PRACTICE EXAM 17: ISA CERTIFIED ARBORIST SIMULATION

PRACTICE EXAM 17 — QUESTIONS 1–200

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

1. Which statement most accurately describes the vascular cambium of a mature tree?

A. A dead layer of extractive-rich cells at the trunk center

B. The outer corky rhytidome protecting the inner bark

C. A thin living layer producing new xylem inward and phloem outward

D. The pith cylinder running through the stem center

2. Which of the following best defines xylem at functional maturity?

A. Dead cells forming hollow tubes that conduct water upward

B. Living cells that actively pump water against gravity

C. Storage parenchyma filled with starch reserves

D. Thin-walled cells conducting sugars to root sinks

3. The correct description of phloem in a mature trunk is:

A. Dead xylem-like cells moving water under tension

B. A dead protective barrier against insect attack

C. The central heartwood resisting decay organisms

D. Living inner-bark tissue transporting sugars to sinks

4. Which statement best describes heartwood compared to sapwood?

A. The outer ring of functional water-conducting xylem

B. Dead wood with deposited extractives providing decay resistance

C. The most metabolically active tissue in the trunk

D. Living cells storing most of the tree's starch reserves

5. Which of the following most accurately describes Wall 4 in the CODIT model?

A. The weakest wall, plugging xylem vessels vertically

B. A wall resisting inward decay across growth rings

C. The strongest wall, formed by the cambium after wounding

D. A wall resisting lateral decay through the ray tissue

6. The correct description of transpiration in trees is:

A. The loss of water vapor from leaves through open stomata

B. The release of energy from stored sugars by living cells

C. The production of sugars from carbon dioxide and water

D. The absorption of water by fine root hairs at depth

7. Which statement most accurately describes photosynthesis?

A. A respiration process occurring only at night

B. A light-driven process converting CO_2 and water into sugars

C. The breakdown of starch into simple sugars

D. A passive process requiring no chlorophyll at all

8. Which of the following best describes respiration in tree cells?

A. A sunlight-driven process producing new sugars in leaves

B. A process limited to dormant winter periods only

C. A process restricted to root tissue below ground

D. A continuous process consuming sugars to release energy

9. The correct description of apical dominance is:

A. Auxin from the shoot tip suppresses lateral bud growth below

B. Cytokinin from roots stimulates terminal shoot growth only

C. Abscisic acid from leaves prevents apical extension

D. Ethylene from fruits halts lateral branch production

10. Which statement most accurately describes mycorrhizal fungi?

A. Parasitic organisms that damage the host tree over time

B. Saprophytic decomposers limited to dead wood on the floor

C. Symbiotic partners extending root absorbing surface area

D. Nitrogen-fixing bacteria converting atmospheric nitrogen

11. Which of the following best describes the cohesion-tension theory?

A. Root pressure actively pumps water into the xylem

B. Transpiration pulls water up through hydrogen-bonded columns

C. Atmospheric pressure pushes water upward from the roots

D. Osmotic gradients drive water from leaves to roots

12. The correct description of spring carbohydrate reserves is:

A. They reach their highest annual level before bud break

B. They remain stable year-round without significant change

C. They are stored entirely in the outer bark of the trunk

D. They are depleted rapidly by refoliation and new growth demand

13. Which statement most accurately describes a tree's response to drought?

A. Stomata close, reducing both transpiration and photosynthesis

B. Photosynthesis increases dramatically as a stress response

C. Root growth accelerates to find deeper water sources

D. All new leaves expand as fast as possible to recover

14. Which of the following best describes reaction wood?

A. Dead wood at the center of leaning stems only

B. A decorative grain pattern of no functional significance

C. Wood produced in response to mechanical stress like wind

D. A structural weakness caused by improper pruning cuts

15. The correct description of girdling roots is:

A. Fine absorbing roots growing outward from the trunk

B. Roots pressing against the trunk and compressing vascular tissue

C. Deep taproots providing the main anchorage of the tree

D. Beneficial roots that fix nitrogen within their tissue

16. Which statement most accurately describes the branch collar?

A. A decorative ring of bark with no functional role

B. The dead outer bark layer of a young branch

C. A pith cylinder inside the branch base only

D. Swollen stem tissue at the branch base containing cambium

17. Which of the following best defines the branch bark ridge?

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

B. An internal barrier within the heartwood cylinder

C. The outer corky layer of a mature tree trunk

D. A dead zone separating sapwood from heartwood

18. The correct description of stomata is:

A. Passive openings that never close under any conditions

B. Structural supports for the leaf blade attachment

C. Pores regulating gas exchange between leaf and atmosphere

D. Reproductive organs producing seeds each season

19. Which statement most accurately describes a tree's secondary growth?

A. Extension of shoots and roots at their growing tips

B. Production of flowers during the reproductive cycle

C. Formation of new leaves at apical meristems only

D. Thickening of the trunk through vascular cambium activity

20. Which of the following best describes primary growth?

A. Thickening of mature trunks through cambium division

B. Extension of shoots and roots at apical meristems

C. Production of heartwood at the center of the stem

D. Formation of annual growth rings in the trunk

21. The correct description of a latent bud is:

A. A dormant bud that remains in reserve under the bark until triggered

B. An actively growing bud expanding into a new leaf cluster

C. A flower bud producing the tree's reproductive organs

D. A dead bud remnant from the previous growing season

22. Which statement most accurately describes epicormic sprouts?

A. Normal scaffold branches from active terminal buds only

B. Flowering structures produced during reproductive maturity

C. Shoots from latent or adventitious buds following stress

D. Root suckers emerging from below the soil line

23. The correct description of a tree species' identification by leaf arrangement is:

A. Both opposite and alternate arrangement occur on every tree

B. Opposite arrangement has leaves in pairs across from each other

C. Alternate arrangement has leaves always in whorls of four

D. Leaf arrangement is irrelevant to identification of any tree

24. Which of the following best describes the MAD Horse mnemonic?

A. Trees with distinctive peeling bark on mature trunks

B. Genera with palmately compound leaves only

C. Conifers that shed all their needles each autumn

D. Maples, ashes, dogwoods, and horse chestnut — opposite genera

25. Which statement most accurately describes a pinnately compound leaf?

A. Leaflets arranged along two sides of a central rachis

B. Leaflets radiating from a single attachment point

C. A single undivided blade with toothed margins

D. Leaves arranged in whorls around the stem

26. The correct description of a palmately compound leaf is:

A. Leaflets arranged along a central rachis like feathers

B. Leaflets radiating from a single attachment point

C. A single blade with deeply cut lobes and veins

D. Multiple leaves joined at separate nodes on the twig

27. Which of the following best describes white oaks?

A. Trees with pointed bristle-tipped leaf lobes

B. Acorns that mature over two full growing seasons

C. Trees that belong to the genus *Carya* exclusively

D. Trees with rounded leaf lobes and one-season acorns

28. The correct description of red oaks is:

A. Rounded leaf lobes without any bristle tips

B. Acorns that mature within one growing season

C. Pointed leaf lobes with bristles and two-season acorns

D. Trees belonging to the beech genus *Fagus*

29. Which statement most accurately describes scientific binomial nomenclature?

A. Genus capitalized and italicized, species lowercase and italicized

B. Genus and species both written in lowercase without italics

C. Both words written in bold capital letters always

D. Only the common name italicized in formal writing

30. Which of the following best describes a plant cultivar name?

A. Italicized with the rest of the scientific name

B. Written in single quotation marks and not italicized

C. Replaces the species name in formal citations

D. Used only for wild botanical varieties of a species

31. The correct description of bald cypress is:

A. An evergreen pine with needles in bundles of five

B. A broadleaf deciduous tree in the oak family

C. An evergreen spruce with drooping needles

D. A deciduous conifer that sheds needles each autumn

32. Which statement most accurately describes the 10-20-30 rule of urban forest diversity?

A. Maximum limits on tree height, age, and diameter

B. Maximum percentages of canopy, understory, and groundcover

C. Maximum percentages of species, genus, and family in plantings

D. Minimum percentages of native species in every planting

33. Which of the following best describes tree of heaven (*Ailanthus altissima*)?

A. A non-native invasive species spreading aggressively

B. A native understory species of eastern forests

C. A federally endangered species under protection

