Soils 101 Exam #2 Name _____

23 March 2006 (126 points total) Student ID# _____

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

1. Optimum soil pH for nutrient availability is
   a. 6 to 7 for most nutrients.
   b. 4 to 5 for some nutrients.
   c. alkaline conditions.
   d. all of the above
   e. both a and b

2. Nutrient levels in your garden are best determined by
   a. plant deficiency symptoms
   b. soil testing
   c. types of weeds present
   d. rate of puddling or runoff of irrigation water
   e. both a and c

3. Concerning macronutrients and micronutrients,
   a. phosphorus is a macronutrient.
   b. macronutrients are needed in larger quantities than micronutrients.
   c. micronutrients improve growth but are not essential.
   d. all of the above.
   e. both a and b.

4. Clays have negative ionic charge that can hold onto positive ions, whereas humic acids can hold onto
   a. Negative ions
   b. Positive ions
   c. Nematodes
   d. All of the above
   e. Both a and b

5. Nutrient elements immediately available for use by plants include those in
   a. primary minerals
   b. the soil solution
   c. humus
   d. both b and c

6. Which of the following is NOT a benefit of soil microbial activity?
   a. Fixation of most of the soil organic carbon from atmospheric CO_2 gas
   b. Fixation of most of the soil nitrogen from atmospheric N_2 gas
   c. Release of nutrients from insoluble inorganic sources into the soil solution
   d. Formation of humus

7. Soil arthropods (jointed-legged critters) feed on
   a. plant matter
   b. fungi
   c. other arthropods
   d. all of the above
   e. both a and c

8. Which of the following is not a function of roots?
   a. Storage of carbohydrates (food).
   b. Absorption of water.
   c. Anchoring of plants.
   d. Respiration.
   e. None of the above

9. The name of the person who developed the binomial system for naming plants is
   a. Linnaeus
   b. Jenny
   c. Darwin
   d. Plato
   e. Reganold

10. Which of the following is provided for a plant by its leaves?
   a. Production of carbohydrates (food)
   b. Anchorage
   c. Photosynthesis
   d. Both a and c
   e. All of the above

11. Pollination is a sexual process in which pollen is deposited on the stigma of the plant. It starts the process of
   a. Fertilization.
   b. seed formation.
   c. production of a fruit or seed coat.
   d. both b and c.
   e. all of the above.

12. The stamen is
   a. the male part of the flower.
   b. the part of the flower that produces pollen.
   c. the part of the flower that holds the stigma.
   d. all of the above.
   e. both a and b.

13. The main function of stems is
   a. to absorb water/nutrients from the soil and anchor the plant.
   b. to transport water/nutrients and to support plant parts.
   c. to manufacture carbohydrates and store it for future use.
   d. to provide food for humans and animals.

14. The four main parts of a flower are the
   a. pollen, ovary, pistil, and stamen.
   b. sepals, petals, stamen, and pistil.
   c. sepals, pistil, ovary, and stigma.
   d. pollen, ovary, sepals, and petals.

15. Bulbs and corms reproduce by a process known as
   a. division.
   b. budding.
   c. offshoots.
   d. separation.

16. The pistil is
   a. the female part of the flower.
   b. the male part of the flower.
   c. the bright, showy part of the flower that attracts pollinators.
   d. the pollen producing part of the flower.

II. Multiple-Answer Multiple Choice (1 point for each answer): In each set, 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.

17-20. The supply of plant nutrients in animal manures,
____ 17. depends on the type of animal
____ 18. depends on the feed eaten by the animal.
____ 19. often requires large volumes to provide optimum plant growth.
____ 20. often depends on microbial activity for their release.

21-24. Advantages of organic fertilizers (over inorganic fertilizers) include
____ 21. their high concentration of nutrients.
____ 22. their ability to improve soil structure.
____ 23. their quick availability to plants once applied.
____ 24. they supply micronutrients as well as macronutrients

25-28. Inorganic fertilizers,
____ 25. always increase plant growth.
____ 26. always contain N.
____ 27. can be toxic to plants in large doses.
____ 28.are generally not allowed in organic production.

29-32. A good soil sample
____ 29. Contains the same amount of soil from the 0-1" depth as from the 4-5" depth.
____ 30. Combines no more than 3 subsamples.
____ 31. Is always taken at a 0-6" depth.
____ 32. represents an entire farm

33-36. Soil humus
____ 33. decays quickly to release N and S.
____ 34. acts as a reserve of plant nutrients.
____ 35. contains very large organic molecules.
____ 36. retains cold temperature in spring and may delay planting.

