

- A. Soil temperature
- B. Nutrient toxicity
- C. Oxygen availability and water infiltration
- D. Beneficial insect activity

32. The branch collar contains specialized tissue for what function?

- A. Wound compartmentalization and closure
- B. Water storage
- C. Photosynthesis
- D. Nutrient absorption

33. Which type of mycorrhizae penetrates root cell walls to form structures inside the cells?

- A. Ectomycorrhizae
- B. Endomycorrhizae (arbuscular mycorrhizae)
- C. Neither type penetrates cell walls
- D. Both types penetrate cell walls equally

34. What growth response typically follows a heading cut on a branch?

- A. No regrowth occurs
- B. A single strong replacement branch develops
- C. The wound closes without any sprouting
- D. Multiple weakly attached sprouts develop below the cut

35. According to industry guidelines, what is the maximum recommended percentage of any single species in an urban forest?

- A. 5 percent
- B. 20 percent
- C. 10 percent
- D. 30 percent

36. What is the primary advantage of a complete tree inventory over a sample inventory?

- A. Documents every individual tree for detailed management
- B. Requires less time and resources
- C. Uses statistical sampling
- D. Only records species diversity

37. Interveinal chlorosis appearing on youngest leaves is most characteristic of deficiency in which nutrient?

- A. Nitrogen
- B. Iron or manganese
- C. Potassium
- D. Phosphorus

38. When electrical lines are discovered during tree work that were not previously identified, what is the proper response?

- A. Continue if the lines appear to be communication cables
- B. Work around them carefully
- C. Cut them to eliminate the hazard
- D. Stop work immediately and contact the utility

39. What root condition develops when container-grown trees are left in pots too long before planting?

- A. Excessive taproot development
- B. Improved root architecture
- C. Circling and girdling roots
- D. Increased fine root density

40. A tree with structural defects that could fail and strike people or property is defined as what?

- A. Hazard tree
- B. Declining tree
- C. Stressed tree
- D. Dead tree

41. Primary growth in plants refers to what type of growth?

- A. Increase in diameter
- B. Elongation of shoots and roots
- C. Bark formation
- D. Wound closure

42. What is the proper approach to watering a newly planted tree?

- A. Water surrounding soil only
- B. Light daily misting of leaves
- C. No supplemental water if mulch is applied
- D. Water the root ball directly, adjusting frequency based on conditions

43. Which root damage scenario typically has the most severe impact on tree survival?

- A. Damage to roots beyond the dripline
- B. Loss of fine absorbing roots only
- C. Severing major roots close to the trunk
- D. Exposure of surface roots

44. Which plant family is most susceptible to fire blight disease?

- A. Rosaceae (rose family)
- B. Fagaceae (beech family)
- C. Pinaceae (pine family)
- D. Betulaceae (birch family)

45. In tree appraisal using the trunk formula method, the condition rating evaluates what?

- A. Species suitability for the site
- B. Tree health and structural integrity
- C. Location relative to structures
- D. Age of the tree

46. When is advanced tree risk assessment with specialized equipment most appropriate?

- A. For routine inspection of healthy trees
- B. For young, recently planted trees
- C. For trees with minor outer crown deadwood
- D. When internal decay is suspected but not visible externally

47. What minimum branch diameter is generally required for a safe climbing tie-in point?

- A. 1 inch
- B. 2 inches
- C. 4 inches
- D. 6 inches

48. What is the purpose of conducting a job briefing before tree work begins?
- A. To communicate hazards, procedures, and emergency plans to all workers
 - B. To calculate the job estimate
 - C. To satisfy marketing requirements
 - D. To document tree species
49. Callus tissue that closes over wounds is produced by what structure?
- A. Heartwood cells
 - B. Cambium at wound margins
 - C. Root tips
 - D. Pith
50. What approach is most effective for addressing established soil compaction in tree root zones?
- A. Heavy fertilization
 - B. Foliar spraying
 - C. Increased irrigation alone
 - D. Vertical mulching and organic matter incorporation
51. The 10-20-30 diversity rule for urban forests limits what percentages?
- A. Tree heights, crown widths, and trunk diameters
 - B. Maintenance budgets across different areas
 - C. Species (10%), genus (20%), and family (30%) representation
 - D. Planting densities in various zones

