

**2015 National FFA Floriculture  
Career Development Event  
General Knowledge Examination**

1. The most important consideration in setting up an irrigation system is \_\_\_\_\_ quality.
  - a) Air
  - b) Water
  - c) Soil
  - d) Piping
2. \_\_\_\_\_ refers to the brightness or dullness of the color within a hue.
  - a) Value
  - b) Intensity
  - c) Chroma
  - d) Triad
3. A standard water analysis usually includes \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
  - a) pH, EC, alkalinity
  - b) fluoride, aluminum, zinc
  - c) iron, sulfates, boron
  - d) potassium, calcium, sulfates
4. True or False: Pinching naturally accelerates a plant's branching.
  - a) True
  - b) False
5. The process of pinching a plant removes the \_\_\_\_\_ factory and eliminates the \_\_\_\_\_ concentration of the \_\_\_\_\_ hormone from the upper portion of the plant.
  - a) auxin, high, inhibitory
  - b) tunic, low, hibitory
  - c) auxin, low, hibitory
  - d) high, low, inhibitory
6. True or False: *Oriental style* arrangements are based on carefully placed branches, flowers, and small amounts of foliage.
  - a) True
  - b) False

7. Acid is injected into the irrigation water to neutralize the \_\_\_\_\_.
- a) growth
  - b) volume
  - c) alkalinity
  - d) light
8. The most common acids used for alkalinity control are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_.
- a) phosphoric, sulfuric, nitric
  - b) sodium, calcium, potassium
  - c) sulfuric, magnesium, manganese
  - d) citric, ethanoic, tartaric
9. Packaging foiled plants for removal from the shop is most easily done by using:
- a) a plastic tub
  - b) a cardboard box
  - c) a sleeve
  - d) a large bag
10. True or False: Mold growth is almost always nonpathogenic to your crop.
- a) True
  - b) False
11. When several types of smaller specimens of foliage plants are placed in a brass or pottery container, a \_\_\_\_\_ is created.
- a) split complementary design
  - b) triad design
  - c) garden dish
  - d) floral leaf bowl
12. In plant nutrition, EC refers to \_\_\_\_\_.
- a) Economic Conditions
  - b) Electrical Conductivity
  - c) Environmental Conditions
  - d) Electrical Conduit
13. The general pH range for greenhouse crops in a soilless medium is \_\_\_\_\_.
- a) 5.4 – 6.8
  - b) 4.0 – 6.0
  - c) 7.2 – 8.1
  - d) 4.5 – 8.6

14. In floral design, \_\_\_\_\_ gives the illusion that all of the flower stems are coming from one point.
- a) radiation
  - b) physical balance
  - c) visual balance
  - d) symmetrical balance
15. True or False: Water alkalinity is a measure of basic ions, mainly bicarbonates and carbonates, dissolved in the water.
- a) True
  - b) False
16. \_\_\_\_\_ analysis can be conducted to determine the nutrient status of the crop or for problem solving.
- a) Stem
  - b) Foliar
  - c) pH
  - d) Chemical
17. The \_\_\_\_\_ design makes an excellent centerpiece because it is attractive when viewed from either the front or the back.
- a) right-triangular
  - b) horizontal
  - c) equilateral triangular
  - d) vertical
18. True or False: Boutonnieres should not be designed with a bow.
- a) True
  - b) False
19. Immediate steps to lower the medium's EC are \_\_\_\_\_ and \_\_\_\_\_.
- a) Increase fertilizer rate, increase fertilization frequency
  - b) Lower fertilizer rate, decrease fertilization frequency
  - c) Increase alkalinity levels, increase potassium bicarbonate
  - d) Lower potassium-calcium-magnesium ratio, decrease magnesium sulfate
20. True or False: In general, plants will become heat stressed at night temperatures above 75°F (24°C) and day temperatures above 90°F (32°C).
- a) True
  - b) False

