

I. Single-Answer Multiple Choice (2 points each): Circle the **one** solution that answers each question or completes each sentence.

1. Biodynamic agriculture
 - a. views the farm as an organism.
 - b. includes planting by the moon and other planets.
 - c. includes enhancing biodiversity.
 - d. all of the above.
 - e. both a and b.

2. What color would a soil that is high in iron likely be?
 - a. Red
 - b. Black
 - c. Bluish-gray
 - d. Light brown
 - e. Pale gray

3. Which of the following is a common practice in organic farming systems?
 - a. Use of certified organic fertilizers
 - b. Use of old, pre-1950s equipment
 - c. Biological pest controls
 - d. All of the above
 - e. Both a and c

4. In the sustainability study of the three apple production systems in the Yakima Valley, which system significantly had the highest cumulative yields?
 - a. The organic
 - b. The conventional
 - c. The integrated
 - d. All three systems had similar cumulative yields.
 - e. Both b and c.

5. Research studies comparing biodynamic agriculture with conventional agriculture
 - a. show that biodynamic farms cannot compete economically with conventional farms.
 - b. show that biodynamic systems have better soil quality than conventional systems.
 - c. show that biodynamic systems generally have lower crop yields than conventional systems.
 - d. all of the above.
 - e. both b and c.

6. A soil horizon is

- a. a vertical exposure of a set of layers.
 - b. a layer of soil approximately parallel to the soil surface.
 - c. a layer of soil differing in characteristics from adjacent layers below or above.
 - d. all of the above.
 - e. both b and c.
7. In the study with the three apple production systems,
- a. social responsibility indicators of each system were compared.
 - b. environmental impact of pesticides was calculated.
 - c. bee pollination of apple trees was compared.
 - d. all of the above.
 - e. both b and c.
8. What do mottled colors indicate in a soil?
- a. Low organic matter
 - b. Imperfect drainage
 - c. Good aeration
 - d. Compaction
 - e. High earthworm activity
9. All other conditions being equal, a soil with which of the following textures has the greatest total water storage?
- a. Sandy loam
 - b. Loamy sand
 - c. Sand
 - d. Silt loam
10. Biodynamic farming includes the use of
- a. compost.
 - b. animals on the farm.
 - c. 12 preparations.
 - d. all of the above.
 - e. both a and b.
11. In the study comparing the two organic and conventional wheat farms in the Palouse, one finding was that the conventional farm
- a. used a green-manure crop.
 - b. had less soil organic matter than did the organic farm.
 - c. had about 6 inches less topsoil than the organic farm.
 - d. all of the above.
 - e. both b and c.
12. Organic agriculture

- a. considers the soil as one of the major management components of the farm system.
 - b. often has lower yields in particular enterprises than conventional agriculture.
 - c. includes the use of fertilizers and pesticides.
 - d. all of the above.
 - e. both a and b.
13. For a farm to be sustainable it must be
- a. environmentally sound.
 - b. economically profitable.
 - c. socially just.
 - d. all of the above.
 - e. both a and b.
14. In the New Zealand study comparing biodynamic and conventional farming,
- a. the biodynamic farms were as often financially viable as the conventional farms.
 - b. the biodynamic farms had better biological soil properties.
 - c. the conventional farms generally had thicker topsoil.
 - d. all of the above.
 - e. both a and b.
15. In what order are the master soil horizons usually seen?
- a. A, B, C, E, C, R
 - b. A, O, E, C, B, R
 - c. O, A, E, B, C, R
 - d. A, B, C, D, E, R
 - e. O, A, C, E, B, R
16. A soil sample that feels sticky and firm, forms a good ribbon, and only has slight grittiness and smoothness is likely a
- a. sandy loam
 - b. silt loam
 - c. sandy clay loam
 - d. clay loam
17. Important soil properties that can be examined in the field to get an idea of what kind of soil one has include
- a. texture and structure.
 - b. the types of horizons.
 - c. color.
 - d. all of the above.
 - e. both a and b.
18. Optimum soil pH in most gardens for good plant growth is
- a. 6 to 7.

- b. 4 to 5.
- c. 8 to 9.
- d. both b and c.

19. If soil textures were equal, soils with ____ structure would be the most permeable.

- a. blocky
- b. granular
- c. platy
- d. prismatic

20. A soil layer that is massive generally has ____ permeability.

- a. rapid
- b. moderate
- c. slow

21. Which layer is a zone of maximum leaching or eluviation?

- a. A
- b. B
- c. D
- d. E

22. No-till farming

- a. leaves more residue on the soil surface than conventional tillage systems.
- b. generally has higher energy inputs than conventional tillage.
- c. is practiced by most farmers in the Palouse.
- d. all of the above.
- e. both a and b.

II. Multiple-Answer Multiple Choice (1 point for each answer): Each problem set below consists of one problem with four possible answers. At least one answer listed is correct but two, three, or four of the answers may be correct. Mark “T” (for true) for each answer that solves the problem correctly and “F” (for false) for each answer that is incorrect.

23-26. Concerning farming systems,

____ 23. integrated farmers cannot use synthetic chemical fertilizers.

____ 24. low-input farming reduces inputs from off the farm.

____ 25. no-till is a practice in which a crop is planted directly into a seedbed not tilled since harvest of the previous crop.

