Indicate the most correct answer in the left-hand column (44 pts @ 2 pts/question).

1. Seedling rootstock:
   a. generally produce a larger tree than a clonal semi-dwarfing rootstock
   b. is more commonly used with apples and pears in the U.S. than clonal rootstock
   c. is generally more expensive to produce than clonally-produced rootstock
   d. a, b & c
   e. a & c

2. In certain budding and grafting systems it is necessary to have the bark “slip”; this is controlled by:
   a. adequate auxin levels
   b. an active vascular cambium
   c. optimal soil and plant water status
   d. a, b & c
   e. a & b

3. The absolute size of a grafted plant is determined by:
   a. the rootstock effect on the scion
   b. the scion effect on the rootstock
   c. soil conditions, temperature, and fertilization practices
   d. a, b & c
   e. a & b

4. The following graft(s) may be done in apical graftage:
   a. whip and splice graft
   b. bridge graft
   c. spliced approach graft
   d. a, b & c
   e. a & b

5. Which potential grafting/budding system is most commonly used for topworking a commercial pecan orchard of larger caliper trees in Texas:
   a. whip graft
   b. banana (4-flap) graft
   c. patch budding
   d. inlay bark graft
   e. chip budding

6. Shimomura in his grafting research with cactus:
   a. applied growth regulators as a spray application
   b. found that auxins stimulated the grafting process
   c. found that growth regulators applied in high concentrations stimulated the grafting process
   d. a & b
   e. b & c

7. For grafting purposes, the “wood” is generally composed of
   a. cortex and xylem
   b. xylem and pith
   c. cortex, phloem, vascular cambium and periderm
   d. vascular cambium, phloem, xylem, periderm and pith
   e. xylem and vascular cambium
8. Some reasons why layering can enhance rooting compared to conventional cutting propagation under mist include:
   a. higher levels of auxins and rooting cofactors
   b. lower percentage of parenchyma cells, compared to sclereids and fibers
   c. higher levels of ABA and GA
   d. a, b & c
   e. a & b

9. Types of "repair grafting" for weak rootstocks or injured trunks, or weak crotch angles are:
   a. inlay bark graft and saddle graft
   b. bridge grafting and inarching
   c. saddle graft and 4-flap graft
   d. a, b & c
   e. b & c

10. During graft union formation in the callus bridge:
    a. wound xylem is formed initially from auxin, which diffuses down from the scion
    b. wound phloem is initially formed from auxin and carbohydrates, which diffuse down from the scion
    c. further xylem and phloem development occurs from a new cambium layer that is formed in the callus bridge
    d. a, b & c
    e. a & b

11. Nurse root grafting:
    a. can be done by girdling the nurse root rootstock below the graft union.
    b. used in rooting difficult-to-root rootstock
    c. commonly done with serpentine layering to encourage the scion to form roots
    d. a, b, and c
    e. a & b

12. In root grafting, the normal polarity is:
    a. proximal of rootstock to proximal of scion
    b. distal of rootstock to proximal of scion
    c. proximal of rootstock to distal of scion
    d. distal of rootstock to distal of scion

13. Which potential grafting/budding system would most likely be used in a Mississippi pecan nursery:
    a. banana (4-flap) graft
    b. whip-and-tongue graft
    c. inlay bark graft
    d. patch budding
    e. chip budding

14. In the Malling-Merton series of clonal apple rootstock:
    a. dwarfing clonal rootstock are sometimes used as an interstock
    b. semi-dwarfing understocks are about half the size of seedling understocks
    c. very vigorous understocks can produce a tree as large as a seedling rootstock produced tree
    d. a, b & c
    e. b & c
15. The following layering system generally is not covered with a mineral, field soil during the layering process.
   a. mound (stool) layering
   b. trench layering
   c. tip layering
   d. air layering
   e. serpentine layering

16. Incompatibility in the Bartlett pear was:
   a. prevented when a Old Home Pear interstock was used
   b. an example of translocatable incompatibility
   c. caused by the conversion (breakdown) of prunasin to free H$_2$SO$_4$ and HCl
   d. a, b & c
   e. a & c

17. When compared to vigorous, seedling rootstock, dwarfing rootstock generally have:
   a. higher ABA levels
   b. lower xylem sap flow
   c. lower starch and/or carbohydrate accumulation
   d. a, b & c
   e. a & b

18. What is not true of the Texas rose bush industry:
   a. digging of two year rose bushes is done from late fall to early winter when plants are dormant
   b. a producer can potentially have 3 different generations planted in the field at the same time
   c. $Rosa$ $multiflora$ is the principal rootstock used and is thornless
   d. it is common practice in Texas not to irrigate the rose crop during production
   e. sticking/propagation of hardwood cuttings is done in early spring & T-budding is done in August