52. What type of tree support system uses cables attached from the tree to ground anchors?

- A. Guying
- B. Cabling
- C. Bracing
- D. Propping

53. When reducing the height of a tree, what type of pruning cut should be used?

- A. Heading cuts to random points
- B. Reduction cuts to lateral branches capable of assuming the terminal role
- C. Topping at a uniform height
- D. Flush cuts at the trunk

54. What physiological mechanism do trees use to conserve water during drought?

- A. Increasing transpiration rate
- B. Expanding stomatal openings
- C. Shedding all leaves immediately
- D. Closing stomata to reduce water loss

55. Which pest management approach modifies the growing environment to reduce pest pressure?

- A. Chemical control
- B. Augmentative biological control
- C. Cultural control
- D. Classical biological control

56. The branch bark ridge helps identify proper pruning cut placement by indicating what?

- A. The top of the branch attachment where branch and trunk tissues meet
- B. Where wound dressing should be applied
- C. The location for flush cuts
- D. Areas of internal decay

57. At what voltage level does the minimum approach distance from electrical conductors begin to increase beyond the base 10 feet?

- A. 25 kV
- B. 50 kV
- C. 75 kV
- D. 100 kV

58. What is the primary purpose of crown thinning?

- A. Stimulating dense regrowth
- B. Creating stubs for wildlife
- C. Lowering the tree height
- D. Reducing crown density while maintaining natural form

59. What information does foliar (tissue) analysis provide that soil testing cannot?

- A. Soil pH
- B. Soil texture
- C. The nutrients actually absorbed by the tree
- D. Organic matter content

60. What is the proper action if a climbing tie-in point fails a load test?

- A. Select a different anchor point and retest
- B. Proceed with extra caution
- C. Add additional weight to test further
- D. Continue if the failure was minor

61. In plant health care, what is emphasized over reactive treatment of pest problems?

- A. Immediate pesticide application
- B. Prevention and overall plant health maintenance
- C. Complete removal of affected plants
- D. Calendar-based chemical treatments

62. Which wound location poses the greatest concern for structural stability?

- A. Small wounds on outer branches
- B. Wounds in the upper crown
- C. Minor bark scrapes
- D. Large wounds at the base of the trunk

63. The annual increase in trunk and branch diameter is called what?

- A. Primary growth
- B. Apical growth
- C. Secondary growth
- D. Terminal extension

64. When should structural pruning of young trees begin?

- A. Early, when branches are small and corrections require minor cuts
- B. After the tree reaches mature size
- C. Only after defects become obvious problems
- D. Never; trees should develop naturally without pruning

65. What type of organism causes anthracnose diseases?

- A. Bacteria
- B. Fungi
- C. Viruses
- D. Nematodes

66. What structure at the root tip protects the meristem and aids in soil penetration?

- A. Root hairs
- B. Pericycle
- C. Endodermis
- D. Root cap

67. In tree risk assessment, what does a park bench beneath a tree represent?

- A. A structural defect
- B. Evidence of disease
- C. A target
- D. An inspection station

68. Where should mulch be placed in relation to the tree trunk?

- A. Several inches away from the trunk with no contact
- B. Piled against the trunk for moisture retention
- C. Covering the root flare completely
- D. In direct contact with the bark

69. Adventitious roots forming above the original root flare typically indicate what condition?

- A. Optimal soil conditions
- B. The tree was planted too deeply or has a buried trunk
- C. Excellent drainage
- D. Superior vigor

70. What type of diagnostic tool measures wood density to detect internal decay?

- A. Increment borer only
- B. Visual inspection
- C. Mallet sounding only
- D. Resistance drill (resistograph)

71. According to ANSI A300, a reduction cut removes a branch to a lateral that is at least what proportion of the diameter of the cut branch?

