PLANT SCIENCE QUESTIONS

1. The process by which plants convert light into energy is called _____.
    a. Transpiration
    b. Photosynthesis
    c. Respiration
    d. Translocation

2. What organelle is the site of photosynthesis?
    a. Chloroplasts
    b. Chlorophyll
    c. Nucleus
    d. Mitochondria

3. What is the green pigment that performs photosynthesis?
    a. Chloroplasts
    b. Chlorophyll
    c. Nucleus
    d. Cytoplasm

4. What 3 products must be present in order for photosynthesis to occur?
    a. Carbon dioxide, water and light
    b. Carbon dioxide, oxygen and light
    c. Carbon dioxide, water and glucose
    d. Glucose, water and light

5. What are the 2 products produced during photosynthesis?
    a. Glucose and light
    b. Glucose and sugar
    c. Glucose and carbon dioxide
    d. Glucose and oxygen

6. What part of the leaf releases oxygen into the atmosphere?
    a. Midrib
    b. Margin
    c. Blade
    d. Stoma

7. What part of the plant transports water to leaves for photosynthesis to occur?
    a. Phloem
    b. Xylem
    c. Vascular bundles
    d. All of these options are correct

8. What part of the plant transports sugars to other parts of the plant?
    a. Phloem
    b. Xylem
    c. Vascular bundles
    d. All of these options are correct

9. True or False: The light breaks apart the carbon dioxide molecule in the light reaction phase of photosynthesis.
    a. True
    b. False

10. True or False: Photosynthesis happens 24 hours a day.
    a. True
    b. False

11. The process by which plants convert sugar into usable energy is called _____.
    a. Transpiration
    b. Photosynthesis
    c. Respiration
    d. Translocation

12. True or False: Respiration happens 24 hours a day.
    a. True
    b. False

13. Plants require _____ to perform respiration.
    a. Carbon dioxide
    b. Water
    c. Oxygen
    d. Light

14. What 2 products are required for transpiration?
    a. Glucose and oxygen
    b. Glucose and light
    c. Glucose and carbon dioxide
    d. Glucose and water

15. A bi-product of transpiration is _____.
    a. Oxygen
    b. Glucose
    c. Carbon dioxide
    d. None of these options are correct

16. The process by which plants release water vapor back into the atmosphere is called _____.
    a. Transpiration
    b. Photosynthesis
    c. Respiration
    d. Translocation

17. What part of the leaf does water vapor leave the plant?
    a. Midrib
    b. Stoma
    c. Margin
    d. Blade

18. What process cools the plant down?
    a. Transpiration
    b. Photosynthesis
    c. Respiration
    d. Translocation

19. This is the equation for photosynthesis is _____.
    a. H2O + CO2 = LIGHT + C6H12O6 + O2
    b. H20 + O2 + LIGHT = C6H1206 + CO2
    c. C6H12O6 + O2 + LIGHT = CO2 + O2
    d. H2O + CO2 + LIGHT = C6H12O6 + O2

20. This is the equation for respiration is _____.
    a. H2O + O2 = C6H12O6 + CO2
    b. C6H1206 + CO2 = H20 + O2
    c. C6H12O6 + O2 = H2O + CO2
    d. H2O + CO2 = C6H12O6 + O2

21. A plant that completes its life cycle in 1 year is called a(n) _____.
    a. Annual
    b. Biannual
    c. Perennial
    d. None of these options are correct

22. A plant that completes its life cycle in 2 years is called a(n) _____.
    a. Annual
    b. Biannual
    c. Perennial
    d. None of these options are correct

23. A plant that completes its life cycle in more than 2 years is called a(n) _____.
    a. Annual
    b. Biannual
    c. Perennial
    d. None of these options are correct

24. Plants that flower when light usually exceeds 12 hours are called _____.
    a. Short day plants
    b. Long day plants
    c. Day neutral plants
    d. None of the options are correct

25. Plants that flower when light usually is less than 12 hours are called _____.
    a. Short day plants
    b. Long day plants
    c. Day neutral plants
    d. None of the options are correct

26. Plants that flower without the influence of light hours are called _____.
    a. Short day plants
    b. Long day plants
    c. Day neutral plants
    d. None of the options are correct

27. Plants that contain both male and female sex gametes are called _____ flowers.
    a. Complete
    b. Incomplete
    c. Self-pollination
    d. All of these options are correct

