PRACTICE EXAM 5: ISA CERTIFIED ARBORIST SIMULATION

QUESTIONS 1–200

Time limit: 3 hours 30 minutes. Each question has exactly one correct answer. This exam emphasizes integrative reasoning and cause-effect synthesis.

1. Two trees of the same species and age are planted side by side. One develops noticeably greater trunk taper than the other after five years. The most likely explanation is that the more tapered tree:

A. Was watered more heavily during establishment

B. Was allowed to flex naturally without rigid staking

C. Was pruned more aggressively each spring

D. Was fertilized with higher rates of nitrogen

2. A researcher injects a dye into the trunk of a maple at breast height and finds it carried upward into the leaves within hours. The dye traveled through:

A. Living phloem cells in the inner bark

B. Cambial tissue between bark and wood

C. Heartwood cells at the trunk's center

D. Xylem conduits in the outer sapwood

3. A tree's autumn leaf color often becomes more brilliant after a sequence of warm sunny days followed by cool nights. This pattern occurs because:

A. Sugars accumulate in leaves and enhance pigment formation

B. Chlorophyll is rapidly synthesized in cooler temperatures

C. Roots actively pump pigments upward into the foliage

D. Nighttime cold prevents any further photosynthesis

4. A tree's ability to seal off injury and prevent decay spread depends most directly on:

A. The vigor of the cambium and its ability to form new wood at the wound

B. The thickness of the outer bark layer at the wound site

C. The age of the heartwood adjacent to the injury point

D. The species' capacity for producing thick callus at the wound surface

5. A homeowner notices a maple's leaves curl and droop on a hot afternoon, then recover overnight without any watering. The most accurate interpretation is:

A. The tree is severely drought stressed and dying

B. The tree has been damaged by an insect outbreak

C. Transpiration temporarily exceeded root absorption

D. The soil has become waterlogged during the day

6. A tree's stored carbohydrate reserves are depleted by all of the following EXCEPT:

A. Producing a flush of new leaves in spring

B. Photosynthesis during peak summer growth

C. Refoliation after a defoliating insect outbreak

D. Continuous respiration throughout the year

7. A scientist measuring sap flow finds that a tree moves the most water during which of the following conditions?

A. Cool overcast days with high humidity

B. Cold winter days during dormancy

C. Mild spring days with wet soil

D. Hot sunny days with low humidity

8. The branch collar plays a critical role in compartmentalization because it:

A. Serves as the primary food storage organ for the branch

B. Contains specialized cells that produce defensive chemicals

C. Conducts water faster than any other branch tissue

D. Holds the cambium that forms Wall 4 around a wound

9. A tree growing in deep shade typically shows all of the following adaptations EXCEPT:

A. Larger thinner leaves to capture limited light

B. Reduced rate of trunk diameter growth

C. Increased density of secondary phloem production

D. Slower height growth than a sun-grown specimen

10. The cohesion-tension theory of water movement in trees relies on:

A. Hydrogen bonding between water molecules holding the column together

B. Active pumping by specialized cells in the root cortex

C. Capillary action alone within the narrow xylem vessels

D. Osmotic pressure generated within the leaf mesophyll

11. A tree's response to a wound differs fundamentally from a mammal's wound response because trees:

A. Heal completely by replacing damaged tissue with new tissue

B. Wall off the damaged area rather than replacing it

C. Move sound tissue inward to seal the wound mechanically

D. Dissolve the damaged wood and excrete it through the bark

12. Which of the following best explains why heartwood does not conduct water?

A. The cells are too small to permit water flow through them

B. The cell walls are coated with a waterproof barrier of suberin

C. The cells are dead and their lumens are blocked with extractives

D. The cells have been completely crushed by surrounding wood

13. A tree's roots respire and require oxygen, which is supplied to them primarily from:

A. Dissolved oxygen in the xylem sap moving down

B. Oxygen produced by mycorrhizal fungal partners

C. Oxygen released from the breakdown of starch

D. Air in the pore spaces of the surrounding soil

14. Apical dominance in a young tree is broken when the central leader is removed because:

A. Auxin from the leader no longer suppresses lateral buds

B. Cytokinin from the roots accumulates in the upper crown

C. Mechanical pressure from above is suddenly released

D. Carbohydrate reserves are redirected to lateral branches

15. A tree's bark provides protection from all of the following EXCEPT:

A. Mechanical damage from animals and weather

B. Water loss through the trunk during active transpiration

C. Temperature extremes that could damage living tissues

D. Entry of fungal pathogens into the inner tissues

16. The most metabolically active tissue in a mature tree trunk is the:

A. Heartwood at the center of the stem

B. Vascular cambium between xylem and phloem

C. Outer bark on the trunk surface

D. Pith cylinder at the very center

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

A. Severe drought during the growing season

B. Late spring frosts that damage early foliage

C. Heavy insect defoliation in early summer

D. Adequate moisture and favorable temperatures

18. Photosynthesis and respiration in a tree differ in that photosynthesis:

A. Releases water vapor and consumes carbon dioxide

B. Occurs only at night while respiration occurs by day

C. Produces sugars while respiration consumes them

D. Takes place in roots while respiration occurs in leaves

19. A tree absorbs nitrogen from the soil primarily in the form of:

A. Nitrate and ammonium ions dissolved in soil water

B. Atmospheric nitrogen gas pulled in through roots

C. Solid crystals of urea on the soil surface

D. Organic protein molecules from decaying matter

20. Why do trees that are repeatedly defoliated by insects often eventually die even if the insect outbreak ends?

A. The insects leave behind a toxin that persists in the wood

B. New leaves emerge stunted and never function properly

C. Mechanical damage to the trunk weakens its structure

D. Stored reserves are exhausted and cannot support recovery

21. A young tree's flexible trunk responds to wind by developing:

A. Thinner bark that can stretch with the trunk

B. Smaller leaves to reduce wind resistance

C. Reaction wood and increased trunk taper

D. Deeper taproots that anchor the tree firmly

22. The primary function of leaf stomata is to:

A. Allow gas exchange while regulating water loss

B. Reflect excess sunlight away from the leaf surface

C. Anchor the leaf blade firmly to the petiole

D. Produce the waxy cuticle covering the leaf

23. A tree with opposite leaf arrangement, palmate venation, and paired winged samaras is most likely a:

A. Pin oak in the genus *Quercus*

B. Sugar maple in the genus *Acer*

C. White ash in the genus *Fraxinus*

D. Eastern cottonwood in *Populus*

24. The MAD Horse mnemonic helps arborists remember which group of trees has:

A. Compound leaves with five or more leaflets

B. Bark that peels in distinctive papery sheets

C. Acorns that mature in a single growing season

D. Opposite arrangement of leaves on the stems

25. A deciduous tree shows alternate simple lobed leaves with rounded lobe tips and acorns maturing in one season. It belongs to which group?

A. The red oak group of *Quercus*

B. The maple genus *Acer*

C. The white oak group of *Quercus*

D. The hickory genus *Carya*

26. Scientific names use binomial nomenclature in which the genus is:

A. Capitalized and italicized in print

B. Written in all uppercase letters

C. Lowercase to match the specific epithet

D. Underlined regardless of the format

27. A nursery label reads *Cornus florida* 'Cherokee Princess'. The portion in single quotes indicates:

A. A cultivar selected for specific traits and propagated clonally

B. A botanical variety that occurs naturally in wild populations

C. The common nickname assigned by the propagator

D. A subspecies recognized in the international codes

28. A pinnately compound leaf differs from a palmately compound leaf in that pinnate leaflets are:

A. All clustered at a single point of attachment

B. Arranged along two sides of a central rachis

C. Joined together to form one continuous blade

D. Borne directly on the woody stem with no rachis

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

A. Maple, ash, and dogwood in mixed forests

B. Horse chestnut, buckeye, and viburnum

C. Catalpa, paulownia, and empress tree

D. Oak, hickory, and beech in eastern woodlands

30. A tree planted under a 25-foot distribution line should have a mature height that is:

A. Slightly above the conductor for shade benefit

B. Exactly at the conductor's height for clearance

C. Safely below the conductor's height

D. Twice the conductor's height for canopy coverage

31. The 10-20-30 rule of urban tree diversity applies to which three taxonomic levels?

A. Cultivar, species, and genus

B. Species, genus, and family

C. Genus, family, and order

D. Order, class, and phylum

32. A tree species native to a region differs from an introduced species in that the native:

A. Always grows faster than non-native alternatives

B. Is automatically immune to all local pests

C. Provides denser shade in landscape settings

D. Co-evolved with local ecological communities

33. Which of the following is a deciduous conifer?

A. Eastern larch in the genus *Larix*

B. Eastern white pine in the genus *Pinus*

C. Eastern hemlock in the genus *Tsuga*

D. Eastern red cedar in *Juniperus*

34. A homeowner wants a 30-foot-tall tree with attractive flowers, good fall color, and tolerance of urban soils. The most appropriate choice from the following is:

A. White oak reaching 80 feet at maturity

B. Eastern white pine reaching 70 feet

C. Serviceberry reaching about 25 feet

D. Tulip poplar reaching 90 feet

35. Which of the following is widely considered an invasive tree species in much of eastern North America?

A. Eastern redbud native to the region

B. Flowering dogwood found in forests

C. Tree of heaven introduced from Asia

D. American holly native to the east

36. A tree with smooth gray bark, alternate simple leaves, prominent parallel veins, and slender pointed buds is most likely:

A. American sycamore with flaking bark

B. American beech with cigar-shaped buds

C. Sugar maple with broad palmate leaves

D. Northern red oak with pointed lobes

37. Right Tree, Right Place primarily means matching:

A. Mature characteristics to the planting site conditions

B. Nursery price to the homeowner's available budget

C. Trunk caliper to a standardized planting depth

D. Leaf color to the surrounding landscape design

38. The genus *Fraxinus* belongs to the:

A. Beech family Fagaceae

B. Maple family Sapindaceae

C. Pine family Pinaceae

D. Olive family Oleaceae

39. A tree with palmately compound leaves bearing five to seven leaflets, opposite arrangement, and large upright flower spikes is most likely:

A. Black walnut in the walnut family

B. Horse chestnut in the soapberry family

C. Pignut hickory in the walnut family

D. White ash in the olive family

40. Identifying a deciduous tree in winter relies most heavily on:

A. The color of the inner bark when scratched

B. The presence of any evergreen lower foliage

C. Bud shape, twig features, and bark character

D. Surrounding companion species in the area

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

A. Loam, an ideal texture for most species

B. Clay loam dominated by fine particles

C. Sandy clay with restricted drainage

D. Silty clay with poor structural stability

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

A. Zero with values increasing for acidity

B. Five with negative values for alkalinity

C. Ten with values doubling for each unit

D. Seven with values above being alkaline

43. The 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. Soil compaction harms tree roots primarily by:

A. Concentrating nitrogen at lethal levels

B. Reducing pore space and root oxygen

C. Raising soil pH to toxic conditions

D. Increasing soil temperatures excessively

45. Ideal mineral soil for tree growth contains approximately what percentage of pore space?

A. About 50 percent split between water and air

B. About 25 percent mostly filled with water

C. About 10 percent with the rest as solids

D. About 75 percent mostly filled with air

46. Mycorrhizal fungi benefit a host tree primarily by:

A. Producing antibiotics that kill all pathogens

B. Storing surplus carbohydrates for the tree

C. Fixing atmospheric nitrogen within roots

D. Extending the absorbing surface of the roots

47. A pin oak planted in alkaline soil that develops interveinal chlorosis on new leaves most likely has:

A. A nitrogen deficiency from lawn competition

B. Iron unavailable due to high soil pH

C. Excessive potassium suppressing magnesium

D. Sulfur excess from nearby industrial sources

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

A. Six to eight inches deep against the trunk

B. A thin scattering across the entire lawn area

C. Two to four inches deep with the trunk clear

D. Replaced with plastic sheeting for moisture

49. A perc test in a planting site shows water taking 36 hours to drain from a one-foot hole. This indicates:

A. Drainage is inadequate for most tree species

B. Drainage is ideal for any tree species available

C. Excessive drainage that will dry out roots

D. The soil is permanently waterlogged below

50. Soil texture is essentially permanent because:

A. Organic matter is the only factor that affects it

B. Soil microbes regenerate the original texture

C. Laboratory testing rarely identifies real changes

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

51. A bulk density reading of 1.8 grams per cubic centimeter in a mineral soil indicates:

A. Loose structure that supports vigorous growth

B. The optimal range for healthy root expansion

C. Severe compaction that halts most root growth

D. A reading typical of healthy forest topsoil

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

A. Till the soil deeply once each spring

B. Maintain a continuous organic mulch layer

C. Apply liquid hydrogen peroxide to the surface

D. Add a thin layer of sand each season

53. Why is a soil sample taken from a single spot less reliable than a composite sample?

A. A composite sample averages variation across the area

B. A composite sample is always cheaper to analyze

C. A composite sample is easier to send to the lab

D. A composite sample requires no special tools

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

A. A heavy application of agricultural lime

B. A surface dressing of fine builder's sand

C. A foliar spray of liquid micronutrients

D. A continuous addition of organic matter

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

A. The same diameter as 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 root ball

56. A tree's root flare at planting should be set:

A. At or slightly above the surrounding grade

B. Six inches below the surrounding grade

C. Exactly 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. The native soil excavated from the hole

C. Equal parts peat moss and perlite mixed

D. Coarse builder's sand with added lime

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

A. Foot of mature height the species reaches

B. Inch of branch diameter on scaffold limbs

C. Square foot of crown spread at planting

D. Inch of trunk caliper at the time of planting

59. Staking a newly planted tree should generally be:

A. Used only when needed and removed within a year

B. Permanent throughout the entire life of the tree

C. Required on every newly planted specimen

D. Tightened progressively as the tree grows

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

A. Left intact to avoid damaging fine root tips

B. Coated with rooting hormone before backfilling

C. Cut or straightened before placing in the hole

D. Treated with a commercial wound dressing

61. Wire baskets on balled-and-burlapped trees should be:

A. Left completely intact to support the root ball

B. Removed entirely before lowering into the hole

C. Replaced with plastic mesh for biodegradability

D. Cut and removed at least from the upper portion

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

A. Watering too lightly during the first week

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

C. Failing to install stakes on every side

D. Using only native soil as the backfill

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

A. Consistently moist but not saturated

B. Completely dry to encourage deep rooting

C. Saturated continuously for the first month

D. Moist only on the south-facing side

64. Fertilizing a newly planted shade 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. Dormancy in late fall or early spring

D. Any month with adequate irrigation

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

A. Reduce the total weight of the future root ball

B. Eliminate any future need for irrigation

C. Prevent suckers from emerging at the trunk

D. Encourage new fibrous roots inside the future ball

67. Why is twine tied around the trunk of a B&B tree dangerous if left in place?

A. It accelerates decay of the bark beneath it

B. It does not decompose and can girdle the trunk

C. It attracts insect pests to the trunk surface

D. It prevents evaporation from the bark surface

68. 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 weed growth

69. 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

70. A newly delivered nursery tree should be inspected for:

A. The exact weight printed on the manifest

B. The brand name printed on the container

C. The width of the wire basket only

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

71. A tree that fails to leaf out the spring after planting most likely suffered from:

A. A foliar disease attacking expanding buds

B. Root ball desiccation during handling

C. Inadequate mulch depth at the trunk

D. Cold temperatures during dormancy

72. The depth of a planting hole should:

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

B. Reach below the tree's lowest scaffold branches

C. Include a layer of gravel for drainage

D. Equal the height from root flare to ball bottom

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

A. Worker safety on arboricultural job sites

B. Quality standards for nursery stock production

C. Tree pruning and maintenance practices

D. Helmet and head protection specifications

74. A correct pruning cut is placed:

A. Just outside the branch collar and bark ridge

B. Flush with the parent stem for smoothness

C. Six inches beyond the branch collar

D. At the midpoint of the branch length

75. Topping a mature shade tree is harmful primarily because it:

A. Requires specialty equipment most crews lack

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

C. Cannot be performed without damaging utilities

D. Is permitted only under specific safety standards

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

A. Reduce sawdust accumulation around the worksite

B. Prevent bark from tearing down the trunk

C. Speed up the total cutting time per branch

D. Allow use of a smaller chainsaw bar

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

A. At the exact final cut location from above

B. Straight down through the top of the branch

C. Parallel to the trunk to score the bark

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

78. The cleaning pruning objective involves selective removal of:

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

B. All interior live foliage to thin the crown

C. Every lateral branch crossing another branch

D. The outermost six inches of every branch

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

A. Is always made with hand pruners only

B. Removes only branches under one inch

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

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. Recently planted trees during establishment