- A. One-quarter
- B. One-half
- C. One-third
- D. Two-thirds

72. What symptom typically appears first in trees experiencing drought stress?

- A. Wilting and leaf scorch
- B. Root rot
- C. Excessive flowering
- D. Bark cracking

73. What is the primary benefit of species diversity in urban forests?

- A. Uniform appearance
- B. Protection against catastrophic losses from species-specific threats
- C. Simplified maintenance
- D. Reduced planting costs

74. What condition indicates that a tree should not be climbed until further evaluation?

- A. Previous proper pruning cuts
- B. Minor lichen on bark
- C. Small deadwood in outer crown
- D. Evidence of significant basal decay or structural failure

75. What safety device on a chipper stops the feed mechanism when activated?

- A. Discharge deflector
- B. Engine governor
- C. Feed control bar
- D. Fuel shutoff valve

76. Deficiency symptoms appearing first on older leaves indicate the lacking nutrient has what characteristic?

- A. Mobility within the plant allowing translocation to new growth
- B. Immobility preventing movement from old leaves
- C. Toxicity at low concentrations
- D. No relationship to symptom location

77. In tree appraisal, what does the location rating evaluate?

- A. Soil quality only
- B. The tree's functional and aesthetic contribution based on its site
- C. Distance from property lines
- D. Proximity to utilities only

78. What is the term for repeatedly removing growth back to permanent scaffold branches on a regular cycle?

- A. Crown thinning
- B. Vista pruning
- C. Crown cleaning
- D. Pollarding

79. What factor most strongly affects the rate of wound closure on trees?

- A. Wound dressing type
- B. Wound shape
- C. Tree growth rate and vigor
- D. Time of year only

80. What is the physiological status of heartwood in a living tree?

- A. Dead tissue providing structural support only
- B. Active in water conduction
- C. Primary site of nutrient storage
- D. Active in sugar transport

81. A basic tree risk assessment should evaluate what areas?

- A. Only the trunk
- B. Crown, trunk, root zone, and surrounding target area
- C. Only the crown structure
- D. Only areas within the dripline

82. What level of concern does a horizontal crack through the trunk indicate?

- A. Minor concern only
- B. No significant concern
- C. Moderate concern requiring routine monitoring
- D. High concern indicating potential imminent failure

83. What is the purpose of using air excavation tools in tree care?

- A. Injecting fertilizer
- B. Watering more efficiently
- C. Removing soil without damaging roots
- D. Killing unwanted vegetation

84. The retention of dead leaves through winter until pushed off by new spring growth is called what?

- A. Marcescence
- B. Abscission
- C. Senescence
- D. Dormancy

85. Under what circumstances is fertilization most likely to benefit an established tree?

- A. Immediately after transplanting
- B. When nutrient deficiency is confirmed by testing
- C. Every spring regardless of tree condition
- D. During drought stress

86. What distinguishes a disease sign from a disease symptom?

- A. Signs are always more visible
- B. Symptoms always appear first
- C. There is no meaningful difference
- D. Signs are direct evidence of the causal agent; symptoms are plant responses

87. Which rigging component redirects the rope path and can provide mechanical advantage?

- A. Sling
- B. Choker
- C. Block or pulley
- D. Port-a-wrap alone

88. What is the correct sequence for implementing integrated pest management?

- A. Monitor, identify, determine if threshold is reached, select appropriate tactics
- B. Apply pesticides first, then monitor
- C. Treat preventively on a calendar schedule
- D. Eliminate all monitoring

89. When are sap-feeding beetles most likely to transmit oak wilt disease?

- A. During winter dormancy
- B. During spring and early summer when attracted to fresh wounds
- C. Only during fall
- D. Equally throughout the year

90. What is the primary cause of transplant shock in newly planted trees?

- A. Excessive root mass
- B. Too much shade
- C. Genetic weakness
- D. Loss of root mass creating water supply deficit