____ 26. natural systems agriculture includes growing perennial grain crops.

27-30. Continual additions of organic matter to the soil

____ 27. darken the soil.

___ 28. generally have little effect on soil structure.

___ 29. generally increase water infiltration rates.

___ 30. can alter soil texture after five years.

31-34. Concerning soil,

___ 31. it is a living system.

___ 32. a soil which contains 15% organic matter is considered a mineral soil.

___ 33. Organic soils develop from an accumulation of plant residues in shallow and stagnant waters.

___ 34. Most soils on our planet are mineral soils.

35-38. In the study comparing the two organic and conventional wheat farms in the Palouse,

___ 35. the conventional farm began using synthetic fertilizers in the late 1940s.

___ 36. both farms had been in wheat production since the early 1900s.

___ 37. wheat was grown more frequently on the conventional farm.

___ 38. erosion rates were less on the organic farm.

39-42. The larger the size of soil particles per unit weight,

___ 39. the faster the soil's permeability.

___ 40. the lower the soil's water storage capacity.

___ 41. the greater the soil's chemical reactivity.

___ 42. the lower the soil's surface area.

43-46. In the study with the three apple production systems,

___ 43. organic apples were usually as big or bigger than conventional apples.

___ 44. the conventional system generally received the lowest annual soil quality index ratings.

___ 45. the organic system was the most energy efficient.

___ 46. the integrated system was more sustainable than the conventional system.

47-50. At McNab Ranch (Bonterra Vineyard),

___ 47. olive trees were one of the crops grown.

___ 48. sheep were used as biological pest controls.

___ 49. chickens were allowed to walk around in the vineyard to eat cutworms and defecate.

___ 50. wildlife corridors and patches provided cover for beneficials that in turn helped control pests in the vineyard.

51-54. Concerning seeds,

___ 51. fertilization is necessary for seeds because they cannot germinate on their own.

___ 52. it's good to use plain garden soil as the growing medium for planting your seeds.

___ 53. most seeds don't need light to germinate.

___ 54. seeds need to be kept constantly moist in order to germinate.

55-58. In the vineyard study at McNab Ranch comparing biodynamic and organic (no preparations) farming, the biodynamic plots generally had

___ 55. greater winegrape yields.

___ 56. more soil organic matter.

___ 57. similar soil quality to the organic plots.

___ 58. more balanced vines.

59-62. In the vineyard study at McNab Ranch,

___ 59. wine produced from the biodynamic winegrapes tasted better than wine produced from the organic winegrapes.

___ 60. the biodynamic treatment was more profitable.

___ 61. the biodynamic system was the most energy efficient.

___ 62. the only difference between the biodynamic and organic treatments was the addition of the biodynamic preparations to the biodynamic plots.

63-66. Which of the following is important when "hardening off" plants?

___ 63. Initially set seedlings in their containers in a lightly shaded sheltered spot outside.

___ 64. Make sure seedlings have adequate moisture.

___ 65. Gradually increase outdoor time of seedlings from a few hours to eventually a full day.

___ 66. Keep seedlings protected from winds.

67-70. Concerning seedlings and their containers,

___ 67. it's best to label your container flats so you know which seeds are which and when you planted them.

___ 68. when growing seedlings inside, it's best to use incandescent rather than fluorescent light

___ 69. seedlings in the greenhouse can tolerate 16 hours of light a day.

___ 70. care must be taken not to overwater seedlings because of potential root rot.

III. Fill-Ins (2 points for each space): Fill-in each space below with the correct word or words.

71. A soil sample can be divided into four components: organic, mineral, LIQUID , and AIR .

72. SEEDS do not need food while germinating because they contain their own food.

73. SULFITES are used in winemaking principally as a preservative and a disinfectant.
74. Preparation 500 is used in biodynamics and comes from fermented MANURE packed in a cow horn.
75. A soil profile seen in the field can be glued to a board and hung in a classroom for educational purposes. Such a mounted soil profile is called a MONOLITH .
76. The two most important requirements for starting seeds in a greenhouse are WATER and WARM TEMPERATURES .
77. “Dampening off” is caused by what kind of organism? A FUNGUS
78. The name for biodynamically certified products is DEMETER .
79. Soil STRUCTURE is the arrangement of soil particles into compound clusters.
80. The ability of a soil to allow air and water movement is called PERMEABILITY .
81. TEXTURE refers to the proportions of sand, silt, and clay in a particular soil.
82. The C horizon in soils is made up of PARENT MATERIAL .
83. CONVENTIONAL farming is characterized by chemical-intensive cropping systems which rely on synthetic chemical inputs to control pests and maintain soil fertility.
84. When we did two different taste tests in class with apples, in the first one, a three-way test, the two conventional apples clearly won out over the organic apple and the apple variety was BRAEBURN . In the second test, a two-way test, the organic clearly won out as the favorite and the variety was PINK LADY .
85. AGGREGATES are units or clusters composed of many soil particles bound or cemented together by organic substances, iron oxides, carbonates, clays, and/or silica.