PRACTICE EXAM 8: ISA CERTIFIED ARBORIST SIMULATION

PRACTICE EXAM 8 — QUESTIONS 1–200

Time limit: 3 hours 30 minutes. Each question has exactly one correct answer.

1. An arborist examining a freshly cut log notices a thin layer of pale green tissue between the wood and the inner bark. This layer is best described as:

A. A diseased zone of dying parenchyma cells

B. The vascular cambium responsible for secondary growth

C. The pith cylinder running through the center

D. The outer rhytidome that has been wounded

2. A red maple growing on a windy ridge develops a noticeably thicker trunk base than a sheltered tree of the same age. The most likely explanation is:

A. Improved soil drainage on the ridge site

B. Heavier annual rainfall on exposed sites

C. Less competition from neighboring trees

D. Mechanical wind stress stimulating reaction wood

3. The single most important storage form for surplus carbohydrates in temperate trees is:

A. Starch held in living parenchyma cells

B. Sucrose dissolved in the xylem sap

C. Cellulose in the secondary cell walls

D. Lignin deposited in the heartwood

4. Phloem differs from xylem in that phloem cells:

A. Are dead at maturity, like xylem vessels

B. Conduct water upward toward the leaves

C. Remain alive and transport sugars to sinks

D. Are produced only during the dormant season

5. The driving force for upward water movement in a mature tree is:

A. Evaporation from leaf surfaces creating tension

B. Active pumping by cells of the root cortex

C. Capillary rise through narrow vessel elements

D. Osmotic pressure within the xylem sap

6. A wound on a tree trunk that has been successfully compartmentalized shows:

A. Continued spread of decay into the heartwood

B. Loose bark sloughing away from the wound

C. Increased sap leakage every spring

D. New wood and callus surrounding the original injury

7. The CODIT model describes how trees respond to wounds by:

A. Replacing damaged tissue with new healthy tissue

B. Walling off damaged areas with internal barriers

C. Dissolving the damaged wood and excreting it

D. Allowing decay to spread throughout the tree

8. Wall 4 in the CODIT model is the strongest barrier and is formed by:

A. The outer bark before any wound has occurred

B. The heartwood decades before the injury

C. The cambium after the wound has been created

D. The pith cylinder at the very center of the stem

9. Most of a mature tree's fine absorbing roots are located:

A. In the upper 18 inches of soil, often beyond the dripline

B. Below 6 feet in the deeper subsoil layer

C. In a narrow band right against the trunk

D. Within the heartwood of the lower trunk

10. A tree girdled by a tight wire eventually dies because the wire interrupts:

A. Water moving upward through the xylem column

B. Oxygen moving inward through the bark

C. Sugars moving downward through the phloem

D. Nitrogen moving outward through the roots

11. Apical dominance in a young tree is regulated primarily by:

A. Cytokinin produced in the active root tips

B. Mechanical pressure from above on lateral buds

C. Gravitational pull on the lower buds and branches

D. Auxin from the shoot tip suppressing lateral buds

12. A tree's stored carbohydrate reserves typically reach their lowest point in:

A. Late spring after new leaves emerge and mature

B. Midsummer at peak photosynthesis

C. Early autumn just before leaf drop

D. Midwinter during deepest dormancy

13. Heartwood is best described as wood that:

A. Conducts the majority of upward water flow

B. Is composed of dead cells with extractives

C. Produces new phloem each growing season

D. Is the most metabolically active tissue type

14. A tree closes its stomata during a hot dry afternoon. The most direct consequence is:

A. Increased water uptake from the root system

B. Acceleration of cellular respiration in the roots

C. Reduction of both transpiration and photosynthesis

D. A surge of new growth in the apical buds

15. Mycorrhizal fungi associated with tree roots primarily benefit the tree by:

A. Extending hyphae outward to expand absorbing surface

B. Producing antibiotics that kill all soil pathogens

C. Decomposing dead roots into available nutrients

D. Fixing atmospheric nitrogen within root cells

16. Which of the following is NOT a primary function of leaf stomata?

A. Allowing carbon dioxide to enter for photosynthesis

B. Releasing water vapor through transpiration

C. Releasing oxygen produced during photosynthesis

D. Anchoring the leaf blade firmly to the petiole

17. Respiration in trees consumes oxygen and:

A. Produces sugars from atmospheric carbon

B. Releases stored chemical energy from carbohydrates

C. Builds new cellulose in cell walls

D. Captures sunlight for use in chloroplasts

18. The conducting cells of xylem are functionally:

A. Dead at maturity, forming hollow conduits

B. Living, requiring constant cellular respiration

C. Filled with chlorophyll for photosynthesis

D. Replaced annually from the inner heartwood

19. A tree's branch collar plays a critical role in compartmentalization because it:

A. Stores the highest concentration of carbohydrates

B. Conducts water faster than other branch tissues

C. Contains the cambium that forms Wall 4 around wounds

D. Produces antimicrobial chemicals against bark beetles

20. The cohesion-tension theory of water movement relies on:

A. Active pumping by cells in the root cortex

B. Atmospheric pressure pushing water upward

C. Osmotic gradients across the leaf mesophyll

D. Hydrogen bonding holding the water column together

21. A tree under prolonged drought stress will most likely show:

A. Reduced photosynthesis as stomata close to conserve water

B. Increased transpiration to compensate for soil dryness

C. A flush of new shoot growth seeking deeper moisture

D. Higher carbohydrate reserves than in a normal year

22. Adventitious roots are best described as roots that:

A. Develop only from seed radicles in new plants

B. Form exclusively in coniferous tree species

C. Arise from stems or other non-root tissues

D. Grow only in response to flooding events

23. A tree's annual growth ring is wider in years with:

A. Severe drought during the growing season

B. Adequate moisture and favorable temperatures

C. Late spring frosts that damage early foliage

D. Heavy insect defoliation in early summer

24. A red maple displays which combination of features?

A. Opposite leaf arrangement and paired winged samaras

B. Alternate leaf arrangement and acorn fruits

C. Whorled leaf arrangement and pine cone fruits

D. Compound leaves and single samara fruits

25. The MAD Horse mnemonic helps arborists remember:

A. Genera with palmately compound leaves

B. Trees with peeling bark patterns

C. Conifers with deciduous needle habits

D. Common temperate genera with opposite leaf arrangement

26. Members of the white oak group are distinguished by:

A. Rounded leaf lobes and acorns maturing in one season

B. Pointed bristle-tipped lobes and acorns maturing over two seasons

C. Compound leaves and winged samara fruits

D. Needle-like leaves and woody cones

27. The correct written form of a scientific name in print is:

A. ACER RUBRUM written entirely in capital letters

B. acer rubrum written entirely in lowercase

C. *Acer rubrum* with the genus capitalized and italicized

D. *Acer Rubrum* with both words capitalized

28. A name in single quotation marks following a species name indicates:

A. A cultivar selected and propagated for specific traits

B. A common name assigned by a regional nursery

C. A botanical variety from a wild population

D. A subspecies recognized in the formal codes

29. A deciduous conifer that sheds its needles each autumn is:

A. Eastern hemlock in the genus *Tsuga*

B. Bald cypress in the genus *Taxodium*

C. Eastern red cedar in *Juniperus*

D. Eastern white pine in the genus *Pinus*

30. The 10-20-30 rule of urban tree diversity sets maximum percentages at which three taxonomic levels?

A. Order, family, and genus together

B. Cultivar, species, and genus levels

C. Genus, family, and order combined

D. Species, genus, and family of the planting

31. Which of the following is widely considered invasive in much of eastern North America?

A. Eastern redbud, native to many states

B. Flowering dogwood, native to eastern forests

C. Tree of heaven, introduced from Asia

D. American holly, native to the eastern states

32. A tree with mature height under 25 feet is most appropriate for planting beneath a:

A. Distribution power line at 30 feet above ground

B. Highway underpass with limited vertical clearance

C. Wide-open meadow without overhead obstacles

D. Mature forest canopy of tall hardwoods

33. A pinnately compound leaf has its leaflets arranged:

A. Joined together to form one continuous blade

B. Along two sides of a central rachis

C. Radiating from a single attachment point

D. Borne directly on the woody stem

34. Which of the following groups all have alternate leaf arrangement?

A. Maple, ash, and dogwood in mixed forests

B. Catalpa, paulownia, and viburnum

C. Oak, hickory, and beech in eastern forests

D. Horse chestnut, buckeye, and dogwood

35. A tree with mottled tan and gray peeling bark and broad palmate leaves is most likely:

A. Sugar maple in the soapberry family

B. Shagbark hickory in the walnut family

C. Norway maple introduced from Europe

D. American sycamore in the plane family

36. Right Tree, Right Place primarily means matching:

A. Mature characteristics to the planting site conditions

B. Trunk caliper to a standardized planting depth

C. Nursery price to the homeowner's budget

D. Leaf color to the surrounding landscape design

37. *Fraxinus* (the ash genus) belongs to which plant family?

A. Pinaceae, the pine family

B. Oleaceae, the olive family

C. Rosaceae, the rose family

D. Sapindaceae, the soapberry family

38. A tree with palmately compound leaves bearing five to seven leaflets and showy upright spring flower spikes is most likely:

A. Black walnut in the walnut family

B. White ash in the olive family

C. Horse chestnut in the soapberry family

D. Pignut hickory in the walnut family

39. Which of the following is NOT a feature commonly used for winter tree identification?

A. Leaf margin and venation of new spring foliage

B. Bud shape and arrangement on the twig

C. Bark character on the mature trunk

D. Twig features such as leaf scars

40. A native tree species generally provides which advantage over a non-native?

A. Faster growth than any introduced alternative

B. Automatic immunity to all local pests and diseases

C. Lower mature height than imported species

D. Adaptation to local climate, soils, and ecology

41. A soil with approximately balanced proportions of sand, silt, and clay is classified as:

A. Sandy loam dominated by sand particles

B. Silty clay with limited drainage

C. Clay loam dominated by fine particles

D. Loam, an ideal texture for most species

42. Soil pH is measured on a scale where neutral equals:

A. 7, with values above being alkaline

B. 5, with values below being alkaline

C. 0, with values increasing for acidity

D. 14, with values decreasing for acidity

43. Cation exchange capacity (CEC) of a soil depends primarily on:

A. The depth of the topsoil horizon present

B. The annual rainfall received at the site

C. The clay content and organic matter present

D. The temperature of the soil through the year

44. Compaction harms tree roots primarily by:

A. Concentrating salts at lethal levels

B. Reducing pore space and root oxygen

C. Raising soil temperatures excessively

D. Increasing soil acidity in the root zone

45. An ideal mineral soil contains approximately what percentage of pore space?

A. About 10 percent with the rest as solids

B. About 25 percent mostly filled with water

C. About 75 percent mostly filled with air

D. About 50 percent split between water and air

46. Mycorrhizal fungi benefit a host tree primarily by:

A. Extending the absorbing surface of the roots

B. Storing surplus carbohydrates for the tree

C. Producing antibiotics that kill all pathogens

D. Fixing atmospheric nitrogen in tissues

47. A pin oak in alkaline soil with interveinal chlorosis on its newest leaves most likely has:

A. A nitrogen deficiency from lawn competition

B. Excess potassium suppressing magnesium

C. Iron unavailable due to high soil pH

D. Sulfur excess from a nearby industrial source

48. A proper mulch layer around an established landscape tree should be:

A. Six to eight inches deep against the trunk

B. Two to four inches deep with the trunk clear

C. A thin scattering across the entire lawn

D. Replaced with plastic sheeting for moisture

49. A perc test that shows water taking 36 hours to drain indicates:

A. Drainage is excessive for most tree species

B. Drainage is ideal for any species available

C. The soil is permanently waterlogged below

D. Drainage is inadequate for most tree species

50. Soil texture is essentially permanent because:

A. Sand, silt, and clay proportions cannot be altered

B. Organic matter regenerates the original texture

C. Microbes restore the original texture quickly

D. Laboratory testing rarely identifies real changes

51. A bulk density of 1.8 g/cm³ in a mineral soil indicates:

A. Loose structure supporting healthy roots

B. Severe compaction halting most root growth

C. The optimal range for root expansion

D. A reading typical of healthy forest topsoil

52. The most effective long-term way to improve soil organic matter is to:

A. Till the soil deeply each spring season

B. Apply fine sand annually to the surface

C. Spray hydrogen peroxide on the soil

D. Maintain a continuous organic mulch layer

53. Why is a composite soil sample more reliable than a single grab sample?

A. A composite sample is cheaper for the laboratory

B. A composite sample requires no special tools

C. A composite sample averages variation across the area

D. A composite sample takes much less time to gather

54. Which amendment is most likely to actually improve a clay soil's structure over time?

A. Continuous addition of organic matter

B. A heavy single application of agricultural lime

C. Surface dressings of fine builder's sand

D. Foliar sprays of liquid micronutrients

55. The width of a planting hole for a container-grown tree should be:

A. Exactly the diameter of the root ball

B. Half the diameter of the root ball

C. Two to three times the root ball diameter

D. Ten times the diameter of the ball

56. A newly planted tree's root flare should be set:

A. Six inches below the surrounding grade

B. At or slightly above the surrounding grade

C. Twelve inches below the lawn surface

D. Completely buried beneath several inches of mulch

57. Backfill for a planting hole should generally consist of:

A. Sterilized purchased potting mix only

B. Equal parts peat moss and perlite mixed

C. Coarse builder's sand with added lime

D. The native soil excavated from the hole

58. A newly planted tree typically requires approximately one year of establishment per:

A. Inch of trunk caliper at the time of planting

B. Foot of mature height the species reaches

C. Inch of branch diameter on scaffold limbs

D. Square foot of crown spread at planting

59. Staking a newly planted tree should generally be:

A. Required on every newly planted specimen

B. Used only when needed and removed within a year

C. Permanent for the entire life of the tree

D. Tightened progressively as the tree grows

60. A circling root found inside a container at planting should be:

A. Left intact to avoid damaging fine tips

B. Coated with rooting hormone before backfilling

C. Treated with a commercial wound dressing

D. Cut or straightened before placing in the hole

61. Wire baskets on B&B trees should be:

A. Cut and removed at least from the upper portion

B. Left completely intact to support the root ball

C. Removed entirely before lowering into the hole

D. Replaced with plastic mesh for biodegradability

62. The most common serious error when planting container-grown trees is:

A. Watering too lightly during the first week

B. Failing to install stakes on all sides

C. Setting the root ball too deep with a buried flare

D. Using only native soil as the backfill material

63. Watering a newly planted tree should aim to keep the root ball:

A. Saturated continuously for the first month

B. Consistently moist but not saturated

C. Completely dry to encourage deep rooting

D. Moist only on the south-facing side

64. Fertilization of a newly planted tree during its first growing season is generally:

A. Unnecessary and sometimes counterproductive

B. The most important practice for survival

C. Required by most municipal specifications

D. Best applied as a foliar spray to leaves

65. The preferred season for transplanting most deciduous trees is:

A. Mid-summer during peak active growth

B. Immediately after leaf expansion in spring

C. Any month with adequate irrigation available

D. Dormancy in late fall or early spring

66. Advance root pruning before a planned transplant serves to:

A. Reduce the total weight of the future ball

B. Encourage new fibrous roots inside the future ball

C. Eliminate any future need for irrigation

D. Prevent suckers from emerging at the trunk

67. Twine tied around the trunk of a B&B tree should be:

A. Tightened further for additional stability

B. Left in place because it decomposes quickly

C. Replaced with heavier cord before planting

D. Removed completely to prevent future girdling

68. A balled-and-burlapped tree should be lifted by:

A. Supporting the root ball from underneath

B. Grasping the trunk firmly with two hands

C. Wrapping the crown with lifting straps

D. Pulling on the burlap from the very top

69. Mulching a newly planted tree provides all of the following benefits EXCEPT:

A. Conserving moisture in the root zone

B. Moderating soil temperatures over time

C. Supplying all the tree's nitrogen needs

D. Suppressing competing weeds at the trunk

70. The depth of a planting hole should:

A. Equal the height from root flare to ball bottom

B. Be at least twice the height of the root ball

C. Reach below the tree's lowest scaffold branches

D. Include a layer of gravel for drainage below

71. A newly delivered nursery tree should be inspected at delivery for:

A. The brand name printed on the container

B. The exact weight printed on the manifest

C. Trunk, crown, root flare, and root ball condition

D. The width of the wire basket only

72. A newly planted tree that fails to leaf out the following spring most likely suffered from:

A. A foliar disease attacking the expanding buds

B. Inadequate mulch depth at the trunk

C. Cold temperatures during the dormant period

D. Root ball desiccation during handling

73. ANSI A300 governs which area of professional tree work?

A. Tree pruning and maintenance practices

B. Worker safety on arboricultural job sites

C. Quality standards for nursery stock production

D. Helmet and head protection specifications

74. A correct pruning cut is placed:

A. Flush with the parent stem for smoothness

B. Six inches beyond the branch collar

C. Just outside the branch collar and bark ridge

D. At the midpoint of the branch length

75. Topping a mature shade tree is unacceptable because it:

A. Requires specialty equipment most crews lack

B. Cannot be performed without damaging utilities

C. Is permitted only under specific safety standards

D. Creates large wounds, depletes reserves, and produces weak sprouts

76. The three-cut method of branch removal is used primarily to:

A. Reduce sawdust accumulation on the worksite

B. Prevent bark from tearing down the trunk

C. Speed up the total cutting time per branch

D. Allow the use of a smaller chainsaw bar

77. The first cut in the three-cut method is made:

A. On the underside of the branch, beyond the final cut

B. From above at the exact final cut location

C. Straight down through the top of the branch

D. Parallel to the trunk to score the bark

78. The cleaning pruning objective involves selective removal of:

A. All interior live foliage to thin the crown

B. Every lateral branch crossing another branch

C. The outermost six inches of every branch

D. Dead, dying, diseased, broken, or weak branches

79. A reduction cut differs from a heading cut in that a reduction cut:

A. Is always made with hand pruners only

B. Cuts back to a lateral that can assume the role

C. Removes only branches under one inch

D. Leaves an arbitrary stub regardless of laterals

80. Structural pruning provides the greatest long-term benefit when performed on:

A. Trees in their final decade of mature life

B. Mature trees with established canopies

C. Young trees during the juvenile growth phase

D. Recently planted trees during establishment

81. The maximum percentage of live foliage that should typically be removed from a mature tree in one session is approximately:

A. 25 to 30 percent during active growth

B. 40 to 50 percent in the dormant season

C. 10 to 15 percent, less for stressed specimens

D. There is no upper limit for healthy mature trees

82. The branch bark ridge is best described as:

A. A raised line of bark on the upper side of a branch union

B. An internal barrier inside the heartwood

C. A layer of dead bark separating heartwood from sapwood

D. The outer protective layer covering the trunk surface

83. Lion-tailing is a harmful pruning practice in which:

A. Only deadwood is removed from the canopy

B. The central leader is severed at the trunk

C. Every crossing branch is removed at its base

D. Interior foliage is stripped, concentrating weight at branch ends

84. Pollarding is a traditional pruning technique that requires:

A. Removal of the central leader during establishment

B. Repeated cuts at the same framework points on a schedule

C. Annual application of wound dressing on cuts

D. Complete heading back of the entire canopy

85. The restoration pruning objective applies to trees that have been:

A. Recently planted in their establishment phase

B. Selected for removal at project completion

C. Topped, vandalized, or severely storm damaged

D. Designated as historic specimens by ordinance

86. Wound dressings applied to pruning cuts have been shown by research to:

A. Provide minimal benefit and sometimes slow healing

B. Eliminate any risk of decay organisms entering

C. Accelerate compartmentalization across all species

D. Be required by the current ANSI A300 standard

87. In oak wilt regions, oaks should ideally be pruned during:

A. Warm summer months to speed wound closure

B. Wet rainy days when beetles are inactive

C. Any time of year with sterilized tools

D. Dormancy to reduce disease transmission risk

88. Subordination pruning is used to:

A. Eliminate the central leader entirely

B. Reduce the growth of a competing stem in favor of a leader

C. Remove all epicormic sprouts from the trunk

D. Cut every lateral branch to equal lengths

89. A flush cut damages a tree because it:

A. Removes the branch collar and Wall 4 tissue

B. Leaves a projecting stub beyond the collar

C. Allows excess rainwater to enter the wound

D. Uses excessive force from the cutting tool

90. A stub cut leaves dead wood projecting beyond the collar, which:

A. Stores reserves for future epicormic sprouts

B. Adds useful structural weight to the branch

C. Helps birds nest more securely on the trunk

D. Cannot be compartmentalized and invites decay

91. Bypass pruning blades are preferred over anvil blades for living wood because they:

A. Apply more force at a lower cutting angle

B. Can be sharpened without removing them

C. Cut cleanly without crushing the stem

D. Are lighter and reduce operator fatigue

92. A pole pruner is most appropriate for:

A. Branches over six inches in diameter overhead

B. Small branches out of reach without climbing

C. Felling small trees on flat terrain only

D. Cutting all lower branches on mature trees

93. An arborist asked to thin a mature tree by 50 percent should:

A. Remove only the smallest interior branches

B. Comply using exclusively bypass hand pruners

C. Agree but charge double for the additional work

D. Explain that thinning of that magnitude violates accepted standards

94. Codominant stems with included bark should ideally be corrected:

A. Early, while stems and necessary cuts are small

B. After the tree reaches structural maturity

C. By spraying the union with systemic fungicide

D. By removing the tree as a preventive measure

95. The raise pruning objective refers to:

A. Increasing the overall height of the crown

B. Lifting the tree with mechanical equipment

C. Removing lower branches for vertical clearance

D. Raising the soil grade around the trunk

96. Disinfecting pruning tools between cuts is most important when:

A. Working on healthy trees during dormant season

B. Performing routine pruning of any healthy tree

C. Using bypass hand pruners on small twigs

D. Pruning trees affected by contagious diseases

97. A professional pruning specification should include all of the following EXCEPT:

A. The identified pruning objective

B. The climber's personal preferences

C. The percentage of live foliage to remove

D. The diameter range of cuts to be made

98. Bypass loppers are most appropriate for branches:

A. Smaller than one-quarter inch in diameter

B. Larger than four inches in diameter

C. Up to one and a half to two inches in diameter

D. Of any size encountered during ground work

99. Removing a dead branch from a mature tree falls under which pruning objective?

A. Clean to remove dead and weak branches

B. Reduce to lower the overall crown height

C. Restore after previous storm damage

D. Raise to provide pedestrian clearance

100. The single most important factor in whether a pruning wound closes successfully is:

A. The brand of cutting tool used by the climber

B. The weather conditions during the operation

C. The time of day when the cut was made

D. The placement of the cut relative to the branch collar

101. The first step in diagnosing an unhealthy tree should be to:

A. Apply broad-spectrum fungicide as a precaution

B. Identify the species and its normal characteristics

C. Recommend immediate removal of the tree

D. Collect samples for laboratory analysis

102. A "sign" of a tree disease is best defined as:

A. A description written in the inspection report

B. The tree's general response such as wilting

C. Direct evidence of the causal agent itself

D. A homeowner's complaint about leaf appearance

103. A "symptom" of a tree disorder refers to:

A. The tree's response such as yellowing or wilting

B. A visible fruiting body of a fungal pathogen

C. A nest of active wood-boring insects on the trunk

D. Laboratory confirmation of a specific pathogen

104. A primary tree pest is best described as one that:

A. Cannot reproduce except under drought stress

B. Is found only in remote forested areas

C. Attacks only trees that are already weakened

D. Can kill healthy vigorous trees on its own

105. Emerald ash borer is classified as a primary pest because it:

A. Was introduced earlier than other borers

B. Successfully attacks healthy ash trees of all sizes

C. Reproduces only under drought conditions

D. Requires bark wounds to enter the tree

106. Integrated Pest Management is best understood as:

A. A decision framework using monitoring, thresholds, and multiple tactics

B. A specific brand of organic pesticide

C. A complete prohibition on all chemical control

D. A method limited only to biological agents

107. Fire blight is caused by a bacterium and affects which family?

A. Pinaceae including pines and firs

B. Sapindaceae including maples

C. Rosaceae including apples and pears

D. Fagaceae including oaks and beeches

108. Oak wilt is spread from tree to tree primarily by:

A. Wind dispersing spores across forests

B. Soil nematodes feeding on fine roots

C. Rain splashing from infected leaves

D. Root grafts and sap-feeding beetles

109. A tree with interveinal chlorosis on new leaves while older leaves remain green most likely has:

A. Nitrogen deficiency affecting mobile nutrients

B. Iron deficiency, often related to high soil pH

C. Excess rainfall causing root rot damage

D. Calcium toxicity from previous over-liming

110. Yellowing that begins on older inner leaves and progresses outward typically indicates deficiency of:

A. Nitrogen, a mobile macronutrient

B. Iron, an immobile micronutrient

C. Calcium, a structural secondary nutrient

D. Boron, a trace element for cell division

111. Cupping and twisting of new growth on a mature tree most likely indicates:

A. An active spider mite outbreak in the canopy

B. Normal seasonal fall color development

C. Phenoxy herbicide drift or residual exposure

D. Drought stress during a dry period

112. Delayed decline three years after nearby construction most likely results from:

A. A new invasive insect pest in the region

B. Normal aging unrelated to the construction

C. Reduced rainfall during the dormant period

D. Root damage during construction now exhausting reserves

113. Anthracnose is best classified as a:

A. Bacterial infection of the vascular system

B. Fungal disease producing leaf spots and blotches

C. Viral disease transmitted by aphid vectors

D. Nutrient disorder limited to new growth

114. Armillaria root rot is confirmed by finding:

A. White mycelial sheets beneath the bark of infected roots

B. Orange pustules on the upper surface of leaves

C. Sticky honeydew dripping from twig tips

D. Hollow tunnels carved into the heartwood

115. Dutch elm disease is spread primarily by:

A. Soil nematodes feeding on elm root systems

B. Wind blowing spores across long distances

C. Elm bark beetles and root grafts between trees

D. Rain splash from infected foliage to others

116. Trunk injection of a systemic insecticide is most appropriate for:

A. Small seedlings growing in container nurseries

B. Very young trees during establishment

C. Controlling weeds in the surrounding lawn

D. High-value trees threatened by borers

117. The phrase "the label is the law" means pesticide labels are:

A. Legally enforceable federal documents

B. Advisory documents to be followed when convenient

C. Expired after one year of open storage

D. Binding only during the first application

118. When a diagnosed disease has no effective treatment, the arborist should:

A. Apply experimental treatments without informing the owner

B. Communicate honestly and recommend appropriate management

C. Recommend removing all nearby trees as a precaution

D. Refuse to discuss the finding with the property owner

119. The Critical Root Zone (CRZ) of a mature tree is commonly calculated as a radius of:

A. Six inches per inch of trunk diameter

B. Two feet per inch of trunk diameter at breast height

C. Three feet per inch of trunk diameter

D. One foot per inch of trunk diameter at breast height

120. Tree protection fencing at a construction site should be placed at:

A. The trunk itself, encircling the bark closely

B. The dripline regardless of tree size or species

C. The CRZ boundary or further from the trunk

D. Half the distance between trunk and dripline

121. Concrete washout within a Tree Protection Zone is harmful because:

A. The aggregate physically damages absorbing roots

B. The vibration disturbs fine root hairs

C. The cement sets up around root surfaces

D. The high pH of the washwater can sterilize soil

122. Raising the soil grade significantly over an existing tree's roots causes:

A. Immediate death within days of the work

B. Stronger anchorage during major storms

C. Gradual decline as roots lose access to oxygen

D. Improved drainage benefits across the root zone

123. The least damaging method for installing a utility line across a root zone is generally:

A. Conventional open-cut trenching at full depth

B. Directional boring beneath the root zone

C. Mechanical auger boring downward from above

D. Surface installation directly on the soil

124. Storage of construction materials within a Tree Protection Zone is:

A. Prohibited because of soil compaction and root damage

B. Permitted if the materials are lightweight only

C. Required to free up other staging areas

D. Allowed only during dry weather conditions

125. A pre-construction tree assessment ideally occurs:

A. After demolition has begun on the site

B. After foundations have been poured and graded

C. Only if trees show obvious symptoms later

D. Before final design so findings can influence decisions

126. An arborist supervising unavoidable root impacts should:

A. Allow the excavator to tear roots randomly

B. Wait until after excavation to assess damage

C. Make clean cuts with sharp tools at the damage line

D. Apply wound sealant to every cut root surface

127. Post-construction care for a damaged tree should emphasize:

A. Aggressive crown reduction to balance roots

B. Deep watering, mulching, and multi-year monitoring

C. Heavy nitrogen fertilization to force growth

D. Immediate trunk injection with systemic fungicide

128. Using the dripline alone as a tree protection boundary is usually inadequate because:

A. Actual root systems extend well beyond the dripline

B. Drip patterns change shape during different seasons

C. Drip lines cannot be enforced legally

D. Drip lines are too difficult to survey accurately

129. Delayed decline following construction damage typically becomes visible:

A. Within hours of the damaging activity ending

B. Only during the next major drought cycle

C. Always on the first anniversary of the construction

D. Months to several years after the triggering event

130. Tree protection fencing on a construction site should be:

A. Lightweight flagging tape that crews can move freely

B. Short stakes spaced widely apart for appearance

C. Sturdy, visible, clearly marked, and maintained throughout

D. Painted to match nearby buildings on the lot