91. What does visible root flare at the base of a tree indicate?

- A. The tree has root disease
- B. Root flare should always be buried
- C. Proper planting depth with healthy trunk-root transition
- D. Poor species selection

92. Wood specific gravity is most directly related to what property?

- A. Density and strength
- B. Color
- C. Bark texture
- D. Leaf size

93. What assessment should be conducted before climbing a tree for work?

- A. Financial appraisal
- B. Pre-climb safety assessment for hazards
- C. Inventory count
- D. Soil analysis

94. What is the most effective way to protect tree roots during construction?

- A. Informing the contractor verbally
- B. Marking trees with flagging tape only
- C. Watering after construction
- D. Installing protective fencing at the CRZ before construction begins

95. What is the purpose of action thresholds in integrated pest management?

- A. To maximize pesticide use
- B. To eliminate monitoring
- C. To determine when pest levels justify intervention
- D. To schedule treatments by calendar date

96. A complete lightning protection system for trees includes air terminals, conductors, and what other component?

- A. Ground rods
- B. Irrigation connections
- C. Solar panels
- D. Insulation only

97. How frequently should tree support systems (cables and braces) be inspected?

- A. Only when problems are visible
- B. At least annually and after major storms
- C. Every five years
- D. Monthly

98. Which pruning type specifically removes dead, dying, diseased, and broken branches?

- A. Crown thinning
- B. Crown reduction
- C. Vista pruning
- D. Crown cleaning

99. Nitrogen-fixing bacteria form symbiotic relationships with legumes in what structures?

- A. Leaf stomata
- B. Bark lenticels
- C. Root nodules
- D. Flower parts

100. In tree risk assessment, "likelihood of impact" evaluates what?

- A. The probability of striking the target if failure occurs
- B. The probability of tree failure
- C. The severity of potential damage
- D. The tree species

PRACTICE TEST 6: ANSWER KEY

WITH EXPLANATIONS

1. **C. Sugar transport from leaves to other plant parts** - Phloem is the vascular tissue responsible for translocating sugars (photosynthates) from sources (mature leaves) to sinks (roots, fruits, growing points) throughout the tree.
2. **B. 10 feet** - ANSI Z133 requires unqualified workers to maintain a minimum approach distance of 10 feet from electrical conductors operating below 50 kV. This applies to all body parts, tools, and equipment.
3. **D. Sand** - Sand particles are the largest soil particles (0.05-2.0 mm), followed by silt (0.002-0.05 mm), and clay (less than 0.002 mm). Particle size affects drainage, water retention, and nutrient-holding capacity.
4. **A. Excurrent growth form** - Excurrent trees have a single dominant central leader extending to the top, typical of many conifers. Decurrent trees have a spreading form with multiple codominant branches, typical of many hardwoods.
5. **B. Evaluation of the tree and surrounding area for hazards** - Before felling, ANSI Z133 requires assessment of the tree's lean, structural condition, surroundings, escape routes, and potential hazards to ensure safe operations.
6. **C. Thinning cut** - Thinning cuts remove branches at their point of origin (parent branch or trunk). This differs from heading cuts, which remove branches at random points, leaving stubs.
7. **D. Cation exchange capacity** - CEC measures soil's ability to attract, hold, and exchange positively charged nutrient ions (cations) like potassium, calcium, and magnesium. Higher CEC indicates better nutrient retention.
8. **A. Compartmentalization** - CODIT stands for Compartmentalization of Decay in Trees, describing how trees create chemical and physical barriers (walls) to isolate damaged and decayed tissue.
9. **C. Armillaria root rot** - White mycelial fans beneath bark at the tree base are diagnostic for Armillaria (honey fungus), an aggressive root rot pathogen. Rhizomorphs (black "shoestring" structures) may also be present.
10. **B. 5,400 pounds** - ANSI Z133 specifies that arborist climbing lines must have a minimum breaking strength of 5,400 pounds (24 kN) to provide adequate safety margin for dynamic loading during climbing.