C. Mature trees with established canopies

D. Young trees during the juvenile growth phase

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

A. 10 to 15 percent, less for stressed specimens

B. 25 to 30 percent during active growth periods

C. 40 to 50 percent in the dormant season only

D. There is no upper limit for healthy mature trees

82. The branch bark ridge is best described as:

A. An internal barrier inside the heartwood column

B. A layer of dead bark separating heartwood from sapwood

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

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. Interior foliage is stripped, concentrating weight at branch ends

C. The central leader is severed at the trunk

D. Every crossing branch is removed at its base

84. Pollarding is a traditional pruning technique that requires:

A. Removal of the central leader during establishment

B. Annual application of wound dressing on cuts

C. Complete heading back of the entire canopy

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

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

A. Topped, vandalized, or severely storm damaged

B. Recently planted in their establishment phase

C. Selected for removal at project completion

D. Designated as historic specimens by ordinance

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

A. Eliminate any risk of decay organisms entering

B. Accelerate compartmentalization across all species

C. Provide minimal benefit and sometimes slow healing

D. Be required by current ANSI A300 standards

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

A. Warm summer months to speed wound closure

B. Any time of year with sterilized tools used

C. Wet rainy days when beetles are inactive

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. Applies excessive force to the cutting tool

D. Allows excess rainwater to enter the wound

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. Cannot be compartmentalized and invites decay

D. Helps birds nest more securely on the trunk

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. Are lighter and less tiring to use

D. Cut cleanly without crushing the stem

92. A pole pruner is most appropriately used 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 is asked by a client to "thin out" a mature tree by 50 percent. The professional response is to:

A. Explain that thinning of that magnitude violates accepted standards

B. Comply using exclusively bypass hand pruners

C. Remove only the smallest interior branches

D. Agree but charge double for the additional work

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

A. Only after the tree reaches structural maturity

B. By spraying the union with systemic fungicide

C. Early, while stems and necessary cuts are small

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. Removing lower branches for vertical clearance

C. Lifting the tree with mechanical equipment

D. Raising the soil grade around the trunk

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

A. Working on trees during the dormant season

B. Performing routine pruning of healthy trees

C. Using bypass hand pruners on small twigs

D. Pruning trees affected by contagious diseases

97. A professional pruning specification should include:

A. The objective, percentage of foliage removed, and cut diameters

B. Only the total dollar price for the entire job

C. Only the brand of cutting tools to be used

D. Only the climber's personal preferences

98. Bypass loppers are most appropriately used on branches:

A. Smaller than one-quarter inch in diameter

B. Larger than four inches across the cut

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. Reduce to lower the overall crown height

B. Clean to remove dead and weak branches

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 time of day when the cut was made

C. The weather conditions during the operation

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 understand 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. Direct evidence of the causal agent itself

B. A description written in the inspection report

C. The tree's general response such as wilting

D. A homeowner's complaint about leaf appearance

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

A. Visible fruiting body of a fungal pathogen

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

C. Laboratory confirmation of a specific pathogen

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

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. Reproduces only under drought conditions

C. Successfully attacks healthy ash trees of all sizes

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 members of which family?

A. Pinaceae including pines and firs

B. Rosaceae including apples and pears

C. Sapindaceae including maples and horse chestnuts

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. Root grafts and sap-feeding beetles attracted to wounds

D. Rain splashing from infected leaves to others

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

A. Iron deficiency, often related to high soil pH

B. Nitrogen deficiency affecting mobile nutrients

C. Excess rainfall causing root rot damage

D. Calcium toxicity from previous over-liming

110. Yellowing that begins on older inner leaves first indicates deficiency of:

A. Iron, an immobile micronutrient

B. Boron, a trace element for cell division

C. Calcium, a structural secondary nutrient

D. Nitrogen, a mobile macronutrient

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. Root damage during construction now exhausting reserves

C. Normal aging unrelated to the construction

D. Reduced rainfall during the dormant period

113. Anthracnose is best classified as a:

A. Fungal disease producing leaf spots and blotches

B. Bacterial infection of the vascular system

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. Rain splash from infected foliage to others

D. Elm bark beetles and root grafts between trees

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

A. Small seedlings growing in a container nursery

B. Very young trees during their establishment

C. High-value trees threatened by borers

D. Controlling weeds in the surrounding lawn

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

A. Advisory documents to be followed when convenient

B. Legally enforceable federal documents

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. Recommend removing all nearby trees as a precaution

C. Refuse to discuss the finding with the property owner

D. Communicate honestly and recommend appropriate management

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

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

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

C. Three feet per inch of trunk diameter

D. Six inches per inch of trunk diameter

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 high pH of the washwater can sterilize soil

C. The vibration disturbs fine root hairs

D. The cement sets up around root surfaces

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. Improved drainage benefits across the root zone

D. Gradual decline as roots lose access to oxygen

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. Mechanical auger boring downward from above

C. Directional boring beneath the root zone

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. Before final design so findings can influence decisions

C. After foundations have been poured and graded

D. Only if trees show obvious symptoms later

126. An arborist supervising unavoidable root impacts should:

A. Allow the excavator to tear roots randomly

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

C. Apply wound sealant to every cut root surface

D. Wait until after excavation to assess damage

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

A. Aggressive crown reduction to balance roots

B. Heavy nitrogen fertilization to force growth

C. Immediate trunk injection with systemic fungicide

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

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. Months to several years after the triggering event