28. Plants that contain only a male or female sex gametes are called _____ flowers.
    a. Complete
    b. Incomplete
    c. Self-pollination
    d. All of these options are correct

29. When a plant pollinates with another plant this is called _____.
    a. Self-pollination
    b. Wind pollination
    c. Insect pollination
    d. Cross-pollination

30. When a plant pollinates with itself this is called _____.
    a. Self-pollination
    b. Wind pollination
    c. Insect pollination
    d. Cross-pollination

31. What is a main function of the roots?
    a. Photosynthesis
    b. Support and structure
    c. Reproduction
    d. Anchorage and absorption of water

32. What is a main function of the stems?
    a. Photosynthesis
    b. Support and structure
    c. Reproduction
    d. Anchorage and absorption of water

33. What is a main function of the leaves?
    a. Photosynthesis
    b. Support and structure
    c. Reproduction
    d. Anchorage and absorption of water

34. What is a main function of the flower/seed?
    a. Photosynthesis
    b. Support and structure
    c. Reproduction
    d. Anchorage and absorption of water

35. Where is water absorbed by the plant?
    a. Root
    b. Primary roots
    c. Fibrous Roots
    d. Root hairs

36. A root with one long primary root is called a _____ root.
    a. Adventitious
    b. Tap
    c. Fibrous
    d. All of the options are correct

37. A root with many small roots is called a _____ root.
    a. Adventitious
    b. Tap
    c. Fibrous
    d. All of the options are correct

38. A plant with 1 cotyledon leaf is called a(n) _____.
    a. Annual
    b. Dicot
    c. Tricot
    d. Monocot

39. A plant with 2 cotyledon leaves is called a(n) _____.
    a. Annual
    b. Dicot
    c. Tricot
    d. Monocot

40. Flowers are colorful to attract _____.
    a. Humans
    b. Pollinators
    c. Predator insects
    d. None of these options are correct

41. When water and nutrients move throughout the plants this is known as _____.
    a. Translocation
    b. Transpiration
    c. Locomotion
    d. Respiration

42. When water sticks the side of the xylem this is known as _____.
    a. Cohesion
    b. Adhesion
    c. Tacky
    d. Osmosis

43. When water molecules are attracted to each other this is known as _____.
    a. Cohesion
    b. Adhesion
    c. Tacky
    d. Osmosis

44. When pollen enters the pistil, this is known as _____.
    a. Fertilization
    b. Pollination
    c. Plant breeding
    d. All of these options are correct

45. When pollen enters the egg, this is known as _____.
    a. Fertilization
    b. Pollination
    c. Plant breeding
    d. All of these options are correct

46. What percentage of water do plants use?
    a. 25%
    b. 50%
    c. 100%
    d. 1-5%

47. _____ have the ability to make their own food.
    a. Heterotrophs
    b. Herbivores
    c. Omnivores
    d. Autotrophs

48. Where does pollen enter the pistil?
    a. Style
    b. Stigma
    c. Ovary
    d. None of these options are correct

49. Where does pollen fertilizes the egg?
    a. Style
    b. Stigma
    c. Ovary
    d. None of these options are correct

50. TRUE OR FALSE: All plants need pollinators such as honey bees in order to get pollinated
    a. True
    b. False

SOIL AND WATER QUESTIONS

1. Soil provides plants with anchorage, water, _____ and oxygen.
    a. Carbon dioxide
    b. Glucose
    c. Nutrients
    d. Organic matter

2. Soil texture is defined as the _____ of sand, silt and clay.
    a. Arrangement
    b. Percentage
    c. Volume
    d. All of these options are correct

3. Soil structure is defined as the _____ of sand, silt and clay.
    a. Arrangement
    b. Percentage
    c. Volume
    d. All of these options are correct