11. **D. Pressure flow (mass flow) hypothesis** - Sugar transport in phloem is explained by pressure flow: sugars loaded at sources create high osmotic pressure, while unloading at sinks creates low pressure, driving mass flow.
12. **A. 3 to 6 inches from the trunk** - Mulch should not contact the trunk. A gap of several inches prevents moisture retention against bark, which promotes decay, pest problems, and stem-girdling roots.
13. **B. Palmately lobed** - Palmately lobed leaves have lobes radiating from a central point like fingers on a hand. Maples are classic examples. Pinnately lobed leaves have lobes arranged along a central axis.
14. **C. Internal wood decay** - Bracket or shelf fungi are fruiting bodies of wood decay fungi, indicating established internal decay. Their presence means decay has progressed significantly within the tree.
15. **D. Approximately two-thirds the distance from the weak attachment to branch ends** - Cables are typically installed in the upper crown at about two-thirds the distance from the weak attachment to branch ends for optimal mechanical advantage.
16. **A. A brace is a rigid rod providing direct support at the attachment point** - Braces are rigid threaded rods installed through weak unions to provide direct reinforcement. Cables are flexible and installed higher to limit movement.
17. **B. Endodermis** - The Casparian strip is a waxy band in the cell walls of endodermal cells that forces water and minerals to pass through cell membranes, regulating what enters the vascular system.
18. **C. Auxin** - Auxin promotes cell elongation and maintains apical dominance by suppressing lateral bud growth. It is produced in shoot tips and moves basipetally (downward) through the plant.
19. **D. 4.5 feet (54 inches) above ground** - DBH (diameter at breast height) is the standard measurement taken at 4.5 feet above ground on the uphill side. This provides consistent, comparable measurements.
20. **A. Aphids and scale insects** - Sucking insects like aphids, scales, and mealybugs feed on phloem sap using piercing-sucking mouthparts. They excrete excess sugars as honeydew, which supports sooty mold growth.
21. **B. Leave untreated to heal naturally** - Research shows wound dressings do not prevent decay and may slow wound closure. Healthy trees close wounds most effectively when left untreated.
22. **D. Xylella fastidiosa, a bacterium affecting xylem** - Bacterial leaf scorch is caused by *Xylella fastidiosa*, which colonizes and blocks xylem vessels, causing marginal leaf scorch that progresses over years.

23. **C. People, property, or activities that could be harmed by tree failure** - A target is anything of value that could be damaged or harmed if the tree fails. Without targets, there is no risk regardless of tree condition.
24. **A. Cork cambium (phellogen)** - The cork cambium produces cork cells (phellem) to the outside and phelloderm to the inside, forming the periderm that develops into outer bark.
25. **B. Root failure with high likelihood of complete uprooting** - Post-storm lean with soil heaving indicates the root plate is rotating—signs of root failure in progress. Such trees have high probability of complete uprooting.
26. **D. Mesophyll (palisade and spongy layers)** - Photosynthesis occurs in chloroplast-containing mesophyll cells. Palisade mesophyll is densely packed for light capture; spongy mesophyll facilitates gas exchange.
27. **C. To prevent damage to trees from construction activities** - Tree protection plans specify protection zones, fencing, prohibited activities, and monitoring to prevent root damage, compaction, and other construction impacts.
28. **A. An immobile nutrient such as iron or manganese** - Immobile nutrients cannot be translocated from older tissue. When deficient, symptoms appear on youngest leaves because older leaves retain their nutrients.
29. **B. Tree vigor and growth rate** - Wound closure depends primarily on how much new wood the tree produces annually. Vigorous trees close wounds faster than stressed or slow-growing trees.
30. **D. Completely removed because they do not decompose** - Synthetic materials will not decompose and will eventually girdle roots and trunk as they grow. All synthetic materials must be completely removed at planting.
31. **C. Oxygen availability and water infiltration** - Compaction reduces soil pore space, immediately limiting oxygen diffusion for root respiration and water infiltration for root uptake.
32. **A. Wound compartmentalization and closure** - The branch collar contains specialized tissue that compartmentalizes decay and produces callus to close wounds. Preserving the collar is essential for proper pruning.
33. **B. Endomycorrhizae (arbuscular mycorrhizae)** - Endomycorrhizal fungi penetrate root cell walls and form structures (arbuscules, vesicles) inside cells for nutrient exchange. Ectomycorrhizae form a sheath without penetrating walls.
34. **D. Multiple weakly attached sprouts develop below the cut** - Heading cuts remove apical dominance, releasing multiple buds to sprout. These shoots originate from surface tissue with weak attachments prone to failure.