19. Which potential grafting/budding system would most likely be used in a Texas pecan nursery:
   a. banana (4-flap) graft
   b. whip-and-tongue graft
   c. inlay bark graft
   d. patch budding
   e. chip budding

20. In the following layering system, there is a compression of the shoot apex in the soil that generally leads to rooting in internodal areas behind the apex:
   a. serpentine layering
   b. trench layering
   c. tip layering
   d. mound (stool) layering
   e. air layering

21. The following graft is commonly done with commercial vegetable crops:
   a. whip and tongue graft
   b. bridge graft
   c. inlay approach graft
   d. saddle graft
   e. splice graft

22. The following layering system requires that stock plant material be severely cut back (pruned):
   a. serpentine layering
   b. tip layering
   c. mounding (stool) layering
   d. trench layering
   e. air layering
Circle the most correct answer in the following true-false statements. If the answer is false indicate why. (32 pts @ 2 pts/question).

T  F  23. One feature about grafting that is generally not found in budding is the use of an insurance bud.

T  F  24. The grafting terms rootstock, understock and interstock are synonymous.

T  F  25. Almond and apricot can be grafted on a peach understock, but cannot be reciprocally grafted onto each other.

T  F  26. The two most important budding systems for woody ornamental plants in the US are patch budding and T-budding.

T  F  27. Advantages of seedling rootstocks include their ease of propagation, and generally lower disease problems than clonally produced rootstock.

T  F  28. In summer budding a one-year scion and two-year rootstock is produced.

T  F  29. In approach grafting two independent, self-sustaining plants are grafted together.

T  F  30. June budding is the preferred time to bud peaches in Tennessee or California nurseries [but not in Texas] with their long growing seasons; the budwood does not require storage since it is taken from current season's wood.

T  F  31. Summer budding is generally done from August through September in the U.S. — using winter-harvested bud wood (scions) maintained in cold storage.

T  F  32. Secondary growth allows for natural root/grafting to occur which are potential problems for the spread of Dutch elm disease and oak wilt.

T  F  33. Mound layering and hedging-back are techniques to keep stock plants in a rejuvenated condition (despite their chronological age); this enhances rooting.

T  F  34. The purpose of deeying Rosa multiflora cuttings is to break apical dominance of the rootstock.

T  F  35. Natural layering of plants can occur with the formation of runners, stolons, offsets and crowns.

T  F  36. Bark slips because the cortex and xylem starts to actively divide.

T  F  37. Banana plants will naturally layer; they were initially transported from Polynesia to the West Indies by the British and were the catalyst for the mutiny of the crew of the HMS Bounty.

T  F  38. In citrus, the virus tristeza can be a contributing factor to pathogen-induced incompatibility.
39. Grafting has been around since the beginning of civilization when humankind first started to cultivate crops. List and discuss four advantages and two disadvantages of grafting.

40. Match the correct term with the following twenty definitions. There should be only one term per definition and not all terms have definitions. (18 pts @ 1 pt/definition)

<table>
<thead>
<tr>
<th>adhesion</th>
<th>air layering</th>
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<tbody>
<tr>
<td>apical graftage</td>
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<td>bracing</td>
<td>budding</td>
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<td>callus bridge</td>
<td>cellular recognition</td>
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<td>chip budding</td>
<td>compound layering</td>
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<td>crown</td>
<td>double working</td>
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<td>inarching</td>
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<td>offset</td>
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<td>stolon</td>
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<td>T-budding</td>
<td>topworking</td>
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<td>wound periderm</td>
<td>wound-repair xylem and phloem</td>
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</tbody>
</table>
A form of grafting which normally includes just one axillary bud on the rootstock.

The proliferation of callus cells at the graft interface.

It may play an important role in graft compatibility/incompatibility.

When you graft or bud twice; can obtain the benefits of certain interstocks.

A temporary graft system to allow a difficult-to-root rootstock to form adventitious roots when it is a temporary scion piece.

It allows a producer to switch out fruit cultivars in an existing orchard under production.

The callus tissue formed from uninjured, rapidly dividing parenchyma cells (adjacent and internal to the necrotic layer).

When two independent, self-sustaining plants are grafted together.

Used to strengthen scaffolding limbs of a tree in order to better support the weight of the fruit crop.

In this process grafts/budding is made high in the tree in the small secondary scaffold branches.

A type of grafting used to replace a weak rootstock system.

Strips of this palm leaf stalk fiber are used to wrap grafts.

The simultaneous rooting and grafting of rose understock.

It is sometimes referred to as shield budding.

Also referred to a pot layerage, circumposition, marcottage and gootee.

Generally done with both a dormant rootstock and dormant scion.

In herbaceous perennials it is the part of the plant where the new shrubs annually arise.

A lateral shoot or branch that develops from the base of the main stem, i.e., slips and suckers in pineapples.