4. What is the largest soil particle size?
    a. Sand
    b. Silt
    c. Clay
    d. All are the same size

5. What is the smallest soil particle size?
    a. Sand
    b. Silt
    c. Clay
    d. All are the same size

6. The ideal soil contains what percentage of air?
    a. 5%
    b. 25%
    c. 45%
    d. 50%

7. The ideal soil contains what percentage of mineral matter?
    a. 5%
    b. 25%
    c. 45%
    d. 50%

8. The ideal soil contains what percentage of water?
    a. 5%
    b. 25%
    c. 45%
    d. 50%

9. The ideal soil contains what percentage of organic matter?
    a. 5%
    b. 25%
    c. 45%
    d. 50%

10. The ideal soil texture is _____.
    a. Loam
    b. Sandy Loam
    c. Silty Clay Loam
    d. Sand

11. Sand feels _____.
    a. Sticky
    b. Gritty
    c. Smooth/Soft/Flowery
    d. All of these options are correct

12. Silt feels _____.
    a. Sticky
    b. Gritty
    c. Smooth/Soft/Flowery
    d. All of these options are correct

13. Clay feels _____.
    a. Sticky
    b. Gritty
    c. Smooth/Soft/Flowery
    d. All of these options are correct

14. What are the good soil characteristics of clay?
    a. Water infiltration, nutrient holding capacity
    b. Nutrient holding capacity, aeration
    c. Water holding capacity, nutrient holding capacity
    d. Water infiltration, aeration

15. What are the good soil characteristics of sand?
    a. Water infiltration, nutrient holding capacity
    b. Nutrient holding capacity, aeration
    c. Water holding capacity, nutrient holding capacity
    d. Water infiltration, soil tilth

16. Which type of soils generally have a weak structure?
    a. Clayey soils
    b. Silty soil
    c. Loam soils
    d. Sandy soils

17. What is the best type of soil structure for growing crops?
    a. Blocky
    b. Granular
    c. Platy
    d. Massive

18. Good soil structure facilitates _____ and _____.
    a. Water infiltration and root development
    b. Water holding capacity and root development
    c. Nutrient holding capacity and water holding capacity
    d. Water infiltration and nutrient holding capacity

19. TRUE OR FALSE: Soil is held together by clay and humus.

20. TRUE OR FALSE: Humans can not alter soil structure but can alter soil texture.

21. Soil organisms gives the soil its _____ activity.
    a. Chemical
    b. Biological
    c. Rhizosphere
    d. All of these options are correct

22. Where is the biological activity located in the soil?
    a. Root zone
    b. Subsoil
    c. Groundwater
    d. None of these options are correct

23. What is a benefit of organic matter?
    a. Provides only macro-nutrients for the plant
    b. Raises pH of the soil
    c. Improves soil texture
    d. Improves water retention

24. What is a drawback to organic matter?
    a. Raises pH of the soil
    b. Provides only macro-nutrients for the plant
    c. Destroy soil structure
    d. Weed seeds may be present

25. A soil pH below a 7 is classified as _____.
    a. Neutral
    b. Acidic
    c. Alkaline
    d. All of these options are correct

26. A soil pH above a 7 is classified as _____.
    a. Neutral
    b. Acidic
    c. Alkaline
    d. All of these options are correct

27. A soil pH of a 7 is classified as _____.
    a. Neutral
    b. Acidic
    c. Alkaline
    d. All of these options are correct

28. TRUE OR FALSE: Soil pH affects the availability of certain nutrients to the plant.

29. What is used to raise the soil pH?
    a. Sulfur
    b. Limestone
    c. Fertilizers
    d. Organic Matter

30. What can lower the soil pH?
    a. Sulfur
    b. Fertilizers
    c. Organic Matter
    d. All of these options are correct

31. _____ is the attraction of water molecules to a solid surface.
    a. Adhesion
    b. Cohesion
    c. Osmosis
    d. None of these options are correct

32. _____ is the attraction of one water molecule to another water molecule.
    a. Adhesion
    b. Cohesion
    c. Osmosis
    d. None of these options are correct

33. The soil moisture status of a fully wetted and drained soil is known as _____.
    a. Permanent wilting point
    b. Available water
    c. Saturation
    d. Field Capacity

34. The soil moisture status when all available water is gone is known as _____.
    a. Permanent wilting point
    b. Available water
    c. Saturation
    d. Field Capacity

35. The soil moisture status when all a fraction of the water is available to the plant is known as _____.
    a. Permanent wilting point
    b. Available water
    c. Saturation
    d. Field Capacity

36. What type of soil has the most available water?
    a. Clay
    b. Loam
    c. Sandy
    d. Sandy Loam

37. What type of soil has the most amount of field capacity water?
    a. Clay
    b. Loam
    c. Clay loam
    d. Silty Loam

38. _____ is the wearing away of the land surface by rain or irrigation water, wind, ice or other natural or human originated activity that abrade, detach and remove soil from one point on the earth.
    a. Erosion
    b. Accelerated erosion
    c. Geological erosion
    d. None of these options are correct