D. Always on the first anniversary of the construction

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

A. Lightweight flagging tape that crews can easily move

B. Short stakes spaced widely apart for appearance

C. Painted to match nearby buildings on the lot

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

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

A. Excluding all activity from the root zone entirely

B. Wrapping the trunk in protective foam padding

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. Improved drainage benefits to deeper roots

B. Increased nutrient access in newly exposed layers

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

D. Better wind anchorage from remaining roots

133. A baseline tree condition report prepared before construction:

A. Eliminates any need for later monitoring efforts

B. Documents pre-existing conditions for later comparison

C. Is used exclusively for billing the client afterward

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. Roots must be identified and preserved during work

B. Conventional trenching would be cheaper for the contractor

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. Approached immediately for pruning by any worker available

B. Sprayed with water to dissipate the electrical charge

C. Removed quickly before the contact is reported

D. Treated as potentially energized until the utility confirms otherwise

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 in feet

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 detailed visual inspection of an individual tree

C. A rapid drive-by screening of street trees

D. A theoretical model based on species alone

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

A. Rapid screening of large tree populations along streets

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. Acts as a reservoir for boring insect larvae

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

D. Prevents formation of a strong structural union

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. Active decay already established within the tree

D. Excess nitrogen from recent fertilization

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

A. A specific branch identified for pruning removal

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

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 frequency and duration of target presence in the strike zone

C. The age of structures beneath the canopy

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. A cosmetic change without structural meaning

C. Seasonal soil movement unrelated to the tree

D. Root plate movement and elevated uprooting risk

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. Detecting hollow areas through changes in sound

D. Locating overwintering insects in the bark

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 likely to occur during the assessment period

C. Failure is unlikely but not impossible

D. Failure cannot occur under any conditions

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

A. Minor property damage easily repaired at low cost

B. Moderate damage with no significant injury involved

C. No measurable effect on any nearby targets

D. Catastrophic damage, serious injury, or death

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. Sufficient intact wood remains around the perimeter

D. The cavity is located above six feet from grade

150. Consequences of failure depend on:

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

B. Only the total weight of the falling part involved

C. Only the distance between tree and structure

D. Only the calendar age of the tree at failure

151. Residual risk refers to:

A. The cost of insurance premiums on tree property

B. Risk remaining after mitigation has been implemented

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. Resistograph drilling and sonic tomography

B. Standard measuring tape and ground observation

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. Eliminate all structural risk on the union completely

B. Reduce but do not eliminate structural risk

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 available

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 might include:

A. Reduction pruning to decrease end weight on the branch

B. Removing the entire tree as a preventive measure

C. Ignoring the situation until the branch fails

D. Cabling every branch in the entire crown

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. Five feet in any direction

C. Twenty-five feet in any direction

D. Ten feet in any direction

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

A. General experience in landscape design work

B. Specialized training in electrical hazards and line clearance

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. A chin strap to retain the helmet during climbing

D. Reflective tape covering every external surface

163. Chainsaw-resistant leg protection works by:

A. Containing fibers that clog the chain on contact

B. Activating an electromagnetic brake in the saw

C. Producing an audible warning to the operator

D. Reflecting the moving chain away from skin

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

A. 30 decibels of normal conversation

B. 50 decibels of quiet outdoor activity

C. 70 decibels of moderate equipment use

D. 85 decibels of typical chainsaw operation

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

A. Only the names of all crew members present

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

C. Only the lunch break schedule for the crew

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

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. For essentially all climbing operations with a crew

D. Only on weekends and holidays when EMS is delayed

167. Suspension trauma can develop in a climber who:

A. Remains motionless in a harness for an extended time

B. Ascends a stationary line too quickly to the canopy

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 bottom edge of the bar near the powerhead

B. The upper portion of the bar tip

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. The standard practice for nearly all saw use

B. Required only for felling very large mature trees

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. Catch the chain if it breaks during cutting

D. Secure the chain to the bar during transport

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

A. Half of the rated tensile strength

B. One-tenth of the rated tensile strength

C. Nine-tenths 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. Initial lifting force applied to a cut piece

C. Dynamic forces from a falling piece suddenly caught

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

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

C. Position the ground worker beneath the falling piece

D. Use a friction device to allow controlled slip

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

A. Half the force of the load itself

B. Twice the force of the load itself

C. Exactly the force of the load itself

D. No additional force when properly installed

178. The hinge in a standard felling cut:

A. Controls fall direction as the tree commits to falling

B. Must be cut completely through before the tree falls

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. Be planned and cleared before cutting begins

D. Always be exactly straight behind the feller

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

A. A resting position taken between difficult cuts

B. Vertical splitting of the trunk during the back cut

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. Only during evening hours to avoid overheating

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

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 approach distance with both bucket and boom

D. Maintain distance only at the bucket itself

183. Personal protective equipment should be inspected:

A. Only during annual company safety reviews

B. Before every use, with damaged items retired

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. 5,400 pounds per the current standard

B. 1,800 pounds for residential climbing work

C. 3,000 pounds for routine maintenance work

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. Be replaced after every single climb

C. Grip reliably while permitting controlled adjustment

D. Slip continuously to allow rapid descent

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

A. Meter lubricant to the feed roller bearings

B. Indicate the speed of the chipping drum

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. Refuel quickly without removing the cap completely

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

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. Shading surfaces and evapotranspiration cooling