131. The single most effective action for protecting a mature tree during construction is:

A. Wrapping the trunk in protective foam padding

B. Excluding all activity from the root zone entirely

C. Pre-construction heavy fertilization of the root zone

D. Reducing the crown to balance expected root losses

132. Lowering the grade around an established tree primarily causes:

A. Direct loss of functional roots along with the soil removed

B. Improved drainage benefits to deeper roots

C. Increased nutrient access in newly exposed layers

D. Better wind anchorage from remaining roots

133. A baseline tree condition report prepared before construction:

A. Eliminates any need for later monitoring

B. Is used exclusively for billing the client

C. Documents pre-existing conditions for later comparison

D. Satisfies all regulatory requirements automatically

134. A tree showing no visible symptoms one year after construction:

A. Has fully recovered and needs no further attention

B. Is certain to fail during the next major storm

C. Can be safely fertilized heavily without concern

D. Should still be monitored for delayed decline

135. Hand or air excavation within a Tree Protection Zone is appropriate when:

A. Conventional trenching would be cheaper for the contractor

B. Roots must be identified and preserved during work

C. Speed is the most important consideration on site

D. The soil is too dry for mechanical equipment

136. A tree that has contacted an energized overhead line during construction should be:

A. Treated as potentially energized until the utility confirms otherwise

B. Approached immediately for pruning by any worker

C. Sprayed with water to dissipate the electrical charge

D. Removed quickly before the contact is reported

137. In formal tree risk assessment, "risk" is defined as:

A. The presence of any visible defect on a mature tree

B. The age of the tree multiplied by its height

C. The combination of likelihood of failure and severity of consequences

D. The total monetary value of the tree at market

138. A Level 2 tree risk assessment is typically:

A. A laboratory analysis of collected wood cores

B. A rapid drive-by screening of street trees

C. A theoretical model based on species alone

D. A detailed visual inspection of an individual tree

139. A Level 1 risk assessment is most appropriate for:

A. Rapid screening of large tree populations

B. Detailed evaluation of a single specimen of concern

C. Advanced internal diagnostics with instruments

D. Post-incident investigation of failure events

140. Codominant stems with included bark are hazardous because the trapped bark:

A. Emits chemical signals that attract decay

B. Prevents formation of a strong structural union

C. Acts as a reservoir for boring insect larvae

D. Alters the tree's center of gravity over time

141. The presence of a fungal fruiting body on a trunk indicates:

A. A healthy mycorrhizal partnership beneath the bark

B. Normal seasonal shedding of outer bark layers

C. Excess nitrogen from recent fertilization

D. Active decay already established within the tree

142. A target in tree risk assessment is best defined as:

A. Any person, property, or activity that could be affected by failure

B. A specific branch identified for pruning removal

C. A zone where the tree is expected to fall

D. An area of decay that has become externally visible

143. Target occupancy rate refers to:

A. The number of trees per acre in a given area

B. The age of structures beneath the canopy

C. The frequency and duration of target presence in the strike zone

D. The total value of nearby real estate

144. A new lean in a previously upright tree, with fresh soil cracking on the opposite side, indicates:

A. Normal phototropic adjustment toward sunlight

B. Root plate movement and elevated uprooting risk

C. A cosmetic change without structural meaning

D. Seasonal soil movement unrelated to the tree

145. Sounding the trunk with a mallet is useful for:

A. Measuring nitrogen content of the trunk wood

B. Identifying the species from the sound alone

C. Locating overwintering insects in the bark

D. Detecting hollow areas through changes in sound

146. The TRAQ risk matrix combines which two dimensions?

A. Likelihood of failure and impact with consequences

B. Tree species and trunk diameter at breast height

C. Site drainage and measured soil pH

D. Property value and the tree's age in years

147. A "probable" likelihood of failure in TRAQ means:

A. Failure has already occurred or is imminent

B. Failure is unlikely but not impossible

C. Failure is likely to occur during the assessment period

D. Failure cannot occur under any conditions

148. The "severe" consequence level in TRAQ applies to failures that produce:

A. Catastrophic damage, serious injury, or death

B. Minor property damage easily repaired at low cost

C. Moderate damage with no significant injury

D. No measurable effect on any nearby targets

149. A tree with an internal cavity may still be structurally sound if:

A. The cavity drains rainwater quickly after storms

B. The cavity is smaller than four inches in width

C. The cavity is located above six feet from grade

D. Sufficient intact wood remains around the perimeter

150. Consequences of failure depend on:

A. Only the total weight of the falling part

B. The size of the part, fall height, and nature of the target

C. Only the distance between tree and structure

D. Only the calendar age of the tree at failure

151. Residual risk refers to:

A. Risk remaining after mitigation has been implemented

B. The cost of insurance premiums on tree property

C. Risk during the mitigation work itself

D. Risk visible only after a tree is removed

152. A professional risk assessment report should include:

A. Only a single sentence final risk rating

B. The arborist's billing details for the visit

C. Scope, defects, targets, mitigation, and residual risk

D. A removal recommendation for every tree examined

153. Level 3 risk assessment tools include:

A. Standard measuring tape and ground observation

B. Resistograph drilling and sonic tomography

C. Color photographs taken from a moving vehicle

D. Basic hand pruners and small mallet

154. Cabling and bracing systems installed on mature trees:

A. Reduce but do not eliminate structural risk

B. Eliminate all structural risk on the union completely

C. Are required on every mature tree by ANSI A300

D. Need no further inspection after installation

155. When communicating risk findings to a property owner, the arborist should:

A. Use highly technical jargon to establish credibility

B. Recommend only the most expensive option

C. Withhold uncertain information to avoid worry

D. Use plain language and respect the owner's decisions

156. Root defects are difficult to evaluate during risk assessment because roots:

A. Always heal spontaneously on their own

B. Are only found in young trees recently planted

C. Are below ground and not directly observable

D. Never produce any above-ground symptoms

157. Which of the following is NOT a structural defect?

A. A codominant stem with significant included bark

B. A healthy rounded callus around an old small wound

C. A large dead scaffold limb above an occupied area

D. An active vertical crack exposing internal wood

158. Appropriate mitigation for a moderate-risk branch overhanging a driveway is:

A. Removing the entire tree as a preventive measure

B. Ignoring the situation until the branch fails

C. Cabling every branch in the entire crown

D. Reduction pruning to decrease end weight

159. The principal safety standard for arboricultural operations in the United States is:

A. ANSI A300 covering pruning practices

B. ANSI Z60.1 covering nursery stock

C. ANSI Z133 covering arboricultural safety requirements

D. OSHA 29 CFR 1926 for general construction

160. The minimum approach distance for an unqualified worker to an energized distribution line below 50 kV is:

A. Three feet in any direction

B. Ten feet in any direction

C. Five feet in any direction

D. Twenty-five feet in any direction

161. A qualified line-clearance arborist differs from an unqualified worker in that the qualified arborist has:

A. Specialized training in electrical hazards and line clearance

B. General experience in landscape design work

C. A current license to operate a bucket truck

D. Personal ownership of insulated rubber gloves

162. A climbing helmet used for arboricultural work must include:

A. A wide brim for blocking direct sunlight

B. An open face design for peripheral vision

C. Reflective tape covering every external surface

D. A chin strap to retain the helmet during climbing

163. Chainsaw-resistant leg protection works by:

A. Activating an electromagnetic brake in the saw

B. Containing fibers that clog the chain on contact

C. Reflecting the moving chain away from skin

D. Producing an audible warning to the operator

164. Hearing protection is generally required when noise levels exceed:

A. 30 decibels of normal conversation

B. 50 decibels of quiet outdoor activity

C. 85 decibels of typical chainsaw operation

D. 120 decibels of extreme machinery use

165. A proper pre-work job briefing should cover:

A. Work scope, hazards, PPE, and emergency procedures

B. Only the names of all crew members present

C. Only the lunch break schedule for the crew

D. Only the pricing of the day's planned work

166. ANSI Z133 requires aerial rescue capability on a climbing crew:

A. Only when working trees over 100 feet in height

B. Only when electrical hazards are present at the site

C. Only on weekends and holidays when EMS is delayed

D. For essentially all climbing operations with a crew

167. Suspension trauma can develop in a climber who:

A. Ascends a stationary line too quickly to the canopy

B. Remains motionless in a harness for an extended time

C. Uses a harness that fits too tightly at the waist

D. Switches between rope systems during a climb

168. The kickback zone of a chainsaw is located at:

A. The upper portion of the bar tip

B. The bottom edge of the bar near the powerhead

C. The middle of the cutting bar during use

D. The rear handle near the throttle control

169. The chainsaw chain brake is designed to:

A. Slow the chain to a smooth idle when not cutting

B. Reduce vibration transmitted to the operator

C. Stop the chain when activated by kickback or hand

D. Prevent engine flooding during cold-weather starts

170. The proper left-hand grip on a chainsaw includes:

A. Only fingertip contact for quick release

B. Loose contact to absorb engine vibration

C. Palm contact with thumb alongside the handle

D. The thumb wrapped fully around the front handle

171. Two-handed operation of a chainsaw is:

A. Required only for felling very large mature trees

B. The standard practice for nearly all saw use

C. Optional based on operator preference and skill

D. Reserved only for cuts above the operator's head

172. Top-handle chainsaws are designed specifically for:

A. Climbing arborist use up in the canopy

B. Cutting firewood at a residential woodlot

C. Bucking large logs while standing on the ground

D. Felling full-size mature trees in forestry

173. The chain catcher on a chainsaw is designed to:

A. Sharpen the chain automatically during use

B. Lubricate the chain during long cuts

C. Secure the chain to the bar during transport

D. Catch the chain if it breaks during cutting

174. The working load limit of rigging equipment is approximately:

A. Half of the rated tensile strength

B. Nine-tenths of the rated tensile strength

C. One-tenth of the rated tensile strength

D. Equal to the rated tensile strength itself

175. Shock loading in rigging refers to:

A. The static weight of the largest piece handled

B. Dynamic forces from a falling piece suddenly caught

C. Initial lifting force applied to a cut piece

D. Electrical charge building up in a dry rope

176. The most effective way to reduce shock loading during a rigging catch is to:

A. Use a friction device to allow controlled slip

B. Tie the rigging line to a hard anchor with no slip

C. Use the smallest-diameter rope that will fit the load

D. Position the ground worker beneath the falling piece

177. A block redirecting a rigging load over an anchor experiences approximately:

A. Half the force of the load itself

B. Exactly the force of the load itself

C. Twice the force of the load itself

D. No additional force when properly installed

178. The hinge in a standard felling cut:

A. Must be cut completely through before the tree falls

B. Controls fall direction as the tree commits to falling

C. Is needed only for hollow or decayed trees

D. Is formed only by the first notch cut from the front

179. An escape route during felling operations should:

A. Lead directly beneath the falling tree

B. Be improvised at the moment of the actual fall

C. Always be exactly straight behind the feller

D. Be planned and cleared before cutting begins

180. "Barber chair" in tree felling refers to:

A. Vertical splitting of the trunk during the back cut

B. A resting position taken between difficult cuts

C. A decorative form intentionally left in the stump

D. A specialty chain used for resinous softwood

181. Chipper operators should feed branches into the machine:

A. Tip first while standing directly behind the infeed

B. Wearing loose clothing for rapid release if needed

C. Butt end first while standing to the side of the infeed

D. Only during evening hours to avoid overheating

182. Aerial lift operators near energized lines must:

A. Approach within one foot for efficient pruning

B. Rely on rubber tires to isolate the lift electrically

C. Maintain distance only at the bucket itself

D. Maintain approach distance with both bucket and boom

183. Personal protective equipment should be inspected:

A. Before every use, with damaged items retired

B. Only during annual company safety reviews

C. Only after a known impact or failure event

D. Only by the original equipment manufacturer

184. The minimum tensile strength required for an arboricultural climbing rope under ANSI Z133 is:

A. 1,800 pounds for residential climbing work

B. 3,000 pounds for routine maintenance work

C. 5,400 pounds per the current standard

D. 10,000 pounds for any climbing operation

185. A properly tied friction hitch should:

A. Lock rigidly and never move under any load

B. Grip reliably while permitting controlled adjustment

C. Be replaced after every single climb

D. Slip continuously to allow rapid descent

186. The feed control bar on a wood chipper is designed to:

A. Indicate the speed of the chipping drum

B. Meter lubricant to the feed roller bearings

C. Switch the chipper between forward and reverse

D. Stop the feed rollers in an emergency

187. When refueling a chainsaw, the operator should:

A. Stop the saw and allow it to cool briefly first

B. Refuel quickly without removing the cap completely

C. Keep the saw running at low idle during refueling

D. Refuel with cut-resistant gloves still on the hands

188. A first aid kit on a tree care worksite should:

A. Be stored in a vehicle parked off the site

B. Contain only basic over-the-counter medications

C. Be available on site and stocked appropriately

D. Be carried only by the designated safety officer

189. Urban trees reduce the urban heat island effect primarily through:

A. Releasing methane gas into the atmosphere

B. Shading surfaces and evapotranspiration cooling

C. Absorbing heat directly through their root systems

D. Reflecting sunlight from waxy leaf surfaces

190. A complete tree inventory records information on:

A. Only trees scheduled for immediate removal

B. A statistical sample of the total population

C. Only trees with obvious structural defects

D. Every tree within the defined inventory area

191. The i-Tree suite of analytical tools was developed to help communities:

A. Estimate the dollar value of ecosystem services

B. Identify unknown tree species from photographs

C. Predict which specific trees will fail in storms

D. Determine the genetic makeup of urban forests

192. The trunk formula method of plant appraisal is most appropriate when:

A. The tree has no visible defects of any kind

B. A replacement tree of identical size is available

C. The tree is too large to replace with nursery stock

D. The tree is a recently planted nursery specimen

193. A typical tree protection ordinance:

A. Bans all pruning by private property owners

B. Requires mandatory removal of mature trees over time

C. Applies only to trees planted by the city

D. Requires permits for removal of protected trees

194. Canopy cover goals are typically expressed as:

A. The number of trees per square mile of city

B. The percentage of land area covered by canopy

C. The total leaf biomass produced annually

D. The average height of street trees in feet

195. A Tree City USA community must maintain a minimum forestry budget of:

A. Two dollars per capita annually

B. Ten dollars per capita annually

C. Fifty dollars per capita annually

D. One hundred dollars per capita annually

196. Species rating in plant appraisal reflects:

A. The lumber value of the species today

B. The exact age of the tree being appraised

C. The desirability and suitability in the local area

D. The current height of the tree in feet

197. Communicating recommendations to a property owner should use:

A. Highly technical jargon to display expertise

B. Pressure tactics to close the sale quickly

C. Refusal to provide any pricing estimate

D. Plain language with respect for the owner's decisions

198. Multiple studies have documented which social or health benefit of urban trees?

A. Improved mental health and reduced stress for residents

B. Increased crime rates in heavily wooded neighborhoods

C. Higher rates of asthma across all age groups

D. Reduced physical activity among nearby residents

199. An urban forester advocating for canopy expansion before a budget-focused council should emphasize:

A. The aesthetic preferences of the forestry staff

B. The documented dollar value of ecosystem services

C. The simplicity of installing artificial turf instead

D. The personal favorite tree species of the mayor

200. Street trees planted following the 10-20-30 rule:

A. Must include only native species from the region

B. Must all be very slow-growing species only

C. Protect the community against catastrophic pest loss

D. Must be purchased from a single approved supplier

PRACTICE EXAM 8 — ANSWER KEY AND EXPLANATIONS

1. B — The thin pale layer between wood and inner bark is the vascular cambium, the actively dividing tissue responsible for secondary growth. It produces new xylem inward and new phloem outward each year. This is the engine of trunk thickening and the source of annual growth rings.

2. D — Mechanical wind stress stimulates the cambium to produce reaction wood and develop greater trunk taper at the base, where bending forces are greatest. This is why naturally flexed trees develop stronger structure than rigidly staked ones. Wind exposure builds wood, not weakens it.

3. A — Trees store surplus photosynthate primarily as starch held in living parenchyma cells within sapwood, inner bark, and roots. Starch reserves fluctuate seasonally and fuel recovery from defoliation, drought, and spring bud break. This is why repeated defoliation is so damaging.

4. C — Phloem cells remain alive at maturity and transport sugars from sources (typically leaves) to sinks (roots, growing tips, storage tissues). Unlike xylem, phloem requires active cellular processes for sugar transport. This is the fundamental difference between the two vascular tissues.

5. A — Evaporation from leaf surfaces creates the tension that pulls water upward through xylem via the cohesion-tension mechanism. No metabolic energy is required from the tree itself. This is why stomatal closure during drought halts water movement entirely.

6. D — A successfully compartmentalized wound shows new wood and callus tissue surrounding the original injury, indicating that the tree has walled off the damage and produced new growth at the perimeter. This is the visible evidence of effective CODIT response.

7. B — CODIT (Compartmentalization Of Decay In Trees) describes how trees wall off damaged areas with internal barriers rather than replacing damaged tissue. This is fundamentally different from mammalian wound healing. Trees grow over and around wounds rather than repairing them.

8. C — Wall 4 is formed by the cambium after the wound is created and resists outward spread of decay into new wood produced after the injury. It is the strongest of the four CODIT walls. Preserving the branch collar during pruning is essential because it contains this critical cambium.

9. A — Most absorbing roots are concentrated in the upper 18 inches of soil, where oxygen, water, and nutrients are most available. They extend well beyond the dripline, often two to three times the crown radius. The deep taproot image is largely incorrect for mature trees.

10. C — A girdling wire severs the phloem, interrupting downward sugar transport from leaves to roots. The roots gradually starve and lose function, followed by the rest of the tree. Xylem flow continues above the girdle until root failure cascades upward.

11. D — Auxin produced at the shoot tip travels downward and suppresses the growth of lateral buds below. Removing the leader interrupts this suppression and releases lateral buds to grow. This hormone-driven mechanism is the biological basis for many pruning responses.

12. A — Reserves reach their lowest point in late spring when new leaves have emerged and matured but have not yet returned more sugar than the refoliation cost. Spring defoliation during this window is particularly devastating. Reserves rebuild through summer and peak in autumn.

13. B — Heartwood is composed entirely of dead cells with extractives (tannins, resins) deposited in the cell walls. It provides structural support and resists decay but no longer conducts water. Sapwood, by contrast, is the outer functional xylem.

14. C — Closing stomata simultaneously reduces transpiration (water loss) and photosynthesis (because CO_2 can no longer enter). This trade-off between water conservation and carbon gain is the central constraint on tree function under heat or drought stress.

15. A — Mycorrhizal fungi colonize tree roots and extend hyphae outward into the surrounding soil, dramatically increasing the effective absorbing surface area. The tree supplies sugars; the fungus supplies access to water and nutrients from a much larger soil volume.

16. D — Stomata regulate gas exchange (CO_2 in, O_2 and water vapor out) but do not anchor the leaf blade. The petiole and vascular tissues provide attachment. Distinguishing structural attachment from physiological functions is essential.

17. B — Respiration consumes oxygen to release stored chemical energy from carbohydrates, powering cell division, ion uptake, and defense. Every living cell respires continuously, day and night. This is why stressed trees continue to deplete reserves even when photosynthesis has stopped.

18. A — Xylem conducting cells are dead at functional maturity, forming hollow tubes that transport water through the tree without requiring metabolic energy. This design is elegant because no respiration is needed to maintain the pipework. Phloem and cambium, in contrast, must remain living.

19. C — The branch collar contains the cambium that forms Wall 4 around a pruning wound. Preserving the collar intact is essential for proper compartmentalization. Flush cuts destroy the collar and eliminate Wall 4.

20. D — The cohesion-tension theory relies on hydrogen bonding between water molecules, which holds the column of water together as it is pulled upward by transpiration tension. This cohesive strength allows trees to lift water hundreds of feet without active pumping.

21. A — A tree under prolonged drought closes stomata to conserve water, which simultaneously reduces photosynthesis because CO_2 can no longer enter. This trade-off explains why drought is not merely a wilting problem but a starvation problem. Repeated drought depletes reserves.

22. C — Adventitious roots arise from stems or other non-root tissues, rather than from seed radicles or existing root systems. They can develop from buried trunks or from mulch piled against bark. They contribute to girdling root problems in deeply planted trees.

23. B — Annual growth rings are wider in years with adequate moisture and favorable temperatures, when the tree can sustain high photosynthetic rates. Drought, frost damage, and heavy defoliation all reduce growth and produce narrower rings. This is why dendrochronology can reconstruct past climate.

24. A — Red maple has opposite leaf arrangement and produces paired winged samaras characteristic of the genus *Acer*. This combination of features is diagnostic for maple. The samaras spin as they fall, aiding wind dispersal.

25. D — MAD Horse stands for Maples, Ashes, Dogwoods, and Horse chestnut — the common temperate genera with opposite leaf arrangement. Most other broadleaf trees are alternate. This mnemonic eliminates most identification possibilities at a glance.

26. A — White oaks have rounded leaf lobes without bristles and acorns that mature in a single growing season. Red oaks have pointed bristle-tipped lobes and acorns maturing over two seasons. These differences are the primary distinction between the two groups.

27. C — Binomial nomenclature requires the genus capitalized and italicized in print, with the specific epithet lowercase and also italicized. *Acer rubrum* follows the convention correctly. All-caps and all-lowercase forms violate the rules.

28. A — A name in single quotation marks following a species name indicates a cultivar — a cultivated variety selected for specific characteristics and propagated clonally. Cultivar names are not italicized. They differ from botanical varieties found in wild populations.

29. B — Bald cypress (*Taxodium distichum*) is a deciduous conifer that sheds its needles each autumn. It is one of a small group of deciduous conifers including larch and dawn redwood. Hemlock, white pine, and red cedar are all evergreen.

30. D — The 10-20-30 rule limits urban forests to no more than 10% of any single species, 20% of any single genus, and 30% of any single family. The hierarchy protects against threats at each taxonomic level. Dutch elm disease and emerald ash borer illustrate the rule's importance.

31. C — Tree of heaven (*Ailanthus altissima*) is widely classified as invasive in much of eastern North America. It escapes cultivation and colonizes disturbed sites aggressively. It is also the preferred host of the spotted lanternfly. Redbud, dogwood, and holly are all natives.

32. A — A tree with a mature height under 25 feet is appropriate for planting beneath a 30-foot distribution power line, leaving safe clearance below the conductors. This is a direct application of Right Tree, Right Place. Mature size, not planting size, governs the decision.

33. B — A pinnately compound leaf has leaflets arranged along two sides of a central rachis, like the feathers of a bird. Palmately compound leaves have leaflets clustered at a single point. Ash, hickory, and walnut are pinnate.

34. C — Oak, hickory, and beech all have alternate leaf arrangement on their stems. The MAD Horse genera (maple, ash, dogwood, horse chestnut) are opposite, as are catalpa and viburnum. Recognizing alternate vs. opposite narrows identification quickly.

