PLSC 210-Horticulture Science Name_____

Examination II

October 29, 2003

1. Which of the following statements correctly describes the phenomenon of apical dominance in woody plants?

   a. Suppression of the growth of apical shoots by auxin compounds produced in the axillary buds.
   b. Suppression of the breaking (growth) of lateral buds on a stem below the apical meristem which produces auxin compounds.
   c. Suppression of the growth of apical shoots by cytokinin compounds produced in the axillary buds.
   d. Suppression of the breaking (growth) of lateral buds on a stem below the apical meristem which produces cytokinin compounds.

2. If you would like to convert female flowers to male flowers on a monoecious cucumber plant, which of the following growth regulators can be used as a spray?

   a. IAA (indoleacetic acid)
   b. Gibberellin (GA_3)
   c. Ethephon (chemical that releases ethylene)
   d. Kinetin (a synthetic cytokinin)

3. Chrysanthemum is a short-day plant. If chrysanthemum is grown under a 16-hr-day/8-hr-night condition, it will:

   a. initiate flower buds and bloom.
   b. continue to grow vegetatively without blooming.
   c. be stunted and die eventually.
   d. be confused, with some plants staying vegetative and others blooming.

4. The phytochrome system (P_r as red light absorbing and P_{fr} as far-red light absorbing form) is responsible for plant response to photoperiods. Phytochromes are also responsible for phototropism.

   a. Both statements are true.
   b. The first statement is true, but the second statement is wrong.
   c. The first statement is wrong, but the second statement is true.
   d. Both statements are wrong.

5. Synthetic cytokinins like naphthaleneacetic acid (NAA) and benzyl adenine (BA) can be used to induce shoot proliferation from tissues cultured in vitro.

   a. True
   b. False

6. Ethylene gas as a growth regulator can be used to ripen green bananas.

   a. True
   b. False

7. Seed dormancy which is caused by impermeable seed coat can be eliminated by:

   a. stratification.
   b. vernalization.
   c. scarification.
   d. growth regulator treatment.

8. Which of the following seed dormancy is caused by the presence of germination inhibitors in the embryo?

   a. Physical dormancy
   b. Seed coat dormancy
   c. Physiological dormancy
   d. All of the above

9. Which of the following fruit trees would require a chilling period for flower bud dormancy breaking and flowering?

   a. Orange, mango, and pineapple
   b. Apple, peach, and pear
   c. Avocado, almond, and papaya
   d. None of the above

10. Which of the following flower crops requires a cold treatment for flower induction?

    a. Poinsettia
    b. Azalea
    c. Chrysanthemum
    d. Rose

11. The carbohydrate to nitrogen ratio (C/N ratio) influences the onset of phase change from vegetative growth to reproductive growth in many plants. Which of the following statements explains the influence of C/N ratio best?

    a. The higher the C/N ratio, the faster the onset of reproductive growth.
    b. The higher the C/N ratio, the higher the vegetative growth.
    c. The lower the C/N ratio, the greater the reproductive growth.
    d. The lower the C/N ratio, the earlier the plant bloom.

12. The cultivated potato is a long-day plant. If a commercial cultivar of potato is grown on a farm near the equator, would it bloom?

    a. Yes, the potato will bloom continuously, because the equator has a long-day condition year round.
    b. No, the potato will not bloom, because the equator has a short-day condition year round.
    c. Yes, the potato will bloom during the summer months when the equator has a long-day condition.
    d. No, the potato will not bloom during the winter months when the equator has a short-day condition.

13. Which of the following is a short-day plant?

    a. Geranium
    b. Tomato
    c. Petunia
    d. Poinsettia

14. The influence of pollination on ovary growth and enlargement into fruit is called metaxinia.

    a. True
    b. False

15. Parthenocarpy is a phenomenon of fruit development without pollination and fertilization. Fruits formed by parthenogenesis contain viable seeds.

    a. Both statements are true.
    b. The first statement is true, but the second statement is wrong.
    c. The first statement is wrong, but the second statement is true.
    d. Both statements are wrong.

16. Segregation of certain genetic traits can be found in the progenies obtained from:

    a. sexual (seed) propagation.
    b. asexual reproduction.
    c. vegetative propagation.
    d. clonal reproduction.