D. A short-lived ornamental with no ecological impact

34. The correct description of Right Tree, Right Place is:

A. Planting the cheapest available nursery stock first

B. Matching mature tree characteristics to site conditions

C. Planting only native species regardless of the site

D. Installing the tallest possible species at every site

35. Which statement most accurately describes the *Fraxinus* genus?

A. Members of the soapberry family Sapindaceae

B. Members of the pine family Pinaceae

C. Members of the rose family Rosaceae

D. Members of the olive family Oleaceae

36. Which of the following best describes a tree appropriate for planting beneath a 25-foot distribution line?

A. A red oak reaching 70 feet at maturity

B. A tulip poplar reaching 80 feet at maturity

C. A flowering crabapple reaching 15 to 20 feet

D. A sycamore reaching 80 feet at maturity

37. The correct description of American sycamore bark is:

A. Mottled tan and white peeling bark on mature trunks

B. Shaggy strips curling from the main trunk

C. Deep furrows running vertically on mature bark

D. Smooth gray bark remaining uniform throughout life

38. Which statement most accurately describes native species selection?

A. Native species are always faster growing than non-natives

B. Native species are automatically immune to all pests

C. Native species are always shorter than introduced species

D. Native species are co-adapted to local climate and ecology

39. Which of the following best describes winter identification of deciduous trees?

A. Leaf venation is the primary reliable winter feature

B. Bud shape, twig features, and bark character are key

C. Flower fragrance from the previous year is diagnostic

D. Root flare measurements are the main winter feature

40. The correct description of loam soil is:

A. Soil composed entirely of fine clay particles

B. Soil made only of coarse sand grains

C. Soil with balanced sand, silt, and clay proportions

D. Soil containing no mineral particles at all

41. Which statement most accurately describes soil pH at 7.0?

A. The neutral midpoint between acidic and alkaline

B. A strongly acidic reading near the scale minimum

C. A moderately alkaline reading for most tree species

D. A reading well above the upper scale limit

42. Which of the following best describes cation exchange capacity?

A. The total depth of the topsoil horizon

B. The annual rainfall received by the soil surface

C. The daily temperature range of the root zone

D. The soil's ability to hold and exchange cation nutrients

43. The correct description of compaction damage to tree roots is:

A. Compaction improves root access to oxygen and water

B. Compaction raises the pore space available to roots

C. Compaction reduces pore space and starves roots of oxygen

D. Compaction has no measurable effect on root function

44. Which statement most accurately describes an ideal mineral soil?

A. Composed entirely of organic matter with no minerals

B. Approximately 50 percent pore space by volume

C. Containing exactly 10 percent pore space by volume

D. Composed entirely of bedrock at the surface

45. Which of the following best describes a composite soil sample?

A. Multiple subsamples combined to average site variation

B. A single grab sample taken from the center of the site

C. A sample containing only surface plant litter

D. A sample of subsoil from below five feet of depth

46. The correct description of soil texture is:

A. The arrangement of particles into stable aggregates

B. The total organic matter content in the surface horizon

C. The relative proportions of sand, silt, and clay particles

D. The total salt content in the rooting zone

47. Which statement most accurately describes soil structure?

A. The relative proportions of sand, silt, and clay particles

B. The arrangement of soil particles into stable aggregates

C. The dissolved salt content of the soil solution

D. The temperature profile through the soil horizons

48. Which of the following best describes field capacity?

A. The saturation level during heavy rainfall events

B. The moisture content at the permanent wilting point

C. The moisture content of an oven-dried soil sample

D. The moisture held after free drainage has ceased

49. The correct description of the permanent wilting point is:

A. The moisture level at which plants cannot recover turgor

B. The moisture level at which drainage has just ceased

C. The total saturation of all soil pores at once

D. The moisture level of pure dry bedrock material

50. Which statement most accurately describes plant-available water?

A. Water bound tightly to dry clay particles only

B. Total mineral content dissolved in the soil solution

C. Water held between field capacity and the wilting point

D. Water inside living root cells during growth

51. Which of the following best describes the effect of mulching on soil?

A. Mulching sterilizes the soil and kills microorganisms

B. Mulching prevents any water from reaching the roots

C. Mulching increases compaction at the trunk base

D. Mulching conserves moisture, moderates temperature, and suppresses weeds

52. The correct description of a proper mulch ring for a landscape tree is:

A. Eight to ten inches deep piled against the trunk

B. Two to four inches deep with the trunk kept clear

C. A thin dusting less than half an inch deep total

D. Plastic sheeting covered with decorative stones

53. Which statement most accurately describes soil acidification with sulfur?

A. Sulfur is oxidized by microbes to lower soil pH

B. Sulfur raises soil pH by neutralizing acidity

C. Sulfur has no effect on soil pH at any rate

D. Sulfur sterilizes the soil and stops pH change

54. Which of the following best describes the use of lime in soil?

A. Lime lowers soil pH toward the acidic range

B. Lime has no effect on soil pH at any application rate

C. Lime raises soil pH by neutralizing acidity

D. Lime sterilizes the soil to stop all chemical activity

55. The correct description of chelated iron is:

A. An inorganic compound that precipitates in alkaline soils

B. A form of iron limited to acidic soil conditions only

C. A toxic form of iron unsuitable for landscape use

D. A form of iron remaining available across a broader pH range

56. Which statement most accurately describes a pH of 4.5?

A. A strongly acidic reading below the neutral midpoint

B. A moderately alkaline reading above the midpoint

C. The exact neutral value at the middle of the scale

D. A reading entirely off the standard pH scale

57. Which of the following best describes the effect of continuous mulching over years?

A. It causes severe compaction throughout the root zone

B. It gradually builds soil organic matter through decomposition

C. It sterilizes the soil and kills beneficial microbes

D. It eliminates the need for any tree watering entirely

58. The correct description of a perc test is:

A. A measure of the soil's nitrogen content over time

B. A test of the soil's calcium carbonate percentage

C. A measure of how quickly water drains from a soil pit

D. A measure of the soil's microbial population density

59. Which statement most accurately describes a tree's absorbing root distribution?

A. Concentrated in a central taproot below the trunk

B. Found only below five feet of soil depth consistently

C. Located exclusively in the outer drip line area

D. Concentrated in the upper 12 to 18 inches of soil

60. Which of the following best describes the proper planting depth for a new tree?

A. Deep enough to bury the root flare completely

B. With the root flare at or slightly above surrounding grade

C. Twelve inches below the surrounding finished grade

D. Beneath a six-inch gravel drainage layer on the bottom

61. The correct description of backfill for a planting hole is:

A. The unamended native soil excavated from the hole

B. Sterilized purchased potting mix only

C. Equal parts peat moss and perlite mixed together

D. Coarse builder's sand with added powdered lime

62. Which statement most accurately describes planting hole width?

A. Exactly the diameter of the root ball

B. Half the diameter of the root ball

C. Two to three times the diameter of the root ball

D. Ten times the diameter of the root ball

63. Which of the following best describes tree establishment time?

A. One week regardless of caliper size at planting

B. Three months regardless of caliper size at planting

C. Ten years regardless of caliper size at planting

D. Approximately one year per inch of trunk caliper

64. The correct description of staking for a newly planted tree is:

A. Permanent staking for the entire life of the tree

B. Only when needed and removed within one season

C. Required on every newly planted tree automatically

D. With progressively tightened ties each growing season

65. Which statement most accurately describes a circling root found at planting?

A. It should be cut or straightened before placing the tree

B. It should be left intact to avoid damaging fine tips

C. It should be coated with rooting hormone before planting

D. It should be treated with commercial wound dressing

66. Which of the following best describes the preferred transplanting window?

A. Mid-summer during peak active growth of the tree

B. Any month with adequate irrigation water available

C. Immediately after leaf expansion each spring

D. Dormancy in late fall or early spring

67. The correct description of advance root pruning is:

A. A technique used only on already-dead branches

B. Severing roots at the future root ball line before the move

C. A substitute for proper transplant irrigation entirely

D. A method of treating vascular wilt diseases in trees

68. Which statement most accurately describes lifting a B&B tree?