35. D — American sycamore (*Platanus occidentalis*) is distinguished by mottled tan and gray peeling bark and broad palmate leaves. The bark alone often allows identification from a distance. Maples and hickories have very different bark patterns.

36. A — Right Tree, Right Place primarily means matching a tree's mature characteristics — size, form, soil and water needs, tolerance — to the conditions of the planting site. Mature size is particularly important. Ignoring mature dimensions is the most common species selection error.

37. B — *Fraxinus* (the ash genus) belongs to the olive family Oleaceae, which also includes lilacs and forsythias. It is not a member of the pine, rose, or soapberry families. Family-level recognition matters for understanding pest susceptibilities.

38. C — Horse chestnut (*Aesculus hippocastanum*) has palmately compound leaves with five to seven leaflets, opposite arrangement, and showy upright spring flower spikes. It belongs to the soapberry family along with maples. It is the "Horse" in the MAD Horse mnemonic.

39. A — Winter identification depends on bud shape, twig features, and bark character because foliage is absent. Leaf margin and venation of new spring foliage are not available in winter. Experienced arborists can identify most deciduous trees from twigs alone.

40. D — Native species are adapted to local climate, soils, pest pressures, and ecological relationships, which generally translates to lower maintenance requirements and better wildlife support. Claims of automatic pest immunity or guaranteed faster growth are overstatements.

41. D — Loam is a soil texture with roughly balanced proportions of sand, silt, and clay. It drains adequately, holds enough water, and supports good structure when organic matter is present. Loam is the ideal texture for most tree species.

42. A — The pH scale runs from 0 to 14, with 7 being neutral. Values above 7 are alkaline; values below 7 are acidic. Each whole number represents a tenfold change in hydrogen ion concentration.

43. C — Cation exchange capacity primarily depends on clay content and organic matter, both of which have negatively charged surfaces that hold cation nutrients. Building organic matter is the only practical way to raise CEC in sandy soils. Higher CEC means better nutrient retention.

44. B — Compaction reduces pore space and the large pores that hold air, starving roots of oxygen needed for respiration. Roots that cannot respire cannot absorb water or nutrients. This is the primary mechanism by which compaction kills urban trees.

45. D — An ideal soil contains approximately 50% pore space by volume, split roughly between water and air, with the remaining 50% as mineral solids and small organic fraction. Pore space is where roots, water, and air reside.

46. A — Mycorrhizal fungi extend the absorbing surface of the root system by sending hyphae far into the surrounding soil. The tree supplies sugars; the fungus supplies access to water and nutrients from a larger volume. The partnership is essential for most tree species.

47. C — Iron chlorosis in a pin oak growing in alkaline soil is almost always caused by high pH rendering iron chemically unavailable. The iron is present but not in forms roots can absorb. Treatment must address pH or use chelated iron.

48. B — A proper mulch layer is 2 to 4 inches deep with the trunk base kept clear of mulch. Deeper layers can suffocate roots, and piling mulch against the trunk causes bark decay. The correct shape is a flat ring, not a volcano.

49. D — Drain time of 36 hours indicates inadequate drainage for most tree species. Water that persists more than 12 to 24 hours signals a drainage problem. Site modification or species selection is required before planting.

50. A — Soil texture is essentially permanent because the proportions of sand, silt, and clay cannot be meaningfully altered by any realistic amount of amendment. These proportions are determined by parent material and weathering. Working with existing texture is the only realistic strategy.

51. B — Bulk density above approximately 1.7 g/cm³ indicates severe compaction that halts most root growth. A reading of 1.8 is clearly in the severe range. Values below 1.3 generally indicate good structure.

52. D — Maintaining a continuous organic mulch layer at the soil surface is the most effective long-term practice for building organic matter. Mulch decomposes gradually, enriching the soil without disturbance. Tilling damages existing roots and structure.

53. C — A composite sample averages variation across the area being tested, producing a representative result. A single spot sample may not reflect overall conditions. Proper sampling is the most important step in soil testing — more important than the analysis itself.

54. A — Continuous addition of organic matter is the most effective way to actually improve a clay soil's structure over time. Lime addresses pH but not structure; sand often makes clay soils worse; foliar sprays do not affect soil. Organic matter improves aggregation and pore space.

55. C — Planting holes should be at least two to three times the diameter of the root ball to provide a zone of loosened soil for new roots to expand into. Width matters more than depth. A hole dug just to ball width offers no expansion zone.

56. B — The root flare should sit at or slightly above the surrounding grade at planting. Burying the flare is one of the most common serious planting errors. The correct depth preserves the flare and allows for some settling without burial.

57. D — Current best practice is to backfill with the unamended native soil excavated from the planting hole. Research has shown that heavily amended backfill can produce pot-bound conditions in the ground. Soil improvement is better delivered through surface mulching.

58. A — A widely used rule of thumb is one year of establishment per inch of trunk caliper at planting. A 2-inch caliper tree needs about two growing seasons; a 4-inch caliper tree needs about four. During this period the tree is rebuilding its root system.

59. B — Staking should be used only when necessary and removed within one growing season in most cases. Unnecessary or prolonged staking produces weaker trunks. The natural flex of the trunk builds strength and taper.

60. D — Circling roots found at planting should be cut or straightened before the tree is placed in the hole. Leaving them in place guarantees they will remain as permanent defects. Correction becomes impossible once the tree is backfilled.

61. A — Current best practice is to cut and remove at least the upper portion of the wire basket after the tree is set in the hole, along with burlap and twine contacting the trunk. Full removal risks damaging the ball; the lower portion can be left in place.

62. C — Planting too deep — burying the root flare — is the most common serious error in planting container-grown trees. The buried flare develops bark decay and girdling root problems that can take years to manifest. Finding and preserving the true flare is essential.

63. B — Establishment watering should keep the root ball and surrounding backfill consistently moist but not saturated. Both extremes are damaging — dry kills through desiccation and saturation kills through suffocation. Checking soil moisture directly is more reliable than fixed schedules.

64. A — Fertilization of a newly planted tree during its first growing season is generally unnecessary and can be counterproductive. A reduced root system cannot effectively use additional nitrogen, and forced top growth exceeds what the roots can support.

65. D — Dormancy — late fall after leaf drop or early spring before bud break — is the preferred transplanting window for most deciduous trees. The tree is not actively transpiring and the stress of root loss is minimized. Summer transplanting carries much higher risk.

66. B — Advance root pruning severs roots at the future root ball line one or more growing seasons before the move. The tree responds by producing new fibrous roots inside the line, which are harvested with the ball and dramatically improve transplant survival.

67. D — Twine tied around the trunk does not decompose reliably and can girdle the trunk as it grows. Synthetic twine in particular persists indefinitely. A single cut at planting prevents years of later damage.

68. A — A balled-and-burlapped tree must be lifted by supporting the root ball from underneath, never by the trunk. Lifting by the trunk can separate the trunk from the ball and destroy the root connection. This is one of the most basic handling rules.

69. C — Mulching does not supply all of a tree's nitrogen needs for the year, though it may contribute some nitrogen as it decomposes. Mulching does conserve moisture, moderate temperature, and suppress weeds. The other three benefits are genuine.

70. A — Planting hole depth should equal the distance from the root flare to the bottom of the root ball — no deeper. A deeper hole allows the tree to settle and bury the root flare, producing long-term decline. Width can be generous, but depth must be exact.

71. C — Nursery stock should be inspected at delivery for trunk condition, crown structure, visible root flare, and root ball condition. Defects identified at delivery can be avoided by rejecting the tree. Inspection is more than checking the manifest.

72. D — A tree that fails to leaf out the spring after planting most likely suffered root ball desiccation during handling. Damaged or dried-out roots cannot support bud break. Inspection at delivery and proper handling prevent most of these failures.

73. A — ANSI A300 governs tree pruning and maintenance practices in the United States. ANSI Z133 addresses worker safety; ANSI Z60.1 covers nursery stock; ANSI Z89.1 covers head protection. Together these standards define accepted professional practice.

74. C — A proper pruning cut is placed just outside the branch collar and bark ridge so the cambium at the wound edge can form Wall 4. Flush cuts and stubs both damage this mechanism. Correct placement is the biological foundation of good pruning.

75. D — Topping creates large wounds that cannot close, removes excessive foliage, depletes carbohydrate reserves, and produces weakly attached epicormic sprouts. It violates every principle of proper pruning simultaneously. ANSI A300 explicitly prohibits it.

76. B — The three-cut method prevents bark from tearing down the trunk below the cut when a heavy branch falls. A single cut from above causes the falling weight to rip bark downward. The undercut severs this bark pathway in advance.

77. A — The first cut is made on the underside of the branch, partway through, several inches beyond the final cut location. This undercut prevents bark tearing when the second cut releases the branch. The sequence is non-negotiable for branches heavy enough to tear bark.

78. D — Cleaning is the selective removal of dead, dying, diseased, broken, and weakly attached branches from the crown. It is one of the five primary pruning objectives recognized by ANSI A300 and the most common routine objective.

79. B — A reduction cut removes a branch back to a lateral large enough (typically at least one-third the diameter of the removed portion) to assume the terminal role. Heading cuts, by contrast, leave arbitrary stubs without regard to laterals.

80. C — Structural pruning during the juvenile phase produces the greatest benefit because small cuts now correct defects that would otherwise require much larger, more damaging cuts decades later. The architectural framework is still being established. Waiting until maturity is far less effective.

81. C — Removing no more than 10 to 15% of live foliage in a single session is the general limit for mature trees, with even less for older or stressed specimens. Heavy pruning depletes reserves and produces weakly attached epicormic sprouts.

82. A — The branch bark ridge is a raised line of bark on the upper surface of a branch union, running outward along the stem from the crotch. It marks the dividing line between stem and branch tissue and is the reference for correct cut placement.

83. D — Lion-tailing strips interior foliage and concentrates weight at the branch ends, creating weaker branches than properly distributed thinning. The pattern removes interior foliage that cushions wind loads. It is explicitly discouraged under current standards.

84. B — Pollarding requires repeated cuts at the same framework points on an ongoing schedule, usually annually or biennially. It must be maintained once begun. Abandoning a pollarded tree produces weakly attached epicormic growth.

85. C — Restoration pruning develops an acceptable crown structure from sprouts that have emerged after topping, vandalism, or severe storm damage. It is a long-term process requiring multiple visits over years. It cannot undo the original damage.

86. A — Research has shown that wound dressings provide minimal benefit and in some cases actually slow compartmentalization by trapping moisture and creating favorable conditions for decay organisms. Current best practice is to leave pruning cuts unsealed.

87. D — In oak wilt regions, pruning of oaks should be postponed until dormancy to reduce the risk of attracting sap-feeding beetle vectors to fresh wounds. Timing is the primary defense. Dormant-season pruning minimizes transmission risk.