B. Absorbing heat directly through their root systems

C. Releasing methane gas into the atmosphere

D. Reflecting sunlight from waxy leaf surfaces

190. A complete tree inventory records information on:

A. Only trees scheduled for immediate removal

B. Every tree within the defined inventory area

C. A statistical sample of the total population

D. Only trees with obvious structural defects

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

A. Identify unknown tree species from photographs

B. Predict which specific trees will fail in storms

C. Determine the genetic makeup of urban forests

D. Estimate the dollar value of ecosystem services

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. Requires mandatory removal of mature trees over time

B. Requires permits for removal of protected trees

C. Bans all pruning by private property owners

D. Applies only to trees planted by the city

194. Canopy cover goals are typically expressed as:

A. The percentage of land area covered by canopy

B. The number of trees per square mile of city

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. One hundred dollars per capita annually

B. Fifty dollars per capita annually

C. Ten dollars per capita annually

D. Two dollars per capita annually

196. Species rating in plant appraisal reflects:

A. The lumber value of the species today

B. The desirability and suitability in the local area

C. The exact age of the tree being appraised

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 simplicity of installing artificial turf instead

C. The documented dollar value of ecosystem services

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. Protect the community against catastrophic pest loss

C. Must all be very slow-growing species only

D. Must be purchased from a single approved supplier

PRACTICE EXAM 5 — ANSWER KEY AND EXPLANATIONS

1. B — Trees that are allowed to flex naturally in the wind develop greater trunk taper and stronger wood than rigidly staked trees. The mechanical stress of swaying triggers reaction wood production and thickening at the base. This is why unnecessary or prolonged staking produces weaker trunks.

2. D — Water moves upward through xylem conduits in the outer sapwood, the most recently produced functional wood. Phloem moves sugars downward, not water upward. Heartwood and cambium are not water-conducting tissues.

3. A — Brilliant fall color depends on sugar accumulation in leaves, which enhances anthocyanin pigment formation. Warm sunny days drive photosynthesis while cool nights slow sugar export to the rest of the tree, trapping sugars in the leaves. This is why weather patterns directly affect autumn color intensity.

4. A — Compartmentalization depends most directly on the vigor of the cambium and its ability to form Wall 4 (new wood) at the wound perimeter. A vigorous cambium produces effective barriers; a weak one cannot. This is why stressed trees compartmentalize poorly and decay spreads farther in them.

5. C — Midday wilting in moist soil reflects a temporary imbalance in which transpiration exceeds the rate at which roots can absorb and deliver water. Most trees recover overnight when transpiration drops. This is a normal short-term response, not a sign of permanent damage.

6. B — Photosynthesis during peak summer growth produces sugars and adds to reserves rather than depleting them. Spring leaf flush, refoliation after defoliation, and continuous respiration all consume reserves. Distinguishing inputs from outputs is essential to understanding tree carbon balance.

7. D — Sap flow is greatest on hot sunny days with low humidity, when the evaporative demand at leaf surfaces is highest and transpiration drives water movement upward. Cool overcast days, dormant winter days, and saturated soils all produce much lower flow rates. Weather drives the engine of water transport.

8. D — The branch collar contains the cambium that forms Wall 4 around a wound after pruning. Preserving the collar intact is essential because it is the only tissue that can produce this critical compartmentalization barrier. Flush cuts destroy it and eliminate Wall 4.

9. C — Trees in shade produce less photosynthate, which limits secondary phloem production rather than increasing it. Larger thinner leaves, reduced trunk growth, and slower height growth are all genuine shade adaptations. Resource limitation reduces all secondary tissue production, not just one type.

10. A — 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. The cohesive strength of water is what allows trees to lift water hundreds of feet. No metabolic energy is required.

11. B — Trees wall off damaged tissue rather than replacing it, isolating the injury through compartmentalization. This is fundamentally different from mammalian wound healing, where damaged tissue is removed and replaced. Trees grow over and around wounds rather than repairing them.

12. C — Heartwood cells are dead at maturity, and their lumens are blocked with extractives such as tannins and resins. The blockage prevents water flow but provides decay resistance. Sapwood, by contrast, conducts water through hollow xylem vessels.

13. D — Root respiration depends on oxygen from air in the pore spaces of the surrounding soil. This is why compaction, which eliminates pore space, kills roots through suffocation. The fact that roots need atmospheric oxygen is why mulching and aeration are protective.

14. A — Auxin produced at the shoot tip travels downward and suppresses lateral bud growth. Removing the leader interrupts auxin flow, releasing dormant lateral buds to develop into branches. This hormone-driven mechanism is the biological basis for many pruning responses.

15. B — Bark cannot prevent water loss during active transpiration, because transpiration occurs through stomata in the leaves rather than through the trunk. Bark does protect against mechanical damage, temperature extremes, and pathogen entry. Distinguishing the functions of leaves and bark is essential.

16. B — The vascular cambium between xylem and phloem is the most metabolically active tissue in a mature trunk, dividing continuously to produce new xylem inward and new phloem outward. Heartwood and outer bark are dead; pith is essentially inactive in mature stems.

17. D — 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.

18. C — Photosynthesis produces sugars (storing energy from sunlight), while respiration consumes them (releasing energy for cellular work). The two processes are opposite directions of the carbon cycle within the tree. Both can occur simultaneously in living tissues.

19. A — Trees absorb nitrogen primarily as nitrate (NO_3^-) and ammonium (NH_4^+) ions dissolved in soil water. Atmospheric nitrogen gas is not directly usable by most plants. Soil microbes convert organic nitrogen into these plant-available ionic forms.