21. The \_\_\_\_\_ tube is used to provide a stem for tube-shaped flowers.
- a) stephanotis
  - b) hairpin
  - c) skeleton
  - d) corsage
22. The four elements of design in floral arrangements are \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
- a) simplicity, beauty, custom, symbolism
  - b) custom, line, color, texture, space
  - c) line, form, texture, color
  - d) none of the above
23. DIF is defined as:
- a) the difference in daytime temperature and the nighttime temperature
  - b) the difference in fertilization
  - c) data interchange format
  - d) difficulty in fertilization
24. The term *daily light integral* is used to describe the total quantity of light delivered within a 12 hour period.
- a) True
  - b) False
25. The wholesale pricing method is based on the concept that \_\_\_\_\_ of the retail selling price is made up of the wholesale value of materials being used.
- a) 20%
  - b) 40%
  - c) 60%
  - d) 50%
26. The biggest insect problems in plugs are \_\_\_\_\_ and \_\_\_\_\_.
- a) fungus gnats, shore flies
  - b) foxglove aphids, chrysanthemum aphids
  - c) silverleaf whiteflies, banded wing whiteflies
  - d) broad mites and bulb mites
27. The area of emphasis on an arrangement is called the \_\_\_\_\_.
- a) recessed focal point
  - b) radiation focal point
  - c) weak focal point
  - d) focal point accent

28. Traditional temperature regimes for greenhouse production are to run \_\_\_\_\_ days and \_\_\_\_\_ nights.
- a) cool, warm
  - b) warm, cool
  - c) cool, cool
  - d) warm, warm
29. A common flaw in establishing a focal area is to:
- a) using flowers that are too large
  - b) using flowers that are too small
  - c) crowd the flowers together very closely
  - d) not using enough flowers
30. Nitrogen deficiency, ammonium toxicity and phosphorus deficiency are some of the common reasons of \_\_\_\_\_ disorders in greenhouse crops.
- a) media
  - b) nutrient
  - c) water quality
  - d) heating
31. Line-mass arrangements which are based on straight lines include vertical, diagonal, L-shaped, and \_\_\_\_\_.
- a) crescent
  - b) inverted-T
  - c) S-curve
  - d) Hogarth curve
32. The formula for determining average daily temperature (ADT) is:
- a)  $(\text{day temperature} \times \text{hours}) \div 24$
  - b)  $(\text{day temperature} \times \text{hours}) \div 12$
  - c)  $(\text{day temperature} \times \text{hours}) + (\text{night temperature} \times \text{hours}) \div 24$
  - d)  $(\text{day temperature} \times \text{hours}) + (\text{night temperature} \times \text{hours}) \div 12$
33. True or False: A common guideline in floral design is to make the height of the arrangement at least 1-1/2 times the height of the container.
- a) True
  - b) False
34. \_\_\_\_\_ is the art of organizing the design elements inherent in plant materials, container, and accessories according to the principles of design.
- a) Color design
  - b) Flower arrangement
  - c) Proportional balance
  - d) Floral design

35. The most widely used mechanics item used for supporting flowers in arrangements is:

- a) chicken wire
- b) plastic grid
- c) tape
- d) floral foam

36. The premier student organization for young people interested in the floral industry is the \_\_\_\_\_.

- a) National Florist Association
- b) National FFA Organization
- c) National Horticulture Association
- d) Future Business Leaders Organization

37. Correcting high pH can be achieved by \_\_\_\_\_.

- a) using a high-ammonium fertilizer combined with low alkalinity
- b) using a low-ammonium fertilizer combined with high alkalinity
- c) applying potassium bicarbonate
- d) drenching soil with flowable lime

38. True or False: The stitch method is a foliage wiring technique used on solid or wide leaves so the leaves can be shaped and curved to fit the style and shape of a corsage or boutonniere.

- a) True
- b) False

39. A *half-couch casket spray* is:

- a) A triangular one-sided, hand-tied design.
- b) A small design displayed inside the casket lid.
- c) A large casket piece that is placed in the center of a closed full couch.
- d) A floral piece that is placed on the right of side of a half couch.