88. B — Subordination reduces the growth of a competing stem in favor of a dominant leader, gradually shifting dominance without the wound of outright removal. It is used to correct codominant stems in young trees.

89. A — A flush cut removes the branch collar along with the branch, eliminating the cambium that would have formed Wall 4. The result is a wound that cannot be effectively compartmentalized and provides a direct pathway for decay.

90. D — A stub cut leaves dead wood projecting beyond the branch collar that the tree cannot compartmentalize. The dead stub becomes an entry point for fungal colonization that eventually reaches the collar and then the trunk.

91. C — Bypass blades cut with a scissor-like action between two curved blades, producing clean cuts on living wood without crushing tissue. Anvil blades press the stem against a flat surface and tend to crush, limiting them to dead material.

92. B — A pole pruner is most appropriate for small-diameter branches out of reach from the ground that do not warrant climbing. Larger branches require more controlled methods. Whole-tree felling and full-canopy work require different tools.

93. D — Removing 50% of live foliage from a mature tree far exceeds the 10 to 15% guideline and would initiate decline. The professional response is to explain that thinning of that magnitude violates accepted standards and propose an appropriate alternative.

94. A — Codominant stems with included bark should be corrected early, while the tree is young and the cuts are small. Subordination or removal shifts dominance to a single leader. Waiting until maturity requires much larger and more damaging cuts.

95. C — The raise objective refers to selective removal of lower branches to provide vertical clearance beneath the crown for pedestrians, vehicles, or sight lines. Raising should be done gradually on young trees to avoid producing a disproportionate crown.

96. D — Tool disinfection is most important when pruning trees with known contagious diseases such as fire blight. Disease organisms can be transferred between cuts on contaminated blades. For routine work on healthy trees, disinfection is not generally required.

97. B — A professional pruning specification should include the identified objective, the percentage of foliage to be removed, and the diameter range of cuts. The climber's personal preferences are not part of a professional specification — clear specifications protect tree, client, and arborist.

98. C — Bypass loppers extend the principle of hand pruners to branches up to approximately one and a half to two inches in diameter, using long handles for mechanical advantage. Smaller branches are better handled by hand pruners.

99. A — Removing a dead branch is part of the cleaning pruning objective, which is defined as selective removal of dead, dying, diseased, broken, and weakly attached branches. Cleaning is the most common routine pruning objective.

100. D — The placement of the cut relative to the branch collar is the single most important factor in whether a pruning wound closes successfully. Correct placement preserves the cambium that forms Wall 4; incorrect placement eliminates it.

101. B — Diagnosis begins with identifying the species and understanding its normal characteristics, because a symptom cannot be evaluated without knowing what a healthy specimen looks like. Jumping to treatment leads to routine misdiagnosis.

102. C — A sign is direct evidence of the causal agent itself — fungal fruiting bodies, visible insects, or confirmed pathogens. Signs are more reliable than symptoms because they point directly to a cause rather than to the tree's response.

103. A — A symptom is the tree's response to a problem — wilting, yellowing, dieback, thinning. Symptoms indicate that something is wrong but usually do not identify the specific cause. Multiple problems can produce overlapping symptoms.

104. D — A primary pest can attack and kill healthy, vigorous trees on its own without requiring the host to be stressed first. Secondary pests, by contrast, attack only weakened trees. The distinction is critical for management.

105. B — Emerald ash borer is classified as a primary pest because it can successfully attack and kill healthy ash trees of all sizes. This distinguishes it from most native wood borers and is why it has devastated ash populations across North America.

106. A — IPM is a decision-making framework that integrates monitoring, action thresholds, multiple control tactics, and outcome evaluation. It is not a specific product or a prohibition on pesticides. The least toxic effective option is preferred when chemical control is warranted.

107. C — Fire blight is caused by the bacterium *Erwinia amylovora* and affects members of the rose family (Rosaceae), including apple, pear, hawthorn, and serviceberry. Family-level recognition matters because susceptibility extends across the family.

108. D — Oak wilt spreads through root grafts between adjacent oaks and through sap-feeding beetles attracted to fresh wounds. The beetle-vector pathway makes warm-season pruning of oaks particularly risky in affected regions.

109. B — Iron is an immobile nutrient, and deficiency appears first on new leaves as interveinal chlorosis with green veins. The tree cannot translocate iron from older foliage. In landscape settings, this is almost always a pH-related availability problem.

110. A — Nitrogen is a mobile macronutrient that the tree translocates from older leaves to support new growth when supply is inadequate. Deficiencies therefore appear first on older inner leaves as uniform yellowing. All mobile-nutrient deficiencies follow this pattern.

111. C — Cupping and twisting of new growth on a mature tree most likely indicates phenoxy herbicide exposure such as 2,4-D, which mimics plant growth hormones. The pattern is often most severe on the side nearest the application source.

112. D — Delayed decline several years after construction almost always reflects root damage that occurred during the work. Trees mobilize reserves to mask initial injury, and visible symptoms typically appear one to three years later when reserves are exhausted.

113. B — Anthracnose is a general term for several fungal leaf diseases that produce spots, blotches, and leaf distortion, often followed by premature leaf drop. Most anthracnose infections are cosmetic rather than life-threatening. Sycamore anthracnose is a particularly visible example.

114. A — Armillaria root rot produces characteristic white mycelial sheets (fungal tissue) beneath the bark of infected roots, visible when the bark is peeled back. Honey-colored mushrooms may also appear at the base in fall.

115. C — Dutch elm disease is a vascular wilt spread primarily by elm bark beetles carrying fungal spores and by root grafts between adjacent elms. This dual pathway is why the disease caused the near-total loss of American elm as a street tree.

116. D — Trunk injection of systemic insecticides is most appropriate for high-value trees threatened by borers, where foliar sprays would be impractical or ineffective for reaching internal tissues. Injection provides rapid systemic translocation with low environmental exposure.

117. A — "The label is the law" means pesticide product labels are legally enforceable federal documents. Applications must match the uses, rates, sites, and methods authorized on the label, and deviations carry legal and liability consequences.

118. B — When no effective treatment exists, the professional response is to communicate the diagnosis honestly and recommend appropriate management, which may include monitoring, removal, or supportive care. Honesty is part of professional standing.

119. D — The CRZ is commonly calculated as a radius of one foot per inch of trunk diameter at breast height. A 24-inch DBH tree has a 24-foot radius CRZ. This formula is the standard reference in ISA Best Management Practices.

120. C — Tree protection fencing should be placed at the calculated CRZ boundary or further from the trunk. Placing fencing at the dripline or closer leaves significant root area exposed. The CRZ formula produces a more defensible boundary.

121. D — The high pH of cement washwater can sterilize soil and kill roots in the affected area. Concrete washout within a TPZ is among the most damaging activities on construction sites and must be explicitly prohibited.

122. C — Raising the grade buries existing roots and root flares under added soil, producing gradual decline as buried tissues lose access to oxygen and gradually fail. Symptoms develop over months or years as reserves are exhausted.

123. B — Directional boring or tunneling passes a utility beneath the root zone without disturbing the soil at root depth. Conventional open-cut trenching through the CRZ is the most damaging option. Higher equipment cost typically favors boring when tree value is significant.

124. A — Storage of construction materials within a TPZ is prohibited because stockpiles compact the underlying soil under their weight and smother roots. This is one of the standard prohibitions enforced by TPZ fencing.

125. D — Pre-construction tree assessment should occur before final design so findings can influence project decisions. Assessment after drawings are complete is reduced to documentation of what has already been decided.

126. C — An arborist supervising unavoidable root impacts should make clean cuts with sharp tools at the damage line before excavation begins. Clean cuts produce better wound responses than the tearing and crushing from unprepared excavation.

127. B — Post-construction care includes deep periodic watering, generous mulching, conservative pruning focused on deadwood and safety, and annual monitoring for at least three to five growing seasons. Patience drives recovery.

128. A — The actual root system of a mature tree typically extends two to three times the crown radius, well beyond the dripline. Using the dripline as the protection boundary leaves most absorbing roots exposed.

129. D — Delayed decline following construction damage typically becomes visible months to several years after the triggering event. Trees mobilize reserves to mask initial injury, and when reserves are exhausted, decline begins. Monitoring should continue for at least three to five growing seasons.

130. C — Tree protection fencing should be sturdy, visible (brightly colored, at least four feet tall), clearly marked with signage, and maintained throughout construction. Flimsy flagging is routinely moved or ignored.

131. B — Excluding all activity — traffic, equipment, and materials — from the root zone is the single most effective action during construction. Compaction and root damage are prevented most reliably by keeping activity out entirely.

132. A — Lowering the grade removes soil along with any roots growing in it, producing immediate direct loss of functional root tissue. Even a few inches of grade cut can remove a large share of absorbing roots concentrated near the surface.

133. C — A baseline condition report documents pre-existing tree conditions for later comparison. It protects all parties when damage is alleged after construction, allowing actual damage to be distinguished from pre-existing conditions.

134. D — A tree showing no visible symptoms one year after construction is not yet out of danger, because delayed decline can appear one to three years later as reserves are exhausted. Monitoring should continue for at least three to five growing seasons.

135. B — Hand or air excavation allows workers to identify and preserve roots individually rather than severing them blindly. These techniques trade labor cost for root preservation and are appropriate when roots must be crossed.

136. A — A tree that has contacted an energized line should be treated as potentially energized until the utility confirms de-energization. A branch in contact with a line can energize the entire tree, including trunk and lower branches.

137. C — Risk is formally defined as the combination of likelihood of failure and severity of consequences. Neither tree condition nor target presence alone constitutes risk. Both factors must be considered together.

138. D — A Level 2 assessment is a detailed visual inspection of an individual tree, typically performed while walking around it from multiple angles using basic tools such as a mallet and probe. It is the standard level for trees of concern.

139. A — Level 1 assessment is a rapid limited visual screening used for large tree populations along streets, through parks, or across properties. Its purpose is to identify obvious hazards requiring further evaluation.

140. B — Included bark between codominant stems prevents the formation of a strong structural union. The attachment becomes progressively weaker as the stems grow, and catastrophic splitting can occur without warning.

141. D — The presence of a fungal fruiting body on a trunk indicates that active decay is already established within the tree's tissues. Fruiting bodies are the reproductive stage of fungi whose vegetative bodies extend into the tree.

142. A — A target is any person, property, or activity that could be affected by a failing tree or tree part. Targets include pedestrians, vehicles, buildings, utility lines, and outdoor activities. Without targets, even high failure likelihood does not produce high risk.