20. D — Repeated defoliation forces the tree to draw on stored carbohydrate reserves to refoliate each time. After several successive years, reserves are exhausted and the tree cannot recover even if the insect pressure ends. This is why repeated outbreaks are far more damaging than single events.

21. C — A young tree responds to wind by producing reaction wood and developing increased trunk taper at the base. Wind flexing stimulates the cambium to lay down stronger wood where bending stress is greatest. This is why naturally flexed trees develop better structure than staked ones.

22. A — Stomata allow gas exchange (CO_2 in, O_2 and water vapor out) while regulating water loss through opening and closing. The trade-off between water conservation and carbon gain is the central constraint on tree function. This is why drought stress halts photosynthesis through stomatal closure.

23. B — Sugar maple has opposite leaf arrangement, palmate venation, and paired winged samaras characteristic of the genus *Acer*. Oaks and cottonwoods have alternate arrangement; ash has compound leaves. The combination of features is diagnostic for maple.

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

25. C — White oaks have rounded leaf lobes without bristles and acorns that mature in a single season. Red oaks have pointed bristle-tipped lobes and acorns maturing over two seasons. This is the primary distinction between the two oak groups.

26. A — 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.

27. A — A name in single quotation marks following a species name indicates a cultivar — a cultivated variety selected for specific characteristics and propagated clonally. 'Cherokee Princess' is a commercial cultivar of flowering dogwood. Cultivar names are not italicized.

28. 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 all pinnate; horse chestnut is palmate.

29. D — 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 is the first step in narrowing identification.

30. C — A tree planted under a 25-foot distribution line should have a mature height safely below the conductors. This is a direct application of Right Tree, Right Place. Planting a species that will grow into the wires guarantees future utility pruning conflicts.

31. B — The 10-20-30 rule applies to species (10%), genus (20%), and family (30%) — the three taxonomic levels at which pest threats commonly act. The hierarchy protects against threats at each level. Dutch elm disease and emerald ash borer illustrate why diversity at all three levels matters.

32. D — Native species have co-evolved with local ecological communities, including pollinators, insects, birds, and soil organisms. This makes them ecologically valuable, but does not give them automatic immunity from pests or guaranteed faster growth. The ecological role is the genuine advantage.

33. A — Eastern larch (*Larix laricina*) is a deciduous conifer that sheds its needles each autumn. It is one of a small group of deciduous conifers including bald cypress and dawn redwood. Pines, hemlocks, and junipers are all evergreen.

34. C — Serviceberry (*Amelanchier*) reaches about 25 feet at maturity and offers attractive flowers, good fall color, and tolerance of urban soils. White oak, white pine, and tulip poplar all far exceed the 30-foot height target. Mature size governs the selection.

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

36. B — American beech (*Fagus grandifolia*) has smooth gray bark, alternate simple leaves with prominent parallel veins, and slender pointed cigar-shaped buds. The combination of features is highly diagnostic. Sycamores have flaking bark; maples have palmate leaves.

37. 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.

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

39. B — 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.

40. C — Winter identification depends on bud shape, twig features, and bark character because foliage, flowers, and fruit are absent. These features are reliable enough for confident identification. Experienced arborists can identify most deciduous trees from twigs alone.

41. A — 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. D — 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. A — 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. Loss of pore space through compaction is a common urban problem.

46. D — Mycorrhizal fungi extend the effective 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, not optional.

47. B — 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. C — A proper mulch ring 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. A — 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. D — 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. C — 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. B — 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 disturbs soil structure.

53. A — 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. D — 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. A — 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. B — 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. D — 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. A — 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. C — 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. D — 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. B — 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. A — 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. Withholding is standard practice.

65. C — 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. D — 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. B — Twine tied around the trunk does not decompose 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. 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.

69. 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.

70. D — Nursery stock should be inspected at delivery for trunk condition (straight, no wounds), crown structure, visible root flare, and root ball condition (firm, moist, intact). Defects identified at delivery can be avoided by rejecting the tree. Inspection is more than checking weight or labels.

71. B — 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.

72. D — 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.

73. C — 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. A — 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. B — 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. D — 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. A — 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. It does not involve removing healthy live wood.

79. C — 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. Reduction cuts are the basis of the reduce objective.

80. D — 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. A — 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. Mature trees cannot be pruned like young ones.

82. C — 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. B — 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. D — 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. A — 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 but can produce a reasonable structure.

86. C — 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, with narrow exceptions such as oak wilt regions.

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. The subordinated stem is made progressively smaller over several seasons.

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. The damage cannot be undone.

90. C — 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. Both flush and stub cuts cause lasting damage.

91. D — 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. Clean cuts support proper compartmentalization.

92. B — A pole pruner is most appropriately used 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 and techniques.

93. A — 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. Good client service does not include damaging the tree.

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

95. B — 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. A — A professional pruning specification should include the identified objective, the percentage of live foliage to be removed, and the diameter range of cuts. Clear specifications protect the tree, client, and arborist. Tool brands and personal preferences are not part of a professional specification.

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. Tool selection should match branch diameter.

99. B — 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 and applies to trees of all ages.

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. Tool brand, time of day, and weather are not factors.

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. Species identification is the first step.

102. A — 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. Diagnosis based on signs is far more defensible.

103. D — 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 different 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. C — 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. Management often requires preventive treatment.

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. B — 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. Sanitation pruning is the standard management.

108. C — 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. Red oak group species are more susceptible than white oaks.

109. A — 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. D — 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. This symptom combination is diagnostic when paired with application history.