40. True or False: Boutonnieres should never be designed with more than a single flower.

- a) True
- b) False

41. Flower arrangements are more pleasing to the eye when their outline creates a \_\_\_\_\_ pattern.

- a) geometric
- b) round
- c) triangular
- d) crescent

42. True or False: Tulips, hyacinths, crocus, and daffodils are all flowering bulbs.
- a) True
  - b) False
43. The \_\_\_\_\_ orchid is the largest of the orchid types used by florists for corsages.
- a) Cattleya
  - b) Cymbidium
  - c) Dendrobium
  - d) Phalaenopsis
44. By tradition, on Mother's Day, a \_\_\_\_\_ flower or corsage is worn by a daughter as a symbol of love and honor for a living mother, and \_\_\_\_\_ flowers are worn as a memorial for a mother who is no longer living.
- a) white, pink
  - b) yellow, white
  - c) red, white
  - d) pink, yellow
45. High or low fertility levels can \_\_\_\_\_ crop susceptibility to \_\_\_\_\_ and \_\_\_\_\_.
- a) decrease, heat, cold
  - b) increase, insects, mites
  - c) increase, heat, cold
  - d) decrease, insects, mites
46. A \_\_\_\_\_ bouquet is a round bouquet that is based on the English nosegay of the Georgian and Victorian eras.
- a) cascade
  - b) colonial
  - c) arm
  - d) crescent
47. \_\_\_\_\_ is the application of water-soluble fertilizers through the irrigation of water.
- a) Fertigation
  - b) Irrigation
  - c) Pre-plant fertilization
  - d) Water motor-controlled injection
48. Considerations when planning a wedding include:
- a) Location of the wedding
  - b) Time of year
  - c) Budget range
  - d) All of the above

49. Accented neutral, monochromatic, analogous, and split complementary are the most common \_\_\_\_\_ used by florists in designs.

- a) color schemes
- b) floral arrangements
- c) texture arrangements
- d) lines

50. \_\_\_\_\_ is a technique of positioning plant materials very close together to cover floral foam in organized lines or areas.

- a) Binding
- b) Pillowing
- c) Pavé
- d) Terracing



# Exam Key

|     |   |
|-----|---|
| 1.  | B |
| 2.  | C |
| 3.  | A |
| 4.  | B |
| 5.  | A |
| 6.  | A |
| 7.  | C |
| 8.  | A |
| 9.  | C |
| 10. | A |
| 11. | C |
| 12. | B |
| 13. | A |
| 14. | A |
| 15. | A |
| 16. | B |
| 17. | B |
| 18. | A |
| 19. | B |
| 20. | A |
| 21. | A |
| 22. | C |
| 23. | A |
| 24. | B |
| 25. | B |
| 26. | A |
| 27. | D |
| 28. | B |
| 29. | C |
| 30. | B |
| 31. | B |
| 32. | C |
| 33. | A |
| 34. | D |
| 35. | D |
| 36. | B |
| 37. | A |
| 38. | A |
| 39. | D |
| 40. | B |
| 41. | A |
| 42. | A |
| 43. | A |
| 44. | C |
| 45. | B |
| 46. | B |
| 47. | A |
| 48. | D |
| 49. | A |
| 50. | C |



**2016 National FFA Floriculture  
Career Development Event  
General Knowledge Exam**



**Directions:** Select the best answer for each question and mark your selection on the separate scan-tron sheet provided. *Mark answers in the Exam section on the scan-tron located in the bottom right hand corner.*

1. DIF, used for height management of crops, is the difference between the daytime temperature and
  - A) temperature requirement
  - B) morning temperature
  - C) nighttime temperature
  - D) none of the above.
2. In commercial greenhouses, which of the following methods are commonly used as a way to regulate plant growth without using chemicals?
  - A) crop timing
  - B) water stress
  - C) container size
  - D) all of the above
3. *Agrobacterium tumefaciens* is a pathogen that is commonly known as
  - A) crown gall
  - B) flower distortion
  - C) chlorotic mottle
  - D) none of the above
4. The recommended pH level for greenhouse crops in a soilless medium is
  - A) 3.0-3.5
  - B) 5.6-6.2
  - C) 4.0-4.3
  - D) all of the above
5. The virtual visual path that directs eye movement through a composition is \_\_\_\_\_.
  - A) pattern
  - B) line
  - C) form
  - D) none of the above
6. Orange, green and violet are \_\_\_\_\_ colors.
  - A) primary
  - B) secondary
  - C) intermediate
  - D) tertiary