143. C — Target occupancy rate formalizes the frequency and duration of target presence within the potential strike zone. Higher occupancy contributes to higher overall risk because failures are more likely to coincide with target presence.

144. B — A new lean combined with fresh soil cracking on the opposite side indicates root plate movement and elevated risk of uprooting failure. Trees showing these signs should be considered at imminent risk. Immediate action may be warranted.

145. D — Sounding the trunk with a mallet produces a solid ringing sound over intact wood and a dull hollow sound over decayed or hollow areas. It is a simple but useful technique for detecting large decay columns that might otherwise be missed visually.

146. A — The TRAQ risk matrix combines likelihood of failure and impact (probability that failure will occur and strike a target) with consequences of failure (severity if impact occurs). The combination produces the overall risk rating.

147. C — A probable likelihood of failure in TRAQ means failure is likely to occur during the assessment time frame under normal conditions. The four levels are improbable, possible, probable, and imminent.

148. A — The severe consequence level in TRAQ applies to catastrophic property damage, serious injury, or death. Minor consequences involve minor damage or injury; significant consequences fall between.

149. D — A tree with an internal cavity may still be structurally sound if sufficient intact wood remains around the cavity perimeter to resist bending forces. A common guideline holds that at least one-third of the diameter should remain as sound wood.

150. B — Consequences of failure depend on the size of the falling part, the height from which it would fall, and the nature of the target it would strike — all three factors together. A single factor in isolation cannot predict severity.

151. A — Residual risk is the risk that remains after mitigation measures have been implemented. No mitigation eliminates risk entirely — pruned trees can still fail, cabled unions can still split. Clients must understand they are choosing acceptable risk levels.

152. C — A professional risk assessment report should document the scope of the assessment, identified defects, targets, recommended mitigation, and an explicit residual risk statement. Thorough reporting supports defensibility and client decision-making.

153. B — Level 3 assessment techniques include resistograph drilling, sonic tomography, static load testing, and other advanced instrumentation. These tools are reserved for high-value trees or situations where Level 2 has left significant uncertainty.

154. A — Cabling and bracing provide supplemental support that reduces but does not eliminate structural risk. The installations require ongoing inspection and maintenance. They are appropriate when defects cannot be addressed by pruning alone.

155. D — Effective client communication uses plain language, presents options rather than ultimatums, and respects the owner's decision-making authority. Technical jargon, pressure tactics, and withholding information all damage credibility.

156. C — Root defects are difficult to evaluate because roots are below ground and cannot be directly observed. Arborists rely on indirect indicators such as root plate movement, fungal fruiting bodies at the flare, and construction history.

157. B — Healthy rounded callus tissue around a small old wound indicates successful compartmentalization and closure. This is evidence of normal healing, not a structural defect. The other options are all genuine defects.

158. D — Reduction pruning to decrease end weight on an overextended branch is a standard mitigation for moderate risk from specific branch defects over targets. It addresses the identified defect without removing the entire tree.

159. C — ANSI Z133 is the American National Standard for Arboricultural Operations — Safety Requirements and is the principal safety standard for tree care work in the United States. ANSI A300 addresses pruning; Z133 addresses safety.

160. B — The minimum approach distance for unqualified workers to energized distribution lines below 50 kV is 10 feet under ANSI Z133. This is the most commonly cited MAD figure and applies to most lines in residential and commercial tree work.

161. A — A qualified line-clearance arborist has completed specialized training in electrical hazards, safe work procedures near energized lines, use of insulated tools, and emergency response to electrical contact. This training cannot be acquired informally.

162. D — A climbing helmet must have a chin strap to retain the helmet during active climbing, rigging, and inverted positions. Traditional construction hard hats without chin straps can fall off during dynamic movement.

163. B — Chainsaw-resistant leg protection contains cut-resistant fibers (ballistic nylon or aramid) that clog the chain of a running saw on contact, stopping the chain before it reaches the leg. The protection dramatically reduces injury severity.

164. C — OSHA requires hearing protection when noise levels exceed 85 decibels, and chainsaw operation routinely produces noise well above this threshold. Repeated exposure without protection causes progressive and irreversible hearing loss.

165. A — A proper job briefing covers work scope, hazards, procedures and precautions, required PPE, and emergency response procedures. It is required under ANSI Z133 and is not optional. Briefings prevent predictable mistakes.

166. D — ANSI Z133 requires aerial rescue capability on essentially every climbing operation with a crew — at least one worker other than the climber must be trained and equipped to perform a rescue. Outside emergency services alone are inadequate.

167. B — Suspension trauma develops when a climber remains motionless in a harness for an extended period, as reduced venous return causes blood to pool in the legs. It can become life-threatening within 30 minutes.

168. A — The kickback zone is the upper portion of the bar tip. Contact between this area and any object can trigger a violent upward and backward reaction. Awareness of tip position throughout every cut is a foundational safety skill.

169. C — The chain brake is designed to stop the chain when activated manually by the front handguard or automatically by kickback motion. It is an essential safety feature that must be functional on every saw in service.

170. D — The left hand should grip the front handle with the thumb wrapped fully around the handle. This grip is stronger and provides better control if the saw moves unexpectedly. It is the standard grip for all chainsaw operation.

171. B — Two-handed operation is the standard practice for nearly all chainsaw use and is required except in specific climbing situations using top-handle saws. The standard grip provides maximum control and reduces injury risk.

172. A — Top-handle chainsaws are designed specifically for climbing arborist use up in the canopy, where compact size and potential one-handed operation are required. They should not be used by untrained workers or for ground-based work.

173. D — The chain catcher is a projection beneath the bar designed to catch the chain if it breaks or derails during operation, preventing it from whipping toward the operator. It is one of several safety features on modern chainsaws.

174. C — Working load limit is commonly calculated as approximately one-tenth of the tensile strength of rigging equipment. A rope with 14,000 pounds tensile strength has a WLL of about 1,400 pounds. This margin protects against shock loading and wear.

175. B — Shock loading is the dynamic force generated when a falling piece is suddenly caught by the rigging rope. Peak forces can be many times the static weight of the piece depending on fall distance and system elasticity.

176. A — Allowing controlled slip through a friction device such as a Port-a-Wrap distributes the energy of the catch over time rather than stopping the load instantly. The result is a dramatically lower peak force compared to a hard tie-off.

177. C — A block redirecting a rigging load over an anchor experiences approximately twice the force of the load itself, because the block holds both the lifting side and holding side of the rope simultaneously. This doubling is a routine source of anchor failure.

178. B — The hinge is the strip of wood between the notch and the back cut that controls fall direction as the tree begins to fall. It must remain intact to guide the tree along the intended fall line. Hinge width should be approximately 10% of trunk diameter.

179. D — An escape route must be planned and cleared before cutting begins and followed immediately as the tree starts to fall. The route should lead away from the tree at about 45 degrees from the fall line on the opposite side.

180. A — Barber chair is a vertical splitting of the trunk upward along the grain during the back cut, caused by cutting the hinge too thin or making the back cut too slowly. It can propel trunk sections backward at high speed.

181. C — Chipper operators should feed branches butt end first while standing to the side of the infeed. Standing to the side avoids struck-by hazards from branches that flex or kick back. Standing directly behind is a recurring cause of serious injury.

182. D — Aerial lift operators must maintain the minimum approach distance with both the bucket and the boom, because the metal boom is an excellent conductor and can carry electricity from a contacted line throughout the machine.

183. A — PPE must be inspected before every use, and items showing damage, wear, or contamination must be retired immediately and replaced. Continuing to use compromised PPE provides reduced or no protection. Annual inspection alone is inadequate.

184. C — ANSI Z133 requires climbing ropes to have a tensile strength of at least 5,400 pounds for arboricultural climbing applications. This value provides the margin needed for the dynamic loads generated during climbing and rigging.

185. B — A properly tied friction hitch must grip the rope reliably under load while permitting controlled adjustment when the climber changes position. A hitch that slips under load is unsafe; one that locks rigidly prevents smooth climbing.

186. D — The feed control bar on a wood chipper is a safety device that stops the feed rollers when pressed, allowing the operator to halt material feed in an emergency. It must be functional and within reach.

187. A — Chainsaws should be stopped and allowed to cool briefly before refueling. Refueling a running or hot saw risks fire from spilled fuel contacting hot components. This is one of the basic safety rules of power equipment handling.

188. C — A first aid kit should be available on every tree care worksite and stocked appropriately for the hazards of the work. This includes supplies for treating chainsaw lacerations, bleeding, and minor injuries that occur routinely.

189. B — Urban trees reduce the urban heat island effect through shading of surfaces and evapotranspiration cooling. Paved cities can be 5 to 10 degrees warmer than surrounding areas, and tree canopy substantially reduces this difference.

190. D — A complete tree inventory records every tree within the defined inventory area, with information on species, size, condition, location, and management needs. Sample inventories cover a statistically representative subset.

191. A — The i-Tree suite developed by the USDA Forest Service allows communities to estimate the dollar value of ecosystem services — stormwater interception, air quality improvement, carbon sequestration, and energy savings — provided by their tree populations.

192. C — The trunk formula method is used when a tree is too large to be practically replaced by nursery stock. It calculates value from trunk cross-sectional area adjusted by species, condition, and location ratings.

193. D — Tree protection ordinances typically require permits for removal of protected trees above a specified size threshold, with penalties for unauthorized removal. Specific provisions vary between jurisdictions.

194. B — Canopy cover goals are typically expressed as the percentage of land area covered by tree canopy, measured through aerial imagery analysis. They provide a high-level metric for tracking urban forest size and communicating progress to the public.

195. A — Tree City USA requires a community forestry budget of at least two dollars per capita annually, along with a tree board, tree care ordinance, and Arbor Day observance. The program recognizes baseline commitment to urban forestry.

196. C — Species rating in plant appraisal reflects the desirability and suitability of the species in the local area. High-quality species well adapted to the location receive higher ratings; invasive or poorly suited species receive lower ones.

197. D — Effective communication with property owners uses plain language and respects the owner's decision-making authority. Technical jargon, pressure tactics, and refusal to share information all damage credibility. The client makes the final decision.

198. A — Multiple studies have found improved mental health outcomes and reduced stress for residents of neighborhoods with more trees, along with faster recovery from illness and increased physical activity. The human-health case is increasingly central.

199. B — A budget-focused council responds to the documented dollar value of ecosystem services and infrastructure savings, not to aesthetic arguments or staff preferences. Matching the message to the audience is basic professional communication.

200. C — Diverse plantings following the 10-20-30 rule protect communities against catastrophic pest loss when species-, genus-, or family-specific pests arrive. Dutch elm disease and emerald ash borer illustrate why diversity matters.