17. In which of the following cell divisions would the number of chromosomes be reduced to one half?

    a. Mitosis
    b. Somatic cell division
    c. Meiosis
    d. Both mitosis and meiosis

18. Which of the following identifies a **monosomic** (aneuploid) condition in spinach (X=12)?

    a. 2N = 3X = 36 chromosomes
    b. 2N = 4X = 48 chromosomes
    c. 2N-1 =2X-1 = 23 chromosomes
    d. 2N+1 = 2X+1 = 25 chromosomes

19. The genomic (X) number of chromosomes for watermelon is 11. How many chromosomes would a seedless watermelon (triploid) have in each cell?

    a. 2N = 1X = 11
    b. 2N = 2X = 22
    c. 2N = 3X = 33
    d. 2N = 4X = 44

20. Life cycle is defined as the alternation of sporophytic and gametophytic generations in cycle. Which of the following is true for life cycle in plants?

    a. The gametophytic generation is much shorter than the sporophytic generation.
    b. The sporophytic generation is shorter than the gametophytic generation.
    c. Seed or fruit ripening occurs during the sporophytic generation.
    d. Both the sporophytic and gametophytic generations have the same number of chromosomes in their cells.

21. Colchicine is used to induce polyploidy plants. Select the best statement on the mode of colchicine action in doubling chromosome numbers during mitosis.

    a. Colchicine induces rapid DNA replication in the nucleus.
    b. Colchicine kills diploid cells allowing only the polyploid cells to survive.
    c. Colchicine interferes with the function of spindle fibers during the anaphase of mitosis, sending all chromosomes into one pole.
    d. None of the above.

22. Which of the following statement is **not true** for double fertilization?

    a. One sperm nucleus combines with the egg nucleus to form a zygotic embryo, and the other sperm nucleus combines with the polar nuclei to form the endosperm.
    b. Double fertilization ends up with the production of two seeds per ovule.
    c. The endosperm tissues formed from double fertilization contain 3N number of chromosomes.
    d. Double fertilization occurs in higher plants.

23. Given that the genomic (X) number of chromosomes for potato is 12 and the cultivated potato is a tetraploid (2N = 4X), how many chromosomes would a potato pollen grain have?

    a. N = 6
    b. N = 12
    c. N = 24
    d. N = 48

24. Which of the following turfgrasses is a cool-season grass?

    a. Kentucky bluegrass
    b. Buffalograss
    c. Zoysia grass
    d. Bermuda grass

25. Which of the following statements is **not true** for golf courses and athletic fields?

    a. There are more athletic turfgrass fields than golf courses in the U.S.
    b. The number of golf courses in North America exceeds that of golf courses in the rest of the world combined.
    c. Europe has the highest number of golf courses per capita.
    d. South America has the least number of golf courses among the five continents.

26. Turfgrasses are plants that form a more or less contiguous ground cover that persists under regular mowing and traffic. A turf is an interconnecting community of turfgrasses and the soil adhering to their foots and other below-ground organs.

    a. Both statements are true.
    b. The first statement is true, but the second statement is wrong.
    c. The first statement is wrong, but the second statement is true.
    d. Both statements are wrong.

27. The gas phase of growing media is needed for:

    a. photosynthesis.
    b. root respiration.
    c. transpiration of water.
    d. conduction of water through xylem tissues.

28. At container capacity, the moisture condition in the growing medium is maintained by:

    a. capillary water, hygroscopic water, and gravitational water.
    b. hygroscopic water and capillary water.
    c. gravitational water only.
    d. hygroscopic water only.

29. Which of the following is correct for the optimum pH range required by plants?

    a. It enhances the availability of water to plants.
    b. It controls the amount of oxygen available in the growing medium.
    c. It maximized the absorption of essential nutrients by roots.
    d. It limits the growth of soil microorganisms.

30. Soils having a high level of cation exchange capacity (CEC) would:

    a. have the individual soil particles positively charged.
    b. absorb and store negatively charged ions.
    c. absorb and store positively charged ions.
    d. repel positively charged ions.

31. Which of the following chemicals can be used to raise the pH of a growing medium.

    a. Aluminum sulfate
    b. Iron sulfate
    c. Phosphoric acid
    d. Dolomite

32. The tap water in Fargo is high in pH (around 8.8). Which of the following chemicals can be used to lower the pH (around 6.5) of the water for greenhouse irrigation?

    a. Sulfuric acid
    b. Potassium hydroxide
    c. Calcium carbonate
    d. Calcium nitrate

33. Which of the following crops tolerates high pH soils?

a. Alfalfa
b. Blueberry
c. Azalea
d. Hydrangea

34. Which of the following statements is true for soil nitrification?

a. The ammonifying bacteria (*Actinomycetes*) convert ammonium (NH_4^+) to nitrite (NO_2) during nitrification.
b. The final product of soil nitrification is nitrate (NO_3^-).
c. Nitrosomonas, as nitrifying bacteria, converts nitrite (NO_2) into nitrate (NO_3^-) during soil nitrification.
d. The first step of soil nitrification involves the conversion of nitrite (NO_2) into ammonium (NH_4^+).