39. Cover practice to reduce erosion include:
    a. Cover crops
    b. Conventional tillage
    c. Wind breaks
    d. All of these options are correct

40. Terraces and wind breaks are _____ types of practices to prevent erosion.
    a. Cover
    b. Engineering/Mechanical
    c. Tillage practices
    d. All of these options are correct

41. _____ represents soil evaporation and the water used by a crop for growth and cooling purposes.
    a. Transpiration
    b. Evaporation
    c. Evapotranspiration
    d. All of these options are correct

42. Evaporation from the soil surface is known as _____.
    a. Transpiration
    b. Evaporation
    c. Evapotranspiration
    d. All of these options are correct

43. TRUE OR FALSE: A general rule of thumb in irrigation management is to replace ET for the week.

44. TRUE OR FALSE : The most effective irrigation scheduling combines soil moisture measurement and calculations of water loss by evaporation.

45. TRUE OR FALSE : The current crop state plays a major role in the water requirement of the plant.

46. Saline soils are high in _____.
    a. Sand
    b. Salts
    c. pH
    d. All of these options are correct

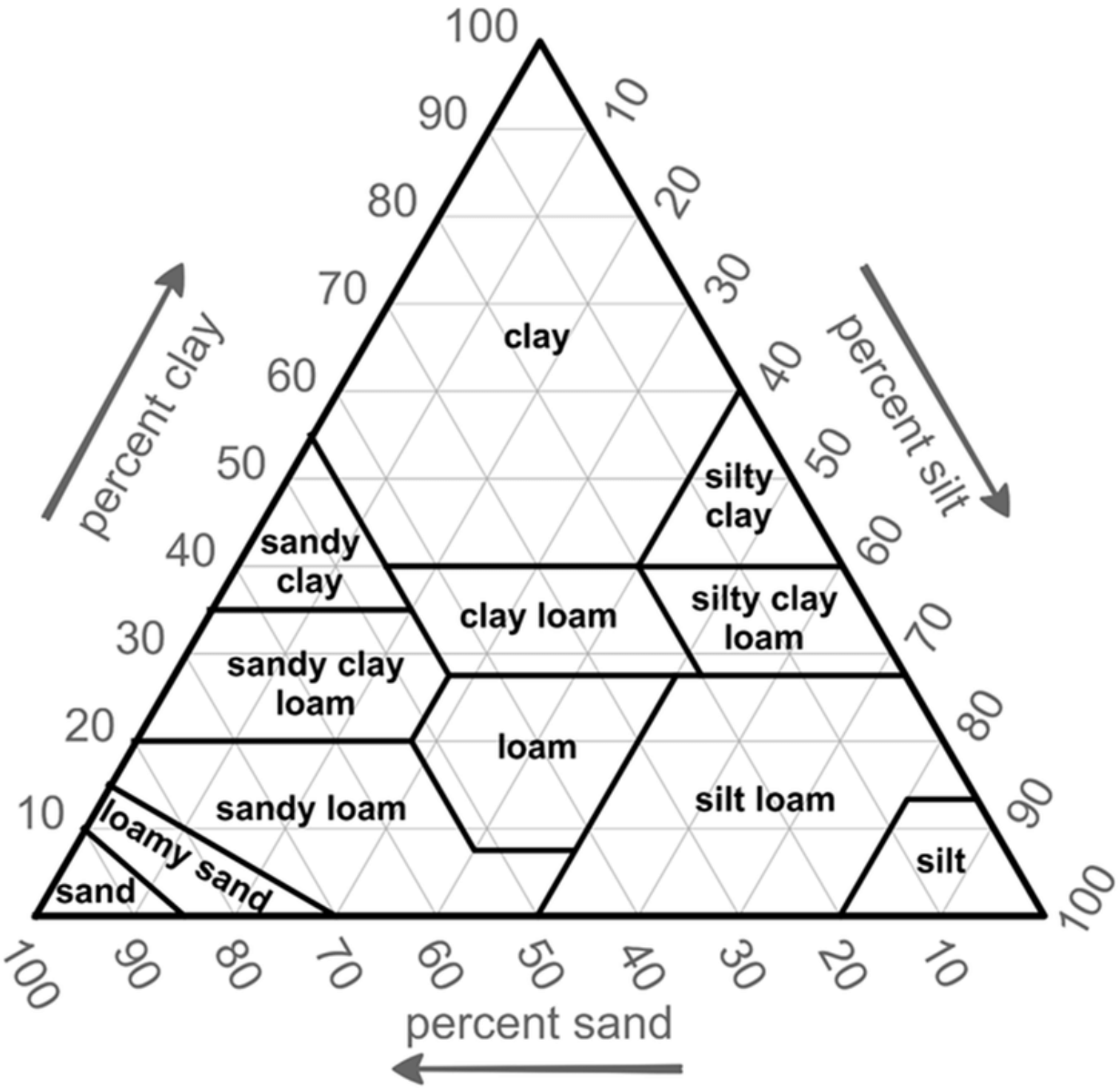
47. What is used to measure the salt content of the soil?
    a. Electroconductivity
    b. Evapotranspiration
    c. pH Meter
    d. Tensiometer