A. Lifting by the trunk with two hands for stability

B. Pulling on the burlap at the top of the ball

C. Supporting the root ball from underneath always

D. Wrapping the crown with lifting straps and cables

69. Which of the following best describes twine tied around a B&B trunk?

A. It must be removed completely to prevent girdling

B. It should be tightened for additional stability

C. It is required to remain in place throughout establishment

D. It should be replaced with heavier rope before planting

70. The correct description of establishment watering for a new tree is:

A. Flooding the hole daily for the first month

B. Keeping the root ball completely dry for deep rooting

C. Watering only the south side of the trunk

D. Keeping the root ball consistently moist but not saturated

71. Which statement most accurately describes fertilization during the first year after planting?

A. It is the single most important survival practice

B. It is required by municipal planting specifications

C. It is generally unnecessary and sometimes counterproductive

D. It should be applied as weekly foliar sprays only

72. Which of the following best describes the ANSI A300 standard?

A. The governing standard for tree pruning and maintenance

B. The governing standard for arboricultural safety only

C. The governing standard for nursery stock grades

D. The governing standard for head protection specifications

73. The correct description of ANSI Z133 is:

A. The standard for pruning cut placement practices

B. The principal safety standard for arboricultural operations

C. The standard for nursery stock size and grading

D. The standard for tree planting depth specifications

74. Which statement most accurately describes topping?

A. A beneficial practice for mature shade trees always

B. A standard ANSI A300 objective for mature trees

C. An approved method for controlling future size

D. A harmful practice producing weak sprouts and decay

75. Which of the following best describes the three-cut method?

A. A method used only for branches under one inch

B. A method for cutting through the root flare

C. A method preventing bark tearing on heavy branch removal

D. A method for sharpening chainsaw chains in the field

76. The correct description of the cleaning pruning objective is:

A. Selective removal of dead, dying, diseased, broken, or weak branches

B. Heading every lateral to force new sprouting growth

C. Removing all interior live foliage from the canopy

D. Cutting back all branches to a uniform length

77. Which statement most accurately describes a reduction cut?

A. A flush cut made directly against the parent stem

B. A heading cut leaving an arbitrary long stub

C. A cut made only with bypass hand pruners only

D. A cut to a lateral large enough to assume the terminal role

78. Which of the following best describes the raise pruning objective?

A. Increasing the overall height of the canopy mechanically

B. Selective removal of lower branches for vertical clearance

C. Raising soil grade around the tree trunk base

D. Lifting the entire tree with machinery for transplant

79. The correct description of structural pruning is:

A. A one-time heavy pruning session in old age

B. Annual topping to control mature size

C. Developmental pruning during the juvenile phase for strong form

D. Removing the central leader on every young tree

80. Which statement most accurately describes the restoration pruning objective?

A. Immediate removal of all epicormic sprouts after damage

B. Developing acceptable structure after topping or severe damage

C. Applying systemic fungicide to the canopy after injury

D. Cutting every branch back to a uniform new length

81. Which of the following best describes lion-tailing?

A. An approved thinning method under ANSI A300 standards

B. A harmful practice stripping interior foliage and concentrating weight

C. The standard technique for young tree establishment

D. A required practice on all mature shade trees

82. The correct description of pollarding is:

A. A one-time heading cut at random heights

B. A form of topping with no ongoing maintenance

C. A method applicable only to conifers and evergreens

D. A long-term system with repeated cuts at framework points

83. Which statement most accurately describes subordination pruning?

A. Reducing a competing stem to favor a dominant leader

B. Cutting every lateral branch to equal lengths on young trees

C. Removing all epicormic sprouts from the trunk

D. Eliminating the central leader entirely from young trees

84. Which of the following best describes a flush cut?

A. A cut just outside the branch bark ridge

B. A cut leaving a projecting stub beyond the collar

C. A cut removing the branch collar and Wall 4 tissue

D. A cut halfway between the trunk and branch tip

85. The correct description of a stub cut is:

A. A flush cut against the parent stem removing the collar

B. A cut leaving dead wood projecting beyond the branch collar

C. A cut made just outside the branch bark ridge properly

D. A cut at the exact midpoint of the branch length

86. Which statement most accurately describes bypass pruning blades?

A. Anvil-style blades that crush the stem against a flat surface

B. Serrated edges that saw through woody material slowly

C. Chipper blades for grinding branches into chips

D. Scissor-action blades that cut cleanly without crushing

87. Which of the following best describes a pole pruner?

A. A tool for small branches out of reach without climbing

B. A tool for felling small trees on flat terrain

C. A tool for branches over six inches in diameter overhead

D. A tool for cutting all lower scaffold branches at once

88. The correct description of bypass loppers is:

A. A tool for branches under one-quarter inch diameter only

B. A tool for branches over eight inches in diameter

C. A tool for branches up to approximately one and a half to two inches

D. A tool for felling full-sized mature trees

89. Which statement most accurately describes a maximum foliage removal guideline for a mature tree in one session?

A. 25 to 30 percent during active growth seasons

B. 10 to 15 percent or less, depending on stress status

C. 50 percent during the dormant season always

D. There is no upper limit for healthy mature trees

90. Which of the following best describes current research on wound dressings?

A. Dressings are required by current ANSI A300 standards

B. Dressings eliminate all decay organism entry risk

C. Dressings accelerate compartmentalization in every species

D. Dressings provide minimal benefit and sometimes slow healing

91. The correct description of oak pruning timing in oak wilt regions is:

A. Summer months are preferred for faster wound closure

B. Wet rainy days when sap beetles are less active

C. Dormancy is preferred to reduce disease transmission

D. Any time of year with sterilized tools is acceptable

92. Which statement most accurately describes tool disinfection between cuts?

A. Most important when pruning trees with contagious diseases

B. Required on every cut regardless of tree health status

C. Required only when using power-driven saws on trunks

D. Unnecessary in every situation because tools are clean

93. Which of the following best describes codominant stems with included bark?

A. A strong structural union stronger than a single trunk

B. A normal branching pattern of no structural concern

C. A feature reducing risk of splitting during storms

D. A structurally weak union with trapped bark preventing strength

94. The correct description of correcting codominant stems is:

A. Waiting until the tree reaches structural maturity

B. Correcting early while the tree is young and cuts are small

C. Applying a systemic fungicide to the stem union

D. Removing the entire tree as a precautionary measure

95. Which statement most accurately describes the single most important factor in pruning wound closure?

A. The brand of cutting tool used by the climber

B. The weather conditions during the pruning operation

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

D. The time of day at which the cut is performed

96. Which of the following best describes a professional pruning specification?

A. A written document detailing objective, scope, and standards

B. The climber's personal stylistic preferences alone

C. A verbal agreement made at the start of the work

D. Only the final invoice for the completed work

97. The correct description of the cleaning pruning objective scope is:

A. Heading back every branch to uniform length

B. Removing dead, dying, diseased, broken, or weak branches

C. Stripping all interior foliage from the canopy

D. Reducing the overall crown height by one-third

98. Which statement most accurately describes the cause of bark tearing during branch removal?

A. Using the three-cut method properly in all cases

B. Using bypass blades instead of anvil blades

C. Making clean cuts outside the branch collar

D. Making a single cut from above on heavy branches

99. Which of the following best describes cut placement and Wall 4 formation?

A. Correct cut placement preserves the collar cambium that forms Wall 4

B. Flush cuts stimulate stronger Wall 4 development than normal cuts

C. Stub cuts produce the strongest possible Wall 4 barriers

D. Wall 4 forms regardless of where the cut is placed on a branch

100. The correct description of structural pruning timing is:

A. Only performed on mature trees at the end of their life

B. Limited to recently planted trees during establishment

C. Most beneficial during the juvenile growth phase

D. Performed annually on every mature shade tree

101. Which statement most accurately describes the first step in diagnosing an unhealthy tree?

A. Applying broad-spectrum fungicide as a precaution