7. The fundamental guidelines to aesthetic design that governs the organization of the elements and materials in accordance with the laws of nature are known the \_\_\_\_\_.
- A) Elements of Design
  - B) Transitions of Design
  - C) Principles of Design
  - D) none of the above
8. Which of the following is NOT a plant hormone that can be used as a plant growth regulator?
- A) ethylene
  - B) anthocyanin
  - C) abscisic acid
  - D) gibberellin
9. A 28 gauge florist wire is \_\_\_\_\_ than 18 gauge florist wire.
- A) thicker
  - B) thinner
  - C) longer
  - D) shorter
10. The LD<sub>50</sub> of a pesticide indicates:
- A) the amount of the pesticide required to kill half of a test population of the test subject
  - B) the time before re-entry into a chemically treated area
  - C) the amount of chemical needed for effective pest control
  - D) none of the above
11. Pesticide toxicity is measured in LD<sub>50</sub> or LC<sub>50</sub> numbers. Which of the following LD<sub>50</sub> numbers for pesticides is the most toxic?
- A) 295 mg/kg
  - B) 1217 mg/kg
  - C) 34 mg/kg
  - D) 4,237 mg/kg
12. The planned area within a floral design, which is devoid of flowers, foliage or other objects, but is still integral to the design is known as \_\_\_\_\_.
- A) the focal area
  - B) positive space
  - C) negative space
  - D) all of the above

13. The placement of materials at different levels within and around a floral arrangement helps to establish \_\_\_\_\_.  
A) pattern C) depth  
B) form D) balance
14. With mat irrigation, water moves by \_\_\_\_\_ from the mat into the root substrate in the pot to maintain constant moisture.  
A) zero-leaching  
B) capillary action  
C) xeri-action  
D) overhead
15. The cost of the plant materials (i.e. cost of seeds, cuttings, bulbs, or other plant propagules) would be examples of \_\_\_\_\_ costs on a financial planning sheet.  
A) wholesale C) fixed  
B) overhead D) direct
16. Achromatic, monochromatic, analogous and complementary are a few of the classically recognized \_\_\_\_\_.  
A) hues  
B) color values  
C) color harmonies  
D) none of the above
17. When propagating asexually, roses can be reproduced from \_\_\_\_\_.  
A) vegetative cuttings  
B) budded plants  
C) grafted plants  
D) all of the above.
18. Soil pH is based on the concentration of \_\_\_\_\_ ions in the soil.  
A) calcium C) oxygen  
B) hydrogen D) sulfur
19. Which of these describes edema in geraniums?  
A) water soaked blisters generally on the underside of the leaf  
B) swelling of the stem of the plant  
C) no visual effects to the foliage of the plant  
D) root disorder causing the demise of the plant

20. Which of the following is NOT a part of the pistil of the plant?
- A) Style
  - B) Ovary
  - C) stigma
  - D) filament
21. The \_\_\_\_\_ phase begins when a plant's seed germinates and grows, producing leaves, stems, and roots.
- A) annual
  - B) dormancy
  - C) reproductive
  - D) vegetative
22. The tiny pores in the epidermis of a leaf through which gas enters and escapes are \_\_\_\_\_.
- A) Cuticle
  - B) Petiole
  - C) stipule
  - D) stomata
23. The process of a plant losing water through the leaves in the form of water vapor is referred to as \_\_\_\_\_.
- A) dehydration
  - B) photosynthesis
  - C) respiration
  - D) transpiration
24. The waxy coating, called the \_\_\_\_\_, serves to prevent excessive water loss from the leaf tissues.
- A) axil
  - B) blade
  - C) cuticle
  - D) vein
25. Lime furnishes \_\_\_\_\_, one of the most important of the macro food elements.
- A) potassium
  - B) phosphorus
  - C) sulfur
  - D) calcium
26. Auxin is responsible for apical dominance in plants. Auxin is produced in three places in the plant located in the
- A) main stem, older leaves, and flowers
  - B) flower buds, leaf buds, and fruit
  - C) leaf petiole, shoot tips, and main older roots
  - D) Shoot tips, young leaf blades, and root tips
27. A complete fertilizer is recommended for a greenhouse crop. Which fertilizer analysis below is NOT a complete fertilizer?
- A) 16-4-8
  - B) 10-0-10
  - C) 5-10-10
  - D) 17-17-17