112. B — 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. The connection is often forgotten.

113. A — 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. Above-ground symptoms include general decline.

115. D — 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. C — 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. The tradeoff is that each injection wounds the tree.

117. B — "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. This applies to every licensed applicator.

118. D — 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. Applying ineffective treatments wastes client resources. Honesty is part of professional standing.

119. A — 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 conservative and defensible boundary.

121. B — 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. Designated washout locations should be far from protected trees.

122. D — 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. The delayed damage is often blamed on unrelated causes.

123. C — 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. Monitoring and approved supervised work are compatible with protection.

125. B — 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. Timing matters as much as thoroughness.

126. B — 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. Prepared cuts dramatically improve outcomes.

127. D — 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. Heavy fertilization and aggressive crown reduction can worsen decline. 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. The CRZ formula produces a more defensible boundary.

129. C — 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. Post-construction monitoring should continue for at least three to five growing seasons.

130. D — 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. Effective fencing is the operational enforcement of the written protection plan.

131. A — 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. Physical fencing makes exclusion enforceable.

132. C — 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. Effects appear sooner than with grade raises.

133. B — 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. Baseline documentation is a legal as well as technical necessity.

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. Early apparent survival is not the same as long-term recovery.

135. A — Hand excavation 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. Conventional trenching is cheaper but far more damaging.

136. D — 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. Assumptions about automatic breakers are unreliable and unsafe.

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 to produce a meaningful risk rating.

138. B — 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. Level 1 is rapid screening; Level 3 uses advanced instrumentation.

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. Individual trees of concern warrant Level 2 or 3.

140. D — 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. This is one of the most dangerous structural defects.

141. C — 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. They warrant closer evaluation but do not automatically mandate removal.

142. B — 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 likelihood of failure does not produce high risk.

143. B — 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. A house is constant; a seldom-used trail is rare.

144. D — 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. C — 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. It is imprecise but rapid and inexpensive.

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. Neither factor alone is sufficient.

147. B — A probable likelihood of failure in TRAQ means failure is likely to occur during the assessment time frame under normal conditions. This is distinct from possible (could occur but not likely) and imminent (failure in progress). The four levels are improbable, possible, probable, and imminent.

148. D — 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. Matching ratings to potential outcomes drives the risk rating to appropriate levels.

149. C — 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. Cavity size alone does not mandate removal.

150. A — 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. Context determines the outcome.

151. B — 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, not zero risk.

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. A single-sentence conclusion does not constitute a professional report.

153. A — 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. Tape measures and basic visual inspection are not Level 3 tools.

154. B — 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 and when tree value justifies the cost.

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. The client makes the final decision with the arborist's guidance.

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. Air excavation can expose the root flare when needed.

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. Codominant stems, dead scaffold branches, and active cracks are all genuine defects.

158. A — 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. Immediate removal is not proportional to moderate risk.

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 practices; Z133 addresses safety. The two complement each other.

160. D — 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 the majority of lines encountered in residential and commercial tree work. Unqualified workers may not cross it.

161. B — 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 or through general experience.

162. C — 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. Climbing helmets are purpose-built for aerial work.

163. A — 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 is not perfect but dramatically reduces injury severity.

164. D — 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. Many veteran tree workers develop preventable hearing damage.

165. D — 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. C — 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. This is not optional and does not depend on tree height or hazards.

167. A — 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. This is why aerial rescue of an unconscious climber is time-critical.

168. B — 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. A saw with a nonfunctional chain brake must be removed from service.

170. D — The left hand should grip the front handle with the thumb wrapped fully around the underside of 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. A — 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 from unexpected saw movement.

172. A — Top-handle chainsaws are designed specifically for climbing arborist use 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. Specific training is required.

173. C — 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. Sharpening and lubrication are separate functions.

174. B — 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 cumulative wear.

175. C — 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. This multiplication is responsible for most equipment failures.

176. D — 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. Every significant rigging operation should include a friction device.

177. B — 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. A 1,000-pound piece produces about 2,000 pounds of force on the anchor. This doubling is a routine source of anchor failure.

178. A — 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. C — 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. Workers who remain at the stump are in the most dangerous position.

180. B — 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, killing workers in the fall zone. Leaning hardwoods are particularly prone.

181. D — 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 the infeed is a recurring cause of serious injury.

182. C — 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. The entire lift structure is a potential conductor.

183. B — 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 for life-safety equipment.

184. A — 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. Lower-strength ropes are not compatible with the standard.

185. C — 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. Hitches must be inspected before each climb.

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. This is a critical safety feature on modern chippers.

187. B — 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. Storage off-site is inadequate.

189. A — 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. The cooling effect lowers air conditioning demand.

190. B — 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. Complete inventories provide the richest basis for management.

191. D — 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. These numbers transform tree management into documented infrastructure investment.

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. Smaller trees are appraised using the replacement cost method.

193. B — Tree protection ordinances typically require permits for removal of protected trees above a specified size threshold, with penalties for unauthorized removal. They distinguish between protected and unprotected trees based on size, species, or location. Specific provisions vary between jurisdictions.

194. A — 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. Communities often set numerical targets.

195. D — 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. These are the standard criteria.

196. B — 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. Regional ISA chapters publish species rating lists.

197. D — Effective client communication presents recommendations in plain language and respects the owner's decision-making authority. Technical jargon, pressure tactics, and refusing to provide pricing all damage credibility. The client owns the tree and 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. These benefits complement the environmental and economic case. The human-health argument is increasingly central.

199. C — 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. The i-Tree tools provide exactly the quantitative data such audiences require.

200. B — 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. The rule does not require natives, slow-growing species, or single suppliers.