35. Which of the following soil amendments would have the lowest pH?

a. Perlite
b. Vermiculite
c. Peat
d. Sand

36. Which of the following is **not** true for the Cornell peat-lite mix?

a. The major ingredients are peat, perlite and vermiculite.
b. It contains sand.
c. It is used for pot plant culture.
d. It contains no soil.

37. Which of the following lights has the longest wave length?

a. Red light
b. Blue light
c. UV light
d. Green light

38. Which of the following photometric units shows the highest light intensity?

a. 1 foot candle
b. 1 lux
c. 1 $\mu mol\ m^{-2}\ s^{-1}$

39. Which of the following statements is **not** true for the atmospheric window?

a. It allows the visible light to reach the earth's surface.
b. It allows the photosynthetically active radiation (PAR) to reach the earth's surface.
c. The ozone layer, CO_2 and water vapor filter out cosmic ray, γ-ray, x-ray, and UV light as well as infra-red lights in the atmosphere.
d. It allows more UV light on earth's surface.

40. Which of the following lights is responsible for so-called “greenhouse effect” in warming up the atmosphere or a greenhouse?

    a. UV light
    b. visible light
    c. PAR (photosynthetically active radiation)
    d. infra-red light

41. The spectral range of the photosynthetically active radiation (PAR) is:

    a. 100 nm - 400 nm.
    b. 400 nm - 700 nm.
    c. 700 nm -1,000 nm.
    d. 1,000 nm - 2,000 nm.

42. For photosynthesis enhancement, fluorescent lamps are less energy efficient than the incandescent lamps.

    a. True
    b. False

43. Incandescent lamps are commonly used to light plants for photoperiod control, because:

    a. the cost of incandescent light bulbs is cheaper than that of fluorescent lamps.
    b. incandescent lamps are more energy efficient in emitting the red and far-red light compared to fluorescent lamps.
    c. incandescent lamps last longer than the fluorescent lamps.
    d. it is easier to screw in an incandescent light bulb than to install fluorescent lamps.

44. At a dew point, the relative humidity (RH) reaches:

    a. 50%.
    b. 75%.
    c. 95%
    d. 100%.

45. Provided that 1 kg = 2.2 lb = 1,000 g and $^{o}F = 9/5\ ^{o}C + 32$, which of the following would contain the greatest amount of heat energy?

    a. 1 kcal
    b. 500 cal
    c. 1 BTU

46. The heat of fusion is:

    a. released to the surrounding when water evaporates.
    b. absorbed from the surrounding when steam condenses to form water.
    c. absorbed from the surrounding when water evaporates to form vapor.
    d. released the surrounding when water freezes.

47. The wet-bulb temperature of an ambient air:

    a. increases as the relative humidity decreases.
    b. decreases as the relative humidity decreases.
    c. stays the same over a range of relative humidity when dry-bulb temperature is the same.
    d. is always higher than the dry-bulb temperature.

48. Transfer of heat energy from one place to another by movement of air or water current is called as:

    a. conduction.
    b. convection.
    c. radiation.
    d. condensation.

49. A deciduous fruit orchard is usually established on a thermal belt rather than in the low-lying valley area. In addition, a north-facing thermal belt is better than a south-facing thermal belt as a site for growing deciduous fruit trees, because:

    a. flowering time is delayed for the plants grown on the north slope than those grown on the south slope, reducing the chances for freeze damage.
    b. plants grown on the north slope receive more winter chilling than those grown on the south slope, allowing more profuse blooming.
    c. flowering time is more hastened for the plants grown on the north slope than those grown on the south slope, leading to an earlier crop.
    d. plants grown on the south slope are more vulnerable to insect pests and diseases during the entire growing season.

50. Which of the following statements best describes smudging?

    a. Spraying water over fruit trees to protect them from freezing
    b. Covering fruit trees with plastic film material to keep them warm.
    c. Burning fuel in an orchard to heat the ambient air so that fruit trees are protected from cold
    d. Mulching the beds with straw or plastic film to keep the soil warm.

51. **Bonus Question** (*4 points*). Make a question of your own from subjects you have studied but was not covered in this exam and answer it correctly.

Honor Pledge: *Upon my honor I have neither given nor received aid in writing this examination.*

*Signed*_____