35. **C. 10 percent** - Urban forest diversity guidelines recommend no more than 10% of any single species to prevent catastrophic losses from species-specific pests or diseases.
36. **A. Documents every individual tree for detailed management** - Complete inventories record data on every tree, enabling individual tree management, work orders, and detailed tracking. Sample inventories only estimate population statistics.
37. **B. Iron or manganese** - Interveinal chlorosis on youngest leaves with veins remaining green is characteristic of immobile nutrient deficiency (iron, manganese). These nutrients cannot move from older to younger tissue.
38. **D. Stop work immediately and contact the utility** - Unexpected electrical hazards require immediate work stoppage. Never assume lines are safe; contact the utility company for proper identification and precautions.
39. **C. Circling and girdling roots** - Container-grown trees left too long develop circling roots that continue circling after planting, potentially strangling the trunk or major roots.
40. **A. Hazard tree** - A hazard tree has structural defects (likely to fail) AND targets within striking distance. Both elements must be present for risk to exist.
41. **B. Elongation of shoots and roots** - Primary growth occurs at apical meristems, adding length to shoots and roots through cell division and elongation. Secondary growth adds diameter.
42. **D. Water the root ball directly, adjusting frequency based on conditions** - Water must reach the original root ball, which can dry even when surrounding soil is moist. Frequency depends on weather, soil, and tree response.
43. **C. Severing major roots close to the trunk** - Root damage severity depends on root size, proximity to trunk, and percentage of system affected. Damage close to the trunk severs larger roots affecting more of the crown.
44. **A. Rosaceae (rose family)** - Fire blight, caused by *Erwinia amylovora* bacterium, affects trees in the rose family including apple, pear, crabapple, hawthorn, mountain ash, and serviceberry.
45. **B. Tree health and structural integrity** - The condition rating evaluates tree vigor (crown density, leaf color, growth) and structural integrity (defects, decay, form), reducing value for trees in poor condition.
46. **D. When internal decay is suspected but not visible externally** - Advanced assessment using resistance drilling, tomography, or other specialized tools is appropriate when internal conditions cannot be determined by visual examination.
47. **C. 4 inches** - Tie-in points should be live, healthy branches at least 4 inches in diameter at the attachment point with sound union and no decay or structural defects.

48. **A. To communicate hazards, procedures, and emergency plans to all workers** - Job briefings ensure all crew members understand hazards present, how they will be controlled, individual responsibilities, and emergency procedures.
49. **B. Cambium at wound margins** - Callus (woundwood) is produced by the cambium around wound edges. It gradually rolls over the wound surface, closing from the margins inward.
50. **D. Vertical mulching and organic matter incorporation** - Compaction is difficult to reverse. Vertical mulching (drilling holes filled with organic matter) and surface organic matter application can improve conditions over time.
51. **C. Species (10%), genus (20%), and family (30%) representation** - The 10-20-30 rule limits species to 10%, genera to 20%, and families to 30% of the urban forest to ensure diversity and resilience.
52. **A. Guying** - Guying uses cables or straps running from the trunk to ground anchors to provide external support, commonly for newly transplanted large trees or trees with compromised roots.
53. **B. Reduction cuts to lateral branches capable of assuming the terminal role** - Proper crown reduction uses reduction cuts to laterals at least one-third the diameter of the removed branch, maintaining natural form.
54. **D. Closing stomata to reduce water loss** - During drought, trees close stomata to reduce transpirational water loss. This also reduces CO₂ uptake, limiting photosynthesis as a necessary tradeoff.
55. **C. Cultural control** - Cultural control modifies the environment to reduce pest problems through practices like proper watering, plant selection, sanitation, mulching, and maintaining plant health.
56. **A. The top of the branch attachment where branch and trunk tissues meet** - The branch bark ridge marks the junction of branch and trunk tissue at the top of the attachment, guiding where the cut should begin.
57. **B. 50 kV** - The base minimum approach distance is 10 feet for voltages below 50 kV. Above 50 kV, the distance increases by 4 inches for each additional 10 kV.
58. **D. Reducing crown density while maintaining natural form** - Thinning removes branches at their point of origin throughout the crown, reducing density while preserving the tree's natural shape and structure.
59. **C. The nutrients actually absorbed by the tree** - Foliar analysis reveals nutrient concentrations within plant tissue, showing what the tree has actually taken up regardless of soil conditions.
60. **A. Select a different anchor point and retest** - Never use a tie-in point that fails testing. Select a different anchor and test it before committing weight.