48. What agriculture practices lends to sodium (salts) the soils?
    a. Flood irrigation
    b. Leaving land fallow
    c. Evaporation
    d. Conventional fertilizers

49. What are the major variables for managing soil and water quality?
    a. Water quality
    b. Soil texture
    c. Crop tolerance
    d. All of these options are correct

50. Which crop is considered a “salt tolerant” crop?
    a. Corn
    b. Alfalfa
    c. Barley
    d. Tomatoes

51. Using the provided soil textural triangle, determine the texture of a soil that contains: 50% sand, 20% silt and 30% clay.
    a. Sandy clay
    b. Clay loam
    c. Loam
    d. Sandy clay loam


100
90
80
70
60
50
40
30
20
10
percent clay
clay
silty clay
sandy clay
clay loam
silty clay loam
sandy clay loam
loam
silt loam
sandy loam
loamy sand
sand
silt
percent silt
percent sand

PLANT NUTRIENT QUESTIONS

1. According the WRCCA there are _____ essential nutrients.
    a. 16
    b. 17
    c. 18
    d. None of these options are correct

2. Plants absorb nutrients from _____.
    a. Organic matter
    b. Soil particles
    c. Soil solution
    d. Soil minerals

3. True or False: Different soil textures have differing capacity to hold nutrients and resist depletion based on mineral and or organic matter content.

4. Macronutrients are need in _____ quantities.
    a. Small
    b. Large
    c. Equal
    d. All of these options are correct

5. Micronutrients are need in _____ quantities.
    a. Small
    b. Large
    c. Equal
    d. All of these options are correct

6. Which of the following are macronutrients?
    a. Fe
    b. Zn
    c. C
    d. K

7. Which of the following are considered micronutrients?
    a. Fe
    b. N
    c. O
    d. S

8. Which of the following are considered atmospheric nutrients?
    a. C
    b. N
    c. P

d. Al

9. Which of the following are considered secondary macronutrients?
    a. N
    b. P
    c. Mg
    d. K

10. Which group of nutrients are the most important for plants?
    a. Macronutrients
    b. Micronutrients
    c. Atmospheric Nutrients
    d. All these options are correct

11. TRUE OR FALSE: A balanced approach to nutrient management is the most effective.
    a. TRUE
    b. FALSE

12. TRUE OR FALSE: Nature does not play a role in changing the pH of soil.
    a. TRUE
    b. FALSE

13. When water evaporates, _____ remain at the soil surface.
    a. Organic matter
    b. Humus
    c. Salts
    d. None of these options are correct

14. Which nutrient is responsible is a key component of protein, growth, chlorophyll, and nucleic acids?
    a. Phosphorous
    b. Potassium
    c. Calcium
    d. Nitrogen

15. Which need nutrient is typically needed in the greatest amount?
    a. Phosphorous
    b. Potassium
    c. Calcium
    d. Nitrogen

16. How can atmospheric nitrogen be fixed into the soil?
    a. Plants
    b. Lightning
    c. Humans

d. All of these options are correct

17. Which crop requires the most amount of nitrogen?
    a. Corn
    b. Tomatoes
    c. Wheat
    d. Alfalfa

18. Which types of plants get most of their nitrogen from the atmosphere?
    a. Forage crops
    b. Row crops
    c. Legumes
    d. All of these options are correct

19. Yellowing (chlorosis) of older leaves is a deficiency symptom for _____.
    a. Phosphorous
    b. Potassium
    c. Calcium
    d. Nitrogen