B. Identifying the species and understanding its normal characteristics

C. Recommending immediate removal of the tree

D. Collecting a wood core sample for the laboratory

102. Which of the following best describes a "sign" of tree disease?

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

B. A description recorded in the inspection report text

C. A homeowner's complaint about the leaf appearance

D. Direct evidence of the causal agent itself

103. The correct description of a "symptom" in tree diagnosis is:

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

B. The direct evidence of a causal pathogen on the bark

C. A laboratory confirmation of a specific disease organism

D. A visible fruiting body on the trunk of the tree

104. Which statement most accurately describes a primary tree pest?

A. A pest found only in remote forested areas

B. A pest that reproduces only during drought stress

C. A pest capable of killing healthy vigorous trees on its own

D. A pest that feeds only on dead or decaying tissue

105. Which of the following best describes emerald ash borer classification?

A. A secondary pest attacking only weakened ash trees

B. A primary pest attacking healthy ash trees of all sizes

C. A saprophytic organism limited to dead ash wood

D. A beneficial predator of other bark-feeding insects

106. The correct description of Integrated Pest Management is:

A. A specific brand of organic pesticide formulation

B. A prohibition on all pesticide use in landscapes

C. A biological control method limited to predators

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

107. Which statement most accurately describes fire blight?

A. A bacterial disease affecting members of the rose family

B. A fungal leaf disease on pine species only

C. A viral disease transmitted by aphid vectors

D. A nutrient deficiency limited to new plant growth

108. Which of the following best describes oak wilt spread?

A. Wind dispersing spores across hundreds of miles

B. Soil nematodes feeding on the fine oak roots

C. Root grafts and sap-feeding beetles at fresh wounds

D. Rain splashing from infected leaves to others

109. The correct description of iron deficiency symptoms in pin oak is:

A. Uniform yellowing of older inner leaves first

B. Sudden wilting identical to drought symptoms

C. Cupping and twisting of the youngest new growth

D. Interveinal chlorosis on new leaves with green veins

110. Which statement most accurately describes nitrogen deficiency pattern?

A. Yellowing appearing first on new leaves at the shoot tips

B. Yellowing beginning on older inner leaves and progressing outward

C. Cupping and twisting distortion of new growth only

D. Sudden wilting of the entire canopy at once

111. Which of the following best describes cupping and twisting of new growth on a mature tree?

A. A likely indication of phenoxy herbicide drift exposure

B. A normal seasonal fall color change pattern

C. A symptom of active spider mite feeding damage

D. A sign of drought stress in the root zone

112. The correct description of delayed decline after construction is:

A. Decline appearing within hours of the damaging activity

B. Decline visible only on the exact anniversary of damage

C. Decline appearing months to several years after the event

D. Decline appearing only during the first severe drought

113. Which statement most accurately describes anthracnose?

A. A systemic bacterial infection of the xylem vessels

B. A fungal leaf disease producing spots and blotches

C. A viral disease transmitted by leafhopper vectors

D. A nutrient deficiency limited to expanding foliage

114. Which of the following best describes Armillaria root rot confirmation?

A. Orange pustules visible on the upper leaf surfaces

B. Sticky honeydew dripping from twig tips in summer

C. Hollow insect tunnels carved into the heartwood

D. White mycelial sheets found beneath infected bark

115. The correct description of Dutch elm disease spread is:

A. Elm bark beetles carrying fungal spores and root grafts

B. Wind dispersing spores across long distances

C. Soil nematodes feeding on elm fine roots

D. Rain splash from infected leaves during storms

116. Which statement most accurately describes trunk injection of insecticide?

A. A method prohibited on all landscape trees

B. A method limited to small nursery seedlings

C. A method suited to high-value trees threatened by borers

D. A method used only to treat turf weed infestations

117. Which of the following best describes the meaning of "the label is the law"?

A. Pesticide labels are advisory and optional to follow

B. Pesticide labels expire one year after opening

C. Pesticide labels are binding only during the first use

D. Pesticide labels are legally enforceable federal documents

118. The correct description of professional practice when no treatment exists is:

A. Applying experimental treatments without owner consent

B. Communicating honestly and recommending appropriate management

C. Recommending the removal of all nearby trees as a precaution

D. Refusing to discuss the findings with the property owner

119. Which statement most accurately describes the Critical Root Zone formula?

A. A radius of one foot per inch of trunk DBH

B. A radius equal to the visible dripline of the tree

C. A radius of three feet per inch of trunk DBH

D. A radius of six inches per inch of trunk DBH

120. Which of the following best describes tree protection fencing placement?

A. The trunk itself encircling the bark closely

B. The dripline regardless of tree size or species

C. The CRZ boundary or further out from the trunk

D. Halfway between the trunk and the outer dripline

121. The correct description of concrete washout damage in a Tree Protection Zone is:

A. The aggregate physically damages fine absorbing roots

B. The high pH of the washwater can sterilize soil

C. The vibration disturbs fine root hairs throughout

D. The cement sets up around the root surfaces

122. Which statement most accurately describes raising the grade over tree roots?

A. Buries roots and reduces oxygen access over time

B. Improves drainage for the deeper subsoil layers

C. Provides stronger anchorage during major storms

D. Has no measurable effect on the existing roots

123. Which of the following best describes directional boring for utility installation?

A. Tears roots more than any open-cut trenching method

B. Compacts the root zone through heavy equipment weight

C. Produces the largest possible root disturbance on site

D. Passes beneath the root zone without disturbing soil

124. The correct description of construction material storage in a TPZ is:

A. Permitted if materials are lightweight like pipes

B. Required to free up other staging areas on site

C. Prohibited because of soil compaction and root damage

D. Allowed only during dry weather conditions outdoors

125. Which statement most accurately describes a pre-construction tree assessment?

A. Performed only after foundation pouring is complete

B. Performed before final design so findings can influence decisions

C. Performed only after demolition has already begun on site

D. Performed only when trees later show obvious symptoms

126. Which of the following best describes clean cuts on unavoidable root impacts?

A. Clean cuts heal more reliably than torn roots during excavation

B. Ripped roots heal just as well as clean-cut roots

C. Wound sealant applied after cutting improves healing

D. Delaying assessment until after excavation is the best approach

127. The correct description of effective post-construction care is:

A. Aggressive crown reduction to balance lost roots

B. Heavy nitrogen fertilization to force vigorous growth

C. Immediate trunk injection with a systemic fungicide

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

128. Which statement most accurately describes the dripline as a protection boundary?

A. A reliable boundary matching all actual root extent

B. An enforceable legal standard in every jurisdiction

C. An inadequate boundary because roots extend well beyond it

D. A boundary preferred over the calculated CRZ formula

129. Which of the following best describes the timing of delayed construction decline?

A. Within hours of the damaging activity ending

B. Months to several years after the triggering event

C. Only during the very next major drought cycle

D. Always on the first anniversary of the construction

130. The correct description of proper construction tree protection fencing is:

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

B. Lightweight flagging that crews can move as needed

C. Short stakes spaced widely apart for easy access

D. Painted stakes to match nearby buildings on the lot

131. Which statement most accurately describes the single most effective construction tree protection action?

A. Wrapping the trunk in protective foam padding

B. Heavy fertilization of the root zone before work begins

C. Excluding all activity from the root zone entirely

D. Reducing the crown to balance expected root losses

132. Which of the following best describes lowering the grade around an established tree?

A. Improves drainage across the whole root zone

B. Has no measurable effect on the existing roots

C. Produces stronger anchorage against major storms

D. Directly removes functional roots with the removed soil

133. The correct description of a baseline tree condition report is:

A. A report eliminating any need for further monitoring

B. A record documenting pre-existing conditions for later comparison

C. A report used exclusively for billing the client

D. A report automatically satisfying all regulatory requirements

134. Which statement most accurately describes monitoring after construction?