28. Mass flowers include all of the following except:
- A) chrysanthemums
  - B) baby's Breath
  - C) carnations
  - D) zinnias
29. Two hues directly opposite each other on the color wheel are \_\_\_\_\_ colors.
- A) diadic
  - B) monochromatic
  - C) polychromatic
  - D) complementary
30. Broken, implied, and continuous are all part of which element of floral design?
- A) space
  - B) line
  - C) color
  - D) texture
31. Light inside a greenhouse is measured in \_\_\_\_\_.
- A) solar energy
  - B) foot light
  - C) foot candles
  - D) solar candles
32. Poinsettias require a \_\_\_\_\_ to produce colored bracts.
- A) short day photoperiod
  - B) long day photoperiod
  - C) cool day temperature regime
  - D) cool night temperature regime
33. Thrips can be effectively managed in the greenhouse by using:
- A) a biological control such as the predator 'swirski mite'
  - B) a chemical control such as the insecticide spinosad
  - C) screening over vents and other openings
  - D) all of the above
34. An insect \_\_\_\_\_ generally does not kill insects, but instead drives them away before they attack the plant.
- A) attractant
  - B) pheromone
  - C) repellent
  - D) sterilant
35. To help identify plants, flower forms are grouped as to their position or arrangement on a stem. The flower position or arrangement is known as
- A) flower inflorescence
  - B) perfect flower
  - C) imperfect flower
  - D) flower calyx

36. After pollination and fertilization, the flower petals begin to drop and the ovary and other surrounding parts enlarge and develop into a \_\_\_\_\_.  
A) fruit  
B) leaf  
C) new flower  
D) raceme
37. Which of the following diseases does NOT affect the root system of plants?  
A) Botrytis  
B) Pythium  
C) Rhizoctonia  
D) Phytophthora
38. The Environmental Protection Agency establishes toxicity categories for pesticides based on how soon one can reenter the area after it has been treated with the pesticide. Which toxicity level can be reentered immediately after pesticide application?  
A) Toxicity 1  
B) Toxicity 2  
C) Toxicity 3  
D) Toxicity 4
39. In order to preserve foliage in a more natural, pliable state, place stems in:  
A) glycerin  
B) bleach  
C) herbicidal soap  
D) borax
40. Greenhouse glazing is:  
A) material sprayed on the roof of a greenhouse to change light intensity  
B) the transparent cover of the greenhouse frame  
C) the amount of solar energy that reaches the plants in a greenhouse  
D) a measure of heat loss from a greenhouse
41. When water is not applied frequently enough, plants wilt and  
A) photosynthesis is slowed.  
B) plant growth is slowed.  
C) cell production is reduced.  
D) all of the above
42. Plants are divided into  $C_3$  and  $C_4$  groups.  $C_4$  plants are differentiated from  $C_3$  plants by which of the following?  
A)  $C_4$  plants flower in shades of red whereas  $C_3$  plants do not  
B)  $C_4$  plants have a higher relative photosynthesis rate  
C)  $C_4$  plants are not as efficient at using carbon dioxide  
D)  $C_4$  plants cannot function as well under high temperature and light conditions

43. A plant that is genetically identical to the parent plant is known as a \_\_\_\_\_.  
A) clone  
B) seedling  
C) replica  
D) hybrid
44. Cross-pollination occurs when pollen grains from the flowers on one plant transfer to the \_\_\_\_\_ of flowers on another plant.  
A) anther  
B) ovary  
C) stigma  
D) style
45. \_\_\_\_\_ is a process of events whereby the seed embryo goes from a dormant state to an actively growing state.  
A) broadcasting  
B) fertilization  
C) germination  
D) pollination
46. Some seeds have a hard seed coat that must be soaked or scratched before the seeds are able to germinate. This process is called \_\_\_\_\_.  
A) drenching  
B) forcing  
C) scarification  
D) stratification
47. The \_\_\_\_\_ is the food storage tissue in the seed that nourishes the plant during germination.  
A) embryonic root  
B) endosperm  
C) seed coat  
D) seed leaf
48. \_\_\_\_\_ is a gray-white soil mix material of volcanic origin that is most commonly used to improve aeration of growing media.  
A) Coir  
B) Peat moss  
C) Perlite  
D) Vermiculite
49. The ability of a plant to withstand colder temperatures is known as \_\_\_\_\_.  
A) cold-sensitive  
B) heat-tolerant  
C) hardiness  
D) morphology
50. \_\_\_\_\_ are plants characterized by one cotyledon in the seedling stage, flower parts in threes or multiples thereof, and parallel leaf venation.  
A) Dicots  
B) Evergreens  
C) Monocots  
D) Perennials