20. Many counties in California require farmers to submit a _____ management plan.
    a. Phosphorous
    b. Potassium
    c. Calcium
    d. Nitrogen

21. Which of the following regulates stomata openings in plants?
    a. Nitrogen
    b. Phosphorous
    c. Potassium
    d. Iron

22. At which of the following plant growth stages would you expect the highest demand for soil nutrients?
    a. Germination
    b. Early seedling
    c. Mid vegetative
    d. Late reproductive

23. If a nutrient is released to the soil during decomposition of organic matter, _____ has occurred.
    a. Mineralization
    b. Immobilization
    c. Antagonism

d. Nitrification

24. Which of the following soil textures would likely have the lowest soil fertility?
    a. Sand
    b. Sandy loam
    c. Clay loam
    d. Clay

25. Symbiotic nitrogen fixation is the process where atmospheric nitrogen is converted to ammonia in the root nodules of _____.
    a. Legumes
    b. Grasses
    c. Fungi
    d. Perennials

26. The portion of a fertilizer that easily dissolves in water is _____.
    a. Total available
    b. Water soluble
    c. Inert
    d. Volatile

27. Soil testing and plant tissue test are usually _____
    a. Completed at the same time
    b. Done monthly during the growing season
    c. Done when plants mature
    d. Used to test for nutrient deficiencies

28. Which of the following is NOT part of the 4R system in regards to nutrient management?
    a. Source
    b. Sink
    c. Time
    d. Place

29. Which of the following loss pathways is of most concern for loss of nitrates in the soil?
    a. Erosion
    b. Runoff
    c. Volatilization
    d. Leaching

30. Which of the following loss pathways is of most concern for loss of phosphate in a recently tilled soil?
    a. Erosion
    b. Runoff
    c. Volatilization
    d. Leaching

31. Potassium deficiency is characterized by a _____.
    a. Marginal leaf scorch
    b. Midrib chlorosis
    c. Purple coloring underneath the leaf
    d. All of these options are correct

32. The symbol for potassium is _____.
    a. N
    b. K
    c. P
    d. Pa

33. What is a function of potassium?
    a. Vegetative growth
    b. Root development
    c. Fight diseases
    d. None of these options are correct

34. Another common name used for potassium is _____.
    a. Potash
    b. Potassium nitrate
    c. Ammonium
    d. Phosphate

35. When applying fertilizers through the irrigation system, this is referred to as _____.
    a. Chemigation
    b. Banding
    c. Broadcasting
    d. Fertigation

36. Phosphorous deficiency is characterized by a _____.
    a. Marginal leaf scorch
    b. Midrib chlorosis
    c. Purple coloring underneath the leaf
    d. All of these options are correct

37. What is a function of phosphorous?
    a. Vegetative growth
    b. Root development
    c. Fight diseases
    d. None of these options are correct

38. The chemical symbol for phosphorous is _____.
    a. N
    b. K
    c. P
    d. Ph

39. Another common name used for phosphorous is _____.
    a. Potash
    b. Phosphoric acid
    c. Ammonium
    d. Phosphate

40. Which part of the plant contains the most phosphorous?
    a. Seeds
    b. Roots
    c. Stem
    d. Leaves

MATH CALCULATIONS

1. The field is a rectangular field that is 660 feet long by 66 feet wide. How many acres are in this field?

2. The field is a rectangular field that is ¾ mile long by ¼ mile wide. How many acres are in this field?

3. How pounds of Potassium are in a ton of 5-4-3 organic fertilizer?

4. Calculate

Field Size: 20 acres
Fertilizer requirements 40 units of N per acre
Urea costs $720 per ton
Urea 46-0-0

Quantity of Urea needed per acre _____
Quantity of Urea needed per field _____
Cost per pound of fertilizer _____
Cost per acre of fertilizer _____
Total cost of fertilizer for field _____

5. Your county extension agent is counting plants in your silage corn field to determine plant population and eventually yield per acre. The corn is planted in 30 inch rows with an average of 42 plants per 20 foot length. What is the plant population per acre?

6. A wheat farmer in North Eastern California desires to plant the recommended rate of 110 pounds per acre of live seed. The seed tag shows that the germination rate is 90%. How many pounds of seed should she plant?

7. A corn farmer in Gustine, CA planted 34,000 seeds per acre. The seed tag shows that the pure seed is 99% and the germination rate is 92%. How many seed should he expect to grow?