A. Should continue for three to five growing seasons after work

B. Should end immediately when construction ends on the site

C. Should continue only during the active growing season

D. Should be limited to the first month after construction

135. Which of the following best describes hand or air excavation within a TPZ?

A. A method primarily used to speed excavation work

B. A method reducing cost compared to mechanical trenching

C. A method allowing roots to be identified and preserved

D. A method required when tree vigor is excellent

136. The correct description of the proper response to a tree contacting an energized line is:

A. Approaching immediately for pruning by any crew member

B. Spraying the tree with water to dissipate the charge

C. Removing the tree quickly before it is reported

D. Treating the tree as potentially energized until the utility confirms

137. Which statement most accurately describes "risk" in formal tree risk assessment?

A. The combination of likelihood of failure and consequences

B. The presence of any visible defect on the tree

C. The age of the tree multiplied by its mature height

D. The total monetary value of the tree at market

138. Which of the following best describes a Level 1 tree risk assessment?

A. A detailed single-tree inspection with mallet and probe

B. A rapid limited visual screening of many trees

C. Advanced instrumentation like sonic tomography

D. Laboratory analysis of collected wood core samples

139. The correct description of a Level 2 tree risk assessment is:

A. A rapid windshield survey of every street tree

B. A post-incident forensic investigation of a failure

C. A detailed visual inspection of a single tree

D. A laboratory-based analysis of core samples

140. Which statement most accurately describes a Level 3 tree risk assessment?

A. A rapid drive-by screening of many trees

B. Only a mallet and probe inspection from the ground

C. A visual inspection of a single tree from all sides

D. Advanced instrumentation like resistograph and tomography

141. Which of the following best describes codominant stems with included bark?

A. A structurally weak union because trapped bark prevents strength

B. A normal strong branching pattern of no structural concern

C. A feature reducing risk of splitting during storms

D. A condition requiring no professional attention ever

142. The correct description of a fungal fruiting body on a trunk is:

A. A sign indicating a beneficial mycorrhizal partnership

B. A sign indicating active decay established within the tree

C. A symptom of normal seasonal bark shedding

D. A symptom of excess nitrogen from fertilization

143. Which statement most accurately describes a target in tree risk assessment?

A. A specific branch identified for pruning removal

B. A zone where the tree is expected to fall

C. An area of decay that has become externally visible

D. Any person, property, or activity that could be affected

144. Which of the following best describes target occupancy rate?

A. The number of trees per acre in the surrounding area

B. The age of structures beneath the tree canopy

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

D. The total value of nearby real estate parcels

145. The correct description of a new lean with soil cracking on the opposite side is:

A. Root plate movement and elevated uprooting risk

B. A normal phototropic response to seasonal sunlight

C. A cosmetic change without any structural meaning

D. A seasonal soil movement unrelated to the tree

146. Which statement most accurately describes sounding the trunk with a mallet?

A. A measure of the nitrogen content of trunk wood

B. A technique for detecting hollow areas through sound

C. A method for identifying the species from sound

D. A method for locating overwintering insect adults

147. Which of the following best describes the TRAQ risk matrix?

A. A measure of only tree species and trunk diameter

B. A measure based only on site drainage and soil pH

C. A combination of likelihood of failure with impact and consequences

D. A measure based solely on property value and age

148. The correct description of "probable" likelihood in TRAQ is:

A. Failure is impossible under any foreseeable conditions

B. Failure is unlikely but not theoretically ruled out

C. Failure is already occurring or clearly imminent now

D. Failure is likely to occur during the assessment period

149. Which statement most accurately describes the "severe" consequence level in TRAQ?

A. Catastrophic damage, serious injury, or death

B. Minor property damage easily repaired at low cost

C. Moderate damage with no significant injury to people

D. No measurable effect on any nearby targets

150. Which of the following best describes a tree with an internal cavity?

A. It must be removed immediately regardless of sound wood

B. It may still be structurally sound if sufficient wood remains

C. It is guaranteed to fail during the next major storm

D. It requires immediate cabling of every scaffold branch

151. The correct description of consequences of failure is:

A. Depends only on the total weight of the falling part

B. Depends only on the nearest distance to a structure

C. Depends on part size, fall height, and target nature

D. Depends only on the calendar age of the tree

152. Which statement most accurately describes residual risk?

A. The cost of insurance premiums on the property

B. The risk present only during the mitigation work itself

C. The risk visible only after the tree has been removed

D. The risk remaining after mitigation has been implemented

153. Which of the following best describes a professional risk assessment report?

A. A document including scope, defects, targets, and residual risk

B. A document recommending removal of every tree examined

C. A document containing only photographs of the site

D. A document limited to property owner billing information

154. The correct description of cabling and bracing systems is:

A. Required on every mature tree by ANSI A300 standards

B. Support systems that reduce but do not eliminate risk

C. Installations that need no further inspection after setup

D. Systems that eliminate all structural risk completely

155. Which statement most accurately describes effective risk communication with a property owner?

A. Using highly technical jargon to establish credibility

B. Recommending only the most expensive mitigation option

C. Using plain language and respecting the owner's decisions

D. Withholding any uncertain information to avoid concern

156. Which of the following best describes why root defects are hard to evaluate?

A. Roots always heal spontaneously without intervention

B. Roots are found only in young recently planted trees

C. Roots never produce any above-ground symptoms at all

D. Roots are below ground and not directly observable

157. The correct description of a healthy rounded callus around an old small wound is:

A. A major structural defect requiring immediate removal

B. Evidence of successful compartmentalization, not a defect

C. A sign of imminent catastrophic whole-tree failure

D. An active cavity requiring immediate cable installation

158. Which statement most accurately describes appropriate mitigation for a moderate-risk overextended branch?

A. Reduction pruning to decrease end weight on the limb

B. Removing the entire tree as a preventive measure

C. Ignoring the situation until the branch actually fails

D. Cabling every branch in the entire crown structure

159. Which of the following best describes the principal arboricultural safety standard?

A. ANSI A300 covering tree pruning and maintenance

B. ANSI Z60.1 covering the grading of nursery stock

C. ANSI Z133 covering arboricultural safety requirements

D. ANSI Z89.1 covering head protection specifications only

160. The correct description of the minimum approach distance for unqualified workers to lines below 50 kV is:

A. Three feet from the nearest energized conductor

B. Five feet from the nearest energized conductor

C. Twenty-five feet from the nearest energized conductor

D. Ten feet from the nearest energized conductor

161. Which statement most accurately describes a qualified line-clearance arborist?

A. A worker trained in electrical hazards and line work

B. A worker with only a current driver's license for trucks

C. A worker with only general landscape design experience

D. A worker owning a personal set of insulated gloves

162. Which of the following best describes a required feature of a climbing helmet?

A. A wide brim for blocking direct sunlight overhead

B. Reflective tape covering every external surface

C. A chin strap to retain the helmet during climbing

D. An open face design for peripheral vision only

163. The correct description of how chainsaw-resistant leg protection works is:

A. Activating an electromagnetic brake on the running saw

B. Containing fibers that clog the chain on contact

C. Reflecting the moving chain away from the operator's skin

D. Producing an audible warning tone to the operator

164. Which statement most accurately describes OSHA's hearing protection threshold?

A. 30 decibels of normal conversation level

B. 50 decibels of quiet outdoor activity level

C. 120 decibels of extreme machinery level only

D. 85 decibels of typical chainsaw operation

165. Which of the following best describes a pre-work job briefing?

A. A briefing covering scope, hazards, PPE, and emergency procedures

B. A briefing listing only the names of crew members present

C. A briefing covering only the day's lunch break schedule

D. A briefing addressing only the pricing of planned work

166. The correct description of ANSI Z133 aerial rescue requirements is:

A. Required only when working trees over 100 feet tall

B. Required only when electrical hazards are present at the site

C. Required for essentially all climbing operations with a crew

D. Required only on weekends when EMS response is delayed

167. Which statement most accurately describes suspension trauma?

A. A condition occurring only when harnesses fit too tightly

B. A condition developing when a climber remains motionless in a harness

C. A condition from climbing ropes deteriorating during long climbs

D. A condition caused by excessive hot weather exposure

168. Which of the following best describes the kickback zone of a chainsaw?

A. The rear handle near the throttle control lever

B. The middle of the bar during normal straight cutting

C. The bottom edge of the bar near the powerhead

D. The upper portion of the chainsaw bar tip

169. The correct description of the chainsaw chain brake is:

A. A device stopping the chain when kickback or hand activates it

B. A device slowing the chain to idle when not cutting wood

C. A device reducing vibration transmitted to the operator's hands

D. A device preventing engine flooding during cold-weather starts

170. Which statement most accurately describes the proper left-hand grip on a chainsaw?

A. Only fingertip contact for rapid release in an emergency

B. Loose contact with the handle to absorb engine vibration

C. The thumb wrapped fully around the front handle

D. Palm contact only with the thumb tucked alongside

171. Which of the following best describes two-handed chainsaw operation?

A. Optional based on the operator's preference and skill

B. The standard practice for nearly all chainsaw use

C. Required only for felling very large mature trees

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

172. The correct description of top-handle chainsaws is:

A. Saws designed for felling large forest trees only

B. Saws designed for bucking logs on flat ground only

C. Saws designed for residential firewood cutting only

D. Saws designed specifically for climbing arborist canopy use

173. Which statement most accurately describes the chain catcher on a chainsaw?

A. A device catching the chain if it breaks during cutting

B. A device sharpening the chain automatically during use

C. A device lubricating the chain during long cuts

D. A device securing the chain to the bar during transport

174. Which of the following best describes the working load limit of rigging equipment?

A. Approximately one-half of the rated tensile strength

B. Approximately nine-tenths of the rated tensile strength

C. Approximately one-tenth of the rated tensile strength

D. Approximately equal to the rated tensile strength itself

175. The correct description of shock loading in rigging is:

A. The static weight of the largest piece being handled

B. The dynamic force from a falling piece suddenly caught

C. The initial lifting force applied to a freshly cut piece

D. The electrical charge building up in a dry rigging rope

176. Which statement most accurately describes the best way to reduce shock loading?

A. Tying the rigging line to a hard anchor with no slip

B. Using the smallest diameter rope that fits the load

C. Positioning the ground worker beneath the falling piece

D. Using a friction device to allow controlled slip

177. Which of the following best describes the force on a block redirecting a rigging load?

A. Approximately twice the force of the load itself

B. Approximately half the force of the load itself

C. Exactly the force of the load itself at all times

D. No additional force when the block is properly installed

178. The correct description of the hinge in a standard felling cut is:

A. A section cut completely through before the tree begins to fall

B. Intact wood between notch and back cut controlling fall direction

C. A section formed only by the first notch cut alone

D. A section needed only for hollow or decayed trees

179. Which statement most accurately describes a proper escape route during felling?

A. Directly beneath the expected fall line of the tree

B. Always exactly straight behind the feller during the cut

C. Improvised at the moment of the actual tree fall

D. Planned and cleared before cutting begins each time

180. Which of the following best describes "barber chair" in tree felling?

A. A resting position taken between difficult cuts

B. A decorative form intentionally left in the stump

C. Vertical trunk splitting during the back cut

D. A specialty chain used for resinous softwoods only

181. The correct description of safe chipper feeding technique is:

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

B. Tip first while standing directly behind the infeed

C. Wearing loose clothing for quick release if needed

D. Only during evening hours to avoid overheating

182. Which statement most accurately describes aerial lift operation near energized lines?

A. Approach distance is needed only at the bucket itself

B. Rubber tires on the ground isolate the lift electrically

C. Approach distance must be maintained with both bucket and boom

D. One-foot clearance is sufficient for efficient pruning work

183. Which of the following best describes PPE inspection frequency?

A. Only during annual company safety reviews by management

B. Before every use with damaged items retired immediately

C. Only after a known impact or failure event has occurred

D. Only by the original equipment manufacturer personnel

184. The correct description of the ANSI Z133 minimum climbing rope tensile strength is:

A. 1,800 pounds rated for residential climbing work

B. 3,000 pounds rated for routine maintenance climbing

C. 10,000 pounds rated for any climbing operation

D. 5,400 pounds rated per the current standard

185. Which statement most accurately describes a properly tied friction hitch?

A. It grips reliably while permitting controlled adjustment

B. It locks rigidly and never moves under any load at all

C. It must be replaced after every single climb day

D. It slips continuously to allow the fastest descent

186. Which of the following best describes the chipper feed control bar?

A. A device measuring the speed of the chipping drum

B. A device metering lubricant to the feed roller bearings

C. A device stopping the feed rollers in an emergency

D. A device switching the chipper between forward and reverse

187. The correct description of chainsaw refueling safety is:

A. Refuel quickly without removing the fuel cap entirely

B. Keep the saw at low idle during the refueling process

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

D. Stop the saw and allow it to cool briefly before refueling

188. Which statement most accurately describes the worksite first aid kit requirement?

A. It may be stored in a vehicle parked off the worksite

B. It must be available on site and stocked appropriately

C. It should contain only basic over-the-counter medications

D. It should be carried only by the designated safety officer

189. Which of the following best describes how urban trees reduce the heat island effect?

A. By shading surfaces and providing evapotranspiration cooling

B. By releasing methane gas into the atmosphere year-round

C. By absorbing heat directly through their root systems

D. By reflecting sunlight from waxy leaf surfaces only

190. The correct description of a complete tree inventory is:

A. A list of only trees scheduled for immediate removal

B. Only a statistical sample of the total tree population

C. A list of only trees with obvious structural defects

D. A record of every tree within the defined inventory area

191. Which statement most accurately describes the i-Tree suite of tools?

A. A plant taxonomy textbook for identifying species

B. A nursery stock pricing catalog for landscape use

C. Analytical tools estimating ecosystem service values

D. Real estate market valuations of residential parcels

192. Which of the following best describes the trunk formula method of appraisal?

A. A method limited to recently planted nursery stock

B. A method applied when a tree is too large to replace with nursery stock

C. A method based only on the lumber value of the wood

D. A method requiring no species or condition adjustments

193. The correct description of a typical tree protection ordinance is:

A. A requirement for permits to remove protected trees

B. A prohibition on all pruning by private property owners

C. A mandate for the removal of mature trees over time

D. A regulation applying only to city-planted trees only

194. Which statement most accurately describes canopy cover goals?

A. The total number of trees planted each calendar year

B. The number of trees per square mile of city area

C. The average height of street trees measured in feet

D. The percentage of land area covered by tree canopy

195. Which of the following best describes the Tree City USA minimum budget?

A. Ten dollars per capita annually in funding

B. Fifty dollars per capita annually in funding

C. Two dollars per capita annually in funding

D. One hundred dollars per capita annually in funding

196. The correct description of species rating in plant appraisal is:

A. The lumber market value of the species at harvest

B. The desirability and suitability in the local area

C. The exact calendar age of the tree at appraisal

D. The current height of the tree measured in feet

197. Which statement most accurately describes effective communication with property owners?

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

B. Highly technical jargon to display professional expertise

C. Pressure tactics designed to close the sale quickly

D. Refusal to provide any pricing estimate until later

198. Which of the following best describes a documented social benefit of urban trees?