61. **B. Prevention and overall plant health maintenance** - Plant health care emphasizes maintaining plant vigor through proper cultural practices, making plants more resistant to pests rather than reacting to outbreaks.
62. **D. Large wounds at the base of the trunk** - Basal wounds affect the structural foundation. Decay at the base can cause complete tree failure; wounds higher up affect only portions of the crown.
63. **C. Secondary growth** - Secondary growth is the increase in diameter produced by lateral meristems (vascular cambium and cork cambium). Primary growth increases length.
64. **A. Early, when branches are small and corrections require minor cuts** - Early structural pruning addresses defects when branches are small, making small wounds that close quickly. Delayed corrections require larger, more harmful cuts.
65. **B. Fungi** - Anthracnose diseases are caused by various fungal pathogens that produce characteristic irregular brown lesions following leaf veins, favored by cool, wet conditions.
66. **D. Root cap** - The root cap is a thimble-shaped structure covering the root tip that protects the delicate meristem and produces mucilage that lubricates passage through soil.
67. **C. A target** - A target is anything of value that could be harmed by tree failure. The park bench represents a location where people (targets) could be present.
68. **A. Several inches away from the trunk with no contact** - Mulch against the trunk retains moisture promoting decay, creates pest habitat, and encourages girdling roots. A gap prevents these problems.
69. **B. The tree was planted too deeply or has a buried trunk** - Adventitious roots above the original root zone indicate the trunk is buried from deep planting, fill soil, or improper mulching.
70. **D. Resistance drill (resistograph)** - Resistance drilling measures wood density as a thin drill penetrates, creating a profile that shows decay as zones of reduced resistance.
71. **C. One-third** - ANSI A300 defines reduction cuts as cuts to lateral branches at least one-third the diameter of the removed branch, capable of assuming the terminal role.
72. **A. Wilting and leaf scorch** - Drought stress typically first appears as midday wilting, followed by marginal leaf scorch as the tree cannot maintain adequate water to foliage.
73. **B. Protection against catastrophic losses from species-specific threats** - Species diversity ensures no single pest or disease can devastate the entire urban forest, as demonstrated by losses from Dutch elm disease and emerald ash borer.
74. **D. Evidence of significant basal decay or structural failure** - Significant basal decay or structural defects may prevent the tree from safely supporting a climber. Such trees require thorough assessment before climbing.