37-40. Soil fungi,
____ 37. form associations with rhizobia.
____ 38. can gain nutrition from capturing nematodes.
____ 39. grow in long, finely branched networks.
____ 40. tend to reduce soil aggregate stability.

41-44. Larger organisms in soil
____ 41. are more likely to be shredders than primary decomposers.
____ 42. make up most of the soil biomass.
____ 43. help to incorporate plant matter into topsoil.
____ 44. have declined in most U.S. ag soils due to intensive tillage.

45-48. Which of the following is important when "hardening off' plants?
____ 45. Increasing the greenhouse temperatures
____ 46. Increasing light levels
____ 47. Increasing water applications
____ 48. Increasing nutrient applications

49-52. Which of the following would be important for propagating cuttings?
____ 49. Healthy parent material
____ 50. Frequent mist
____ 51. Bottom heat
____ 52. Treatment of cuttings with auxins

53-56. From the film “Dirt is not Dead”, we learned that
____53. soil microorganisms can breakdown pollutants like oil.
____54. soil microorganisms compete with each other.
____55. fungi eat nematodes.
____56. mites and springtails are considered to be mesofauna.

57-60. Plant parts used in asexual reproduction include
____ 57. flowers.
____ 58. leaves.
____ 59. stems.
____ 60. roots.

61-64. Seeds can be comprised of the
____ 61. endosperm
____ 62. cotyledons
____ 63. embryo
____ 64. seed coat

65-68. Mycorrhiza
____65. fixes nitrogen.
____66. is a fungus-root association.
____67. is bacteria that beneficially infect roots.
____68. benefits the host plants.

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

69. CEC stands for _____ . *Cation exchange capacity*

70. The more stable, slow-decomposing portion of soil organic matter is _____*humus*_____.

71. ____*Protozoans*_____ are single-celled animals that feed mostly on bacteria.

72. The area of soil immediately surrounding plant roots is called the _____*rhizosphere*_____

73. In the soil food web, organisms that derive their nutrition from plant material are considered
____*primary*____ ____*consumers*_____

74. A nicer word for earthworm feces is _____*casts*_____

75. __*Cotyledons* _____ are the ‘seed leaves’ of flowering plants that are the food storage structure seedlings rely on before being able to produce food through photosynthesis.

76. __*Chlorophyll* _____ is the pigment in the chloroplasts of the leaves that captures the energy from light during the process of photosynthesis.

77. The three types of leaf arrangements used to describe simple leaves are (1) opposite, (2) *alternate* _____ , and (3) _____ *whorled*

78. A _____ *Rhizome* is an underground stem.

79. When two separate parent plants are involved in the pollination process, it is known as _____ . *cross-pollination*

80. The first part of the new plant to emerge from the seed is the _____ *root*

81. Nitrogen fixation is the conversion of __*gaseous nitrogen (N_2)*_____ to organic nitrogen utilizable in biological processes.

82. The main function of flowers is _____ *reproduction*

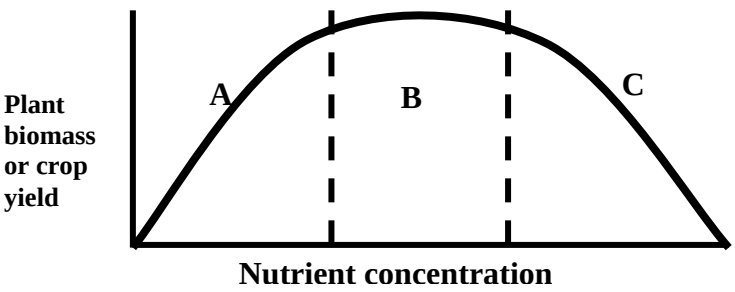
83. Chlorophyll molecules most efficiently absorb the __*red* _____ and __*blue* _____ colors of the light spectrum.

84. ___*Biennials* _____ are plants that require two growing seasons to complete their life cycles.

85. Soil microbial activity is greatest in which season? _____*Summer (late spring also ok)*

IV. Graph interpretation (2 pt each)

86. In this graph, region A represents
    a. Deficiency
    b. Sufficiency
    c. Optimum supply
    d. Toxic concentration



87. If your soil Phosphorus is within the "B" range and Nitrogen is within the "A" range you should
    a. Add N
    b. Add P
    c. Add both N and P
    d. Retest the soil, as it is abnormal to have nutrients at such different levels.