A. Increased crime rates in heavily wooded neighborhoods

B. Higher rates of asthma across all resident age groups

C. Reduced physical activity among nearby residents

D. Improved mental health and reduced stress for residents

199. The correct description of the most persuasive argument for canopy expansion before a budget-focused council is:

A. The aesthetic preferences of the forestry staff

B. The mayor's personal favorite tree species

C. The documented dollar value of ecosystem services

D. The simplicity of installing artificial turf instead

200. Which statement most accurately describes the primary benefit of the 10-20-30 diversity rule?

A. Reducing nursery costs for the community budget

B. Protecting the community against catastrophic pest loss

C. Ensuring every tree grows at the same rate always

D. Limiting the total number of trees required citywide

PRACTICE EXAM 17 — ANSWER KEY AND EXPLANATIONS

1. C — The vascular cambium is a thin living layer between xylem and phloem that produces new xylem inward and new phloem outward each year. It is the most metabolically active layer of a mature trunk and the engine of secondary growth. Heartwood, bark, and pith do not produce new wood.

2. A — Xylem conducting cells are dead at functional maturity, forming hollow tubes that transport water through the tree without requiring metabolic energy. This design allows water to move under tension generated by transpiration. Phloem and cambium, in contrast, must remain living.

3. D — Phloem is living inner-bark tissue that transports sugars from sources (typically leaves) to sinks (roots, growing tips, storage tissues). Unlike xylem, phloem requires active cellular processes for sugar transport. This is the fundamental difference between the two vascular tissues.

4. B — Heartwood is composed of dead cells with extractives (tannins, resins) deposited in the cell walls, providing decay resistance and structural support. Sapwood, by contrast, is the outer functional xylem that actively conducts water. This distinction explains heartwood's durability.

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

6. A — Transpiration is the loss of water vapor from leaves through open stomata, driving the cohesion-tension mechanism that pulls water upward. It is distinct from respiration (energy release) and photosynthesis (sugar production). Transpiration is the engine of water transport in trees.

7. B — Photosynthesis is a light-driven process that converts CO_2 and water into sugars using chlorophyll in leaf chloroplasts. This process powers all tree growth and metabolism. It occurs only in the presence of light and is the foundation of the tree's carbon economy.

8. D — Respiration is a continuous process in every living cell that consumes stored sugars to release energy for cellular function. It occurs day and night throughout the year, not just during active growth. Respiration is fundamentally different from photosynthesis, which produces sugars.

9. A — Apical dominance is the hormonal mechanism by which auxin produced at the shoot tip travels downward and suppresses lateral bud growth below. Removing the leader interrupts auxin flow and releases lateral buds to grow. This is the biological basis for many pruning responses.

10. C — Mycorrhizal fungi are symbiotic partners that extend tree root absorbing surface area through their hyphal network. The tree supplies sugars; the fungus supplies access to water and nutrients from a much larger soil volume. The partnership is essential for most tree species.

11. B — The cohesion-tension theory explains that transpiration pulls water upward through xylem in continuous columns held together by hydrogen bonding between water molecules. No active metabolic pumping is required from the tree. This is how trees lift water hundreds of feet.

12. D — Spring carbohydrate reserves are depleted rapidly by refoliation and new growth demand because new leaves must be built before they can photosynthesize. This is why reserves reach their lowest point in late spring. Spring defoliation during this window is particularly devastating.

13. A — A tree under drought closes its stomata, which simultaneously reduces transpiration (water loss) and photosynthesis (because CO_2 can no longer enter the leaf). This trade-off between water conservation and carbon gain is the central constraint on tree function under stress.

14. C — Reaction wood is produced in response to mechanical stress such as wind flexing or lean, contributing to greater trunk taper and structural adaptation. It is a normal adaptive response, not a decorative pattern or weakness. Rigidly staked trees lose this stimulus.

15. B — Girdling roots are roots that press against the trunk and compress the vascular tissue, eventually restricting water and sugar transport. They can develop from circling roots left uncorrected at planting or from planting too deep. Girdling roots are a long-term decline factor.

16. D — The branch collar is swollen stem tissue at the branch base that contains the cambium forming Wall 4. Preserving the collar during pruning is essential for proper compartmentalization. Flush cuts damage the collar; stubs leave wood beyond it.

17. A — The branch bark ridge is a raised line of bark on the upper surface of a branch union, marking the dividing line between stem and branch tissue. It is the reference point for correct pruning cut placement. Proper cuts are made just outside the ridge.

18. C — Stomata are microscopic pores on leaf surfaces that regulate gas exchange between the leaf and the atmosphere — allowing CO_2 in and water vapor and oxygen out. Stomata can open and close in response to environmental conditions. They are not structural supports or reproductive organs.

19. D — Secondary growth thickens the trunk through vascular cambium activity, producing new xylem inward and new phloem outward. This is distinct from primary growth, which extends shoots and roots in length. Together, the two types of growth produce the overall tree form.

20. B — Primary growth extends shoots and roots in length at apical meristems. Secondary growth thickens trunks and branches through cambial activity. The distinction is fundamental to understanding how trees develop.

21. A — A latent bud is a dormant bud that remains in reserve under the bark until triggered to grow by injury, severe pruning, or other stress. Latent buds are the source of epicormic sprouts following topping or canopy damage. They provide the tree with a reserve for recovery.

22. C — Epicormic sprouts emerge from latent or adventitious buds after stress events such as topping, severe defoliation, or canopy damage. They are weakly attached and produce the poor structure seen after topping. Normal scaffold branches form from active buds at the shoot tips.

23. B — Opposite leaf arrangement has leaves borne in pairs directly across from each other at each node, while alternate arrangement has leaves borne singly at alternating positions. This single feature narrows identification dramatically — the MAD Horse genera are the main opposite broadleaf trees.

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

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

26. B — A palmately compound leaf has leaflets radiating from a single attachment point at the end of the petiole. Horse chestnut is the classic example. Pinnately compound leaves have leaflets arranged along a central rachis.

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

28. C — Red oaks have pointed leaf lobes ending in bristles and produce acorns that mature over two growing seasons. White oaks have rounded lobes without bristles and one-season acorns. Recognizing lobe shape is the first step in identifying which oak group.

29. 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.

30. B — A cultivar name is written in single quotation marks and is NOT italicized — only the genus and species are italicized. Cultivar names follow the species name in written nomenclature. This typographic convention is set by the international code.

31. D — Bald cypress (*Taxodium distichum*) is a deciduous conifer that sheds its needles each autumn. It is one of a small group of deciduous conifers including larch and dawn redwood. Most conifers, such as pine and spruce, are evergreen.

32. C — The 10-20-30 rule limits urban forests to no more than 10% of any single species, 20% of any single genus, and 30% of any single family. The hierarchy protects against threats at each taxonomic level. Dutch elm disease and emerald ash borer illustrate why diversity matters.

33. A — Tree of heaven (*Ailanthus altissima*) is widely classified as a non-native invasive species in much of eastern North America. It escapes cultivation and colonizes disturbed sites aggressively. It is also the preferred host of the spotted lanternfly.

34. B — 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.

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

36. C — A flowering crabapple reaching 15 to 20 feet is appropriate beneath a 25-foot distribution line, leaving safe clearance below the conductors. This is a direct application of Right Tree, Right Place. Larger species would inevitably conflict with the line as they grow.

37. A — American sycamore (*Platanus occidentalis*) is distinguished by mottled tan and white peeling bark on mature trunks. The bark alone often allows identification from a distance. Other trees with peeling bark have different color patterns.

38. D — Native species are co-adapted to local climate, soils, and ecology through co-evolution. This adaptation is the genuine advantage. Claims of automatic pest immunity, faster growth, or guaranteed smaller size are overstatements.