75. **C. Feed control bar** - The feed control bar is a safety device across the feed opening that stops or reverses the feed mechanism when pushed, providing protection if entanglement begins.
76. **A. Mobility within the plant allowing translocation to new growth** - Mobile nutrients (N, P, K, Mg) can move from older to younger tissue. When deficient, older leaves show symptoms as nutrients are remobilized.
77. **B. The tree's functional and aesthetic contribution based on its site** - Location rating evaluates how the tree's position contributes to functional benefits (shade, energy savings) and aesthetic value on the property.
78. **D. Pollarding** - Pollarding is a traditional practice of repeated removal back to permanent scaffold branches (pollard heads) on a regular cycle, distinct from random topping.
79. **C. Tree growth rate and vigor** - Wound closure rate depends primarily on annual growth rate. Vigorous trees producing more wood close wounds faster than stressed or slow-growing trees.
80. **A. Dead tissue providing structural support only** - Heartwood is dead tissue that no longer conducts water or stores reserves. It provides structural support and contains decay-resistant extractives.
81. **B. Crown, trunk, root zone, and surrounding target area** - Basic assessment evaluates the entire tree (crown, trunk, roots) and the surrounding area to identify targets and assess overall risk.
82. **D. High concern indicating potential imminent failure** - Horizontal cracks indicate the trunk is splitting—structural failure in progress. This is among the most serious defects with high likelihood of imminent failure.
83. **C. Removing soil without damaging roots** - Air excavation uses compressed air to blow soil away without cutting roots, allowing root examination, root collar investigation, or careful work in root zones.
84. **A. Marcescence** - Marcescence is the retention of dead leaves through winter, common in American beech and some oaks. Leaves drop in spring when pushed off by new growth.
85. **B. When nutrient deficiency is confirmed by testing** - Fertilization benefits trees when actual deficiencies exist. Testing identifies whether and which nutrients are needed, preventing unnecessary applications.
86. **D. Signs are direct evidence of the causal agent; symptoms are plant responses** - Signs are the pathogen itself (fungal fruiting bodies, insects). Symptoms are changes in the tree (chlorosis, wilting) in response to problems.
87. **C. Block or pulley** - Blocks and pulleys redirect rope path in rigging systems and can create mechanical advantage configurations by combining multiple pulleys.

88. **A. Monitor, identify, determine if threshold is reached, select appropriate tactics** - IPM follows systematic steps: monitor for pests, identify accurately, determine if action thresholds are exceeded, then select appropriate control methods.
89. **B. During spring and early summer when attracted to fresh wounds** - Nitidulid beetles transmitting oak wilt are most active in spring and early summer, attracted to fresh wounds on trees.
90. **D. Loss of root mass creating water supply deficit** - Transplanting removes most roots while the crown remains. The reduced root system cannot supply adequate water to support the existing canopy.
91. **C. Proper planting depth with healthy trunk-root transition** - Visible root flare indicates correct planting depth with proper trunk-to-root transition. Absence of flare suggests the tree is too deep.
92. **A. Density and strength** - Specific gravity measures wood density relative to water. Higher specific gravity indicates denser, stronger wood with more cell wall material.
93. **B. Pre-climb safety assessment for hazards** - Before climbing, trees must be assessed for structural defects, decay, dead branches, electrical hazards, and other conditions that could endanger the climber.
94. **D. Installing protective fencing at the CRZ before construction begins** - Physical barriers installed before any construction provide the most effective protection by preventing equipment access throughout the project.
95. **C. To determine when pest levels justify intervention** - Action thresholds define the pest population or damage level at which treatment becomes justified, preventing unnecessary treatments while ensuring intervention when needed.
96. **A. Ground rods** - Complete lightning protection requires air terminals (at tree top), conductors (running down the trunk), and ground rods (dissipating current into earth).
97. **B. At least annually and after major storms** - Support systems require annual inspection and additional inspection after significant storms to verify hardware condition, tension, and tree growth response.
98. **D. Crown cleaning** - Crown cleaning specifically removes dead, dying, diseased, crowded, weakly attached, and broken branches, directly addressing hazard reduction goals.
99. **C. Root nodules** - Nitrogen-fixing bacteria (*Rhizobium* species) form symbiotic relationships with legumes in specialized root structures called nodules, converting atmospheric nitrogen to plant-usable forms.

100. **A. The probability of striking the target if failure occurs** - Likelihood of impact evaluates target occupancy and location relative to potential failure direction. Even if a tree fails, it may not strike the target.