**2016 National FFA Floriculture CDE  
General Knowledge Exam  
ANSWER KEY**

| <b>Question #</b> | <b>Answer</b> | <b>Reference</b>  | <b>Page #</b> | <b>Corresponding Standards</b>   |
|-------------------|---------------|---|---------------|--|
| 1                 | C             | Ball Red Book   | 67            | ABS.07.01,<br>PS.01.03.01.c,<br>PS03.02.05.a, and<br>PS.01.03.04.c   |
| 2                 | D             | Ball Red Book   | 85            | PS.01.03.03.c and<br>PS.03.02.05.a   |
| 3                 | A             | Introduction to Floriculture                                      | 34            | PS.03.03.01.b  |
| 4                 | B             | Ball Red Book   | 34            | PS.02.03.02.a  |
| 5                 | B             | The AIFD Guide to Floral Design                                   | 99            | PS.04.01.01.c and<br>PS.04.01.02.c   |
| 6                 | B             | The AIFD Guide to Floral Design                                   | 106           | PS.04.01.02.c  |
| 7                 | C             | The AIFD Guide to Floral Design                                   | 112           | PS.04.01.01.c and<br>PS.04.01.02.c   |
| 8                 | B             | Nelson. Greenhouse Operation & Management, 7 <sup>th</sup><br>ed. | 381-383       | PS.02.03.0.a   |
| 9                 | B             | Scace and DelPrince. Principles of Floral Design                  | 60            | PS.04.02.02.a  |
| 10                | A             | Nelson. Greenhouse Operation & Management, 7 <sup>th</sup><br>ed. | 432-433       | PS.03.03.04.a  |
| 11                | C             | Introductory Horticulture, 7 <sup>th</sup> edition, Delmar        | 177           | BS.02.04.01.b,<br>CS.03.01.01.c, and<br>CS.03.01.02.c  |
| 12                | C             | The AIFD Guide to Floral Design                                   | 129           | PS.04.01.01.c and<br>PS.04.01.02.c   |
| 13                | C             | The AIFD Guide to Floral Design                                   | 125           | PS.04.01.01.c and<br>PS.04.01.02.c   |
| 14                | B             | Greenhouse Operations and Maintenance, 6 <sup>th</sup><br>edition | 283           | PS.01.03.03.b  |
| 15                | D             | Nelson. Greenhouse Operation & Management, 7 <sup>th</sup><br>ed  | 572-576       | CRP.03.02.01.a and<br>CRP.03.02.02.a   |
| 16                | C             | The AIFD Guide to Floral Design                                   | 107           | PS.04.01.02.c  |
| 17                | D             | Introduction to Floriculture                                      | 75-76         | PS.03.01.03.c  |
| 18                | B             | Introduction to Horticulture, Revised 4 <sup>th</sup> edition     | 147           | ESS.01.01.01.c,<br>PS.03.02.05.c, and<br>PS.03.02.06.b   |
| 19                | A             | Introduction to Floriculture                                      | 472           | CRP.07.01.01.c,<br>CRP.07.01.02.b,<br>CRP.08.01.01.c,<br>NRS.01.02.03.b,<br>NRS.04.02.01.b, and<br>PS.03.02.01.b |