39. B — Winter identification of deciduous trees depends on bud shape, twig features, and bark character because leaves are absent. These features are reliable enough for confident identification. Experienced arborists can identify most deciduous trees from twigs alone.

40. C — 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.

41. A — A pH of 7.0 is the neutral midpoint of the soil pH scale, neither acidic nor alkaline. Values below 7.0 are acidic; values above are alkaline. Each whole number represents a tenfold change in hydrogen ion concentration.

42. D — Cation exchange capacity is a measure of the soil's ability to hold and exchange cation nutrients such as calcium, magnesium, and potassium. It primarily depends on clay content and organic matter. Higher CEC means better nutrient retention and reduced leaching.

43. C — 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.

44. B — An ideal mineral 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.

45. A — A composite soil sample combines multiple subsamples from across the area being tested to average variation and produce a representative result. A single grab sample may not reflect overall conditions. Proper sampling is the most important step in soil testing.

46. C — Soil texture refers to the relative proportions of sand, silt, and clay particles in a soil. It is essentially permanent and cannot be meaningfully altered by amendments. Structure, in contrast, can be improved over time through organic matter.

47. B — Soil structure refers to the arrangement of particles into stable aggregates that create pore space for water, air, and roots. Structure is improved through organic matter additions. It is distinct from texture, which refers to particle size.

48. D — Field capacity is the moisture content held in soil after free drainage has ceased under gravity. It represents the upper limit of plant-available water. The permanent wilting point is the lower limit.

49. A — The permanent wilting point is the moisture level at which plants cannot recover turgor even when moved to saturated conditions. It defines the lower limit of plant-available water. Plants wilt and die below this level.

50. C — Plant-available water is the water held between field capacity (upper limit) and the permanent wilting point (lower limit). This range represents water that roots can actually extract for growth. The rest is either bound too tightly or drains away.

51. D — Mulching conserves moisture in the root zone, moderates soil temperatures, and suppresses competing weeds. It also gradually builds soil organic matter through decomposition. These multiple benefits make mulching one of the most valuable landscape practices.

52. B — 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.

53. A — Elemental sulfur lowers soil pH through microbial oxidation that produces sulfuric acid. The process takes time and depends on soil temperature and moisture. Sulfur is the standard amendment for acidifying alkaline soils.

54. C — Agricultural lime raises soil pH by neutralizing acidity through the addition of calcium carbonate. It is the standard amendment for correcting acidic soils. Lime and sulfur have opposite effects and must be chosen based on soil needs.

55. D — Chelated iron is a form of iron that remains chemically available to roots across a broader pH range than inorganic iron sulfate. In alkaline soils, inorganic iron rapidly precipitates and becomes unavailable. Chelated forms are more effective for treating iron chlorosis in high-pH soils.

56. A — A pH of 4.5 is strongly acidic, well below the neutral value of 7.0. At this level, aluminum and manganese toxicity become concerns for many tree species. Each whole number represents a tenfold change in hydrogen ion concentration.

57. B — Continuous mulching gradually builds soil organic matter through decomposition of the mulch over time. Organic matter improves soil structure, CEC, and microbial activity. This is why continuous mulching is the most effective long-term soil-building strategy.

58. C — A perc test measures how quickly water drains from a soil pit filled with water. Drainage longer than 12 to 24 hours signals a drainage problem that may require site modification or drainage-tolerant species selection.

59. D — Most absorbing roots of a mature tree are concentrated in the upper 12 to 18 inches of soil where oxygen, water, and nutrients are most available. They often extend well beyond the dripline. The deep taproot image is largely inaccurate for mature trees.

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

61. A — 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.

62. 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.

63. D — A widely used rule of thumb is one year of establishment per inch of trunk caliper at planting. A 3-inch caliper tree needs about three growing seasons. During this period the tree is rebuilding its root system lost at transplanting.

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

65. A — 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 that eventually girdle the trunk. Correction becomes impossible once backfilled.

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

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

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

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

70. D — 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.

71. C — 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.

72. A — ANSI A300 is the American National Standard for Tree Care Operations and governs pruning and maintenance practices in the United States. ANSI Z133 addresses worker safety; the two complement each other.

73. B — ANSI Z133 is the principal safety standard for arboricultural operations in the United States. It addresses electrical hazards, PPE, climbing, rigging, and aerial rescue requirements. ANSI A300 addresses pruning practices instead.

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

75. C — 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.

76. A — The cleaning pruning objective is 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.

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

78. 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.

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

80. B — 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.

81. 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.

82. D — Pollarding is a long-term system requiring 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.

83. A — Subordination pruning 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.

84. C — 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.

85. B — 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.

86. D — Bypass pruning 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.

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

88. 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.

89. B — 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.

90. D — 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.

91. C — 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.

92. A — 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.

93. D — Codominant stems with included bark are structurally weak because the trapped bark prevents formation of a strong union. The attachment becomes progressively weaker as the stems grow, and catastrophic splitting can occur. Early correction is the best response.

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

95. C — The 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.

96. A — A professional pruning specification is a written document detailing the pruning objective, scope, percentage of foliage to be removed, diameter range of cuts, and applicable standards. Verbal agreements and personal preferences are not specifications.

97. B — The cleaning pruning objective is defined as selective removal of dead, dying, diseased, broken, and weakly attached branches. Cleaning does not involve uniform heading, interior stripping, or crown reduction. It is the most common routine objective.

98. D — Making a single cut from above on a heavy branch causes the falling weight to rip bark downward along the trunk. The three-cut method prevents this by severing the bark pathway with an undercut before the final cut releases the branch.

99. A — Correct cut placement outside the branch collar preserves the cambium that forms Wall 4. Wall 4 is the strongest CODIT wall and is essential for successful compartmentalization. Flush cuts and stubs both destroy this mechanism.

100. C — Structural pruning during the juvenile growth phase is most beneficial because small cuts now correct defects that would otherwise require much larger, more damaging cuts decades later. The architectural framework is still being established at this stage.

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

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

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

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

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

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

108. 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.

109. D — 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 pin oak specifically, this is almost always a pH-related availability problem.

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

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

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

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

115. A — 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.

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

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

119. 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 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.

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

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

125. 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.

126. A — Clean cuts with sharp tools at the damage line produce better wound responses than the tearing and crushing from unprepared excavation. Clean cuts allow the tree to compartmentalize more effectively. This should be done before excavation begins.

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. Patience drives recovery.

128. C — 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 to damage.

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

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

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

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

133. 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.

134. A — Post-construction monitoring should continue for three to five growing seasons because delayed decline can appear one to three years later as reserves are exhausted. Early apparent survival is not the same as long-term recovery.

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

136. 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.

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

138. B — 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.

139. C — 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.

140. D — 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.

141. A — Codominant stems with included bark are structurally weak because the trapped bark prevents formation of a strong structural union. The attachment becomes progressively weaker as the stems grow, and catastrophic splitting can occur without warning.

142. B — 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.

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

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

145. A — 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.

146. B — 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.

147. C — 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.

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

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

150. B — 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.

151. C — 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.

152. D — 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.

153. A — A professional report should document scope, defects, targets, mitigation, and residual risk. Recommendations must be proportional to actual risk. Blanket removal recommendations damage professional credibility.

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.

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

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

157. B — Healthy rounded callus tissue around a small old wound indicates successful compartmentalization and closure. This is evidence of normal healing, not a structural defect. The tree has successfully walled off the original injury.

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.

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

160. 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 most lines in residential and commercial tree work.

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

162. 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.

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

164. 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.

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

166. 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. Outside emergency services alone are inadequate.

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

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

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

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

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

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

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

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

176. 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.

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

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

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

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

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

182. 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.

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.

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

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

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

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

189. 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.

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

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

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

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

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

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

196. 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.

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

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

199. 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.

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.