|    |   |  |            |   |
|----|---|--|------------|---|
| 20 | D | Introduction to Horticulture, 3 <sup>rd</sup> Edition                | 83         | PS.02.03.05.c and PS.03.01.01.b   |
| 21 | D | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed; Interstate | 75         | PS.01.01.01.c   |
| 22 | D | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed; Interstate | 78         | PS.01.02.04.c   |
| 23 | D | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed; Interstate | 81         | PS.01.03.02.c   |
| 24 | C | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed; Interstate | 81         | PS.01.02.04.c   |
| 25 | D | Introductory Horticulture, 6 <sup>th</sup> edition                   | 42         | PS.01.01.01.c, PS.01.01.02.c, and PS.03.02.05.c   |
| 26 | D | Ball Red Book, Crop Production, Volume 2                             | 91         | PS.02.02.04.c and PS.03.02.05.c   |
| 27 | B | Introduction to Horticulture, 3 <sup>rd</sup> Edition                | 139        | PS.01.03.01.c, PS.01.03.03.c, and PS.01.03.06.c   |
| 28 | B | Scace and DelPrince. Principles of Floral Design                     | 144-145    | PS.04.02.01.b   |
| 29 | D | The AIFD Guide to Floral Design                                      | 108        | PS.04.01.02.c   |
| 30 | B | The AIFD Guide to Floral Design                                      | 99         | PS.04.01.02.c   |
| 31 | C | Introduction to Horticulture, Revised 4 <sup>th</sup> edition        | 364        | PS.02.03.01.a   |
| 32 | A | Nelson. Greenhouse Operation & Management, 7 <sup>th</sup> ed.       | 354-355    | PS.01.01.01.b   |
| 33 | D | Nelson. Greenhouse Operation & Management, 7 <sup>th</sup> ed        | 401-416    | PS.03.03.01.c   |
| 34 | C | Introductory Horticulture; 8 <sup>th</sup> Ed; Delmar                | 198        | PS.03.03.03.c, PS.03.03.01.c, and PS.03.03.02.c   |
| 35 | A | Introduction to Horticulture, Revised 4 <sup>th</sup> edition        | 95         | PS.01.02.05.c and PS.01.01.01.c   |
| 36 | A | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed; Interstate | 97         | PS.01.01.05.c and PS.01.02.06.c   |
| 37 | A | Ball Red Book, Crop Production, Volume 2                             | Chapter 10 | CS.04.01.02.b, CRP.07.01.01.c, CRP.07.01.01.c, CRP.07.02.02.b, CRP.08.01.01.c, NRS.01.02.03.b, and NRS.04.02.01.b |
| 38 | D | Introductory Horticulture, 7 <sup>th</sup> edition, Delmar           | 180        | BS.02.04.01.b, CS.03.01.01.c, CS.03.01.02.c, CS.03.02.01.c, CS.03.02.02.c, CS.03.03.01.b,                         |

|    |   |   |         |  |
|----|---|---|---------|--|
|    |   |   |         | CS.02.02.02.c, and<br>PS.03.03.04.b  |
| 39 | A | Scace and DelPrince. Principles of Floral Design                        | 441-444 | PS.03.05.04.a  |
| 40 | B | Ball Red Book, Greenhouse & Equipment, Volume 1                         | 35      | CS.01.02.01.b,<br>CS.01.02.02.b,<br>CS.02.02.02.c,<br>CS.02.02.03.b,<br>CRP.11.01.01.b,<br>CRP.11.01.02.b,<br>ESS.01.02.02.a,<br>PS.03.02.06.b |
| 41 | D | Greenhouse Operations and Maintenance, 6 <sup>th</sup><br>edition       | 257     | ABS.04.03.02.a,<br>CS.01.01.02.b,<br>CS.02.01.02.c   |
| 42 | B | Introduction to Horticulture, 3 <sup>rd</sup> Edition                   | 69      | PS.01.01.03.c,<br>PS.02.03.01.c, and<br>PS.02.03.02.c  |
| 43 | A | Introduction to Horticulture, Revised 4 <sup>th</sup> edition           | 111     | PS.01.01.01.c  |
| 44 | C | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed;<br>Interstate | 94      | PS.03.01.01.a  |
| 45 | C | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed;<br>Interstate | 98      | PS.01.01.01.c and<br>PS.01.02.06.c   |
| 46 | C | Introductory Horticulture; 8 <sup>th</sup> Ed; Delmar                   | 76      | PS.01.02.06.c  |
| 47 | B | Introductory Horticulture; 8 <sup>th</sup> Ed; Delmar                   | 76      | PS.01.02.06.c  |
| 48 | C | Introductory Horticulture; 8 <sup>th</sup> Ed; Delmar                   | 78      | PS.02.02.01.b and<br>PS.02.02.02.b   |
| 49 | C | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed;<br>Interstate | 73      | PS.01.02.03.c  |
| 50 | C | Introduction to Horticulture; Revised 4 <sup>th</sup> Ed;<br>Interstate | 73      | PS.01.01.01.c  |



**2017 National FFA Floriculture  
Career Development Event  
General Knowledge Exam**



**Directions:** Select the best answer for each question and mark your selection on the separate scantron sheet provided. *Mark answers in the General Knowledge Exam section on the scantron located in the left side of the scantron.*

1. The following is not a characteristic of an insect:
  - A. Three segmented body
  - B. Six legs
  - C. Two pairs of wings
  - D. Two tentacles
  
2. The following is not used to measure greenhouse crop nutrient levels:
  - A. Soil tests
  - B. Soluble salts meter
  - C. Foliar analysis
  - D. Tensiometer
  
3. Light intensity can be measured in units of:
  - A. Nanometers
  - B. Micrometers
  - C. Foot-candles
  - D. Newtons
  
4. A \_\_\_\_\_ results from crossing parents of different genotype for a trait.
  - A. clone
  - B. scion
  - C. species
  - D. hybrid
  
5. The \_\_\_\_\_ transports water and nutrients from the roots to other parts of the plant.
  - A. phloem
  - B. xylem
  - C. pith
  - D. cambium
  
6. *Crassula argentea* is the botanical name for Jade Plant. *Crassula* is the \_\_\_\_\_ of the plant.
  - A. family
  - B. cultivar
  - C. species
  - D. genus

7. Indolebutyric acid (IBA) is commonly used to:

- A. control insects
- B. control diseases
- C. raise soil pH
- D. promote rooting of cuttings

8. Signal words on labels alert the user to the toxicity of a pesticide. Which of the following words is not used as a signal word?

- A. DANGER
- B. HAZARDOUS
- C. CAUTION
- D. WARNING

9. Which of the following flower parts is contained in the pistil?

- A. sepal
- B. receptacle
- C. anther
- D. style

10. \_\_\_\_\_ is the process of softening or breaking a seed coat in order to overcome seed dormancy.

- A. Scarification
- B. Stratification
- C. Ratification
- D. Augmentation

11. Prior to transplanting, seedlings should be \_\_\_\_\_.

- A. kept in the dark.
- B. grown at a temperature of 90°F.
- C. hardened-off
- D. allowed to dampen-off.

12. In order to lower the pH of a soil, materials containing \_\_\_\_\_ are used.

- A. dolomite
- B. lime
- C. hydrated lime
- D. sulfur

13. Which of the following nutrients would be retained more by a root medium with high cation exchange capacity (CEC)?

- A. Potassium
- B. Phosphate
- C. Nitrate
- D. Sulfate

14. Soluble salts in medium is measured by electrical conductivity (EC). An appropriate EC range for flowering potted crops using the pour through extraction method is:

- A. 0.25mS/cm to 0.75 mS/cm
- B. 0.5 mS/cm to 2.0 mS/cm
- C. 1.0 mS.cm to 4.6 mS/cm
- D. 3.0 mS.cm to 6.2 mS/cm

15. Soilless medium can be amended with which of the following materials prior to potting to provide magnesium?

- A. Epsom Salt
- B. Gypsum
- C. Micronutrients mix
- D. Triple superphosphate

16. The Worker Protection Standards (WPS) developed for agriculture pesticides was implemented by what government agency?

- A. United States Department of Agriculture
- B. Agriculture Cooperative Extension Service
- C. Department of Homeland Security
- D. Environmental Protection Agency

17. Cytokinins are responsible for cell division and differentiation in the plant. Cytokinins are produced in what plant part?

- A. Lateral shoots
- B. Roots
- C. Terminal shoots
- D. Cambium

18. Which of the following auxins is naturally produced in the plant?

- A. Indole-3-acetic acid (IAA)
- B. Naphthalene acetic acid (NAA)
- C. Indolepropionic acid (IPA)
- D. Indole-3-butyric acid (IBA)

19. Carbon is an essential plant element. Plants obtain carbon from carbon dioxide gas (CO<sub>2</sub>). Air on the average contains what percent CO<sub>2</sub>?

- A. 0.30 percent
- B. 30 percent
- C. 0.03 percent
- D. 3 percent

20. A plant's growth response to temperature is called:

- A. Vernalization
- B. Thermotropism
- C. Photoperiodism
- D. Thermoperiodic

21. Which of the following is not an advantage of hydroponics?

- A. Plant nutrition is completely controlled through prepared nutrient solutions.
- B. Yield per unit area is reduced since plants may be planted closer together.
- C. Roots do not spread as much because H<sub>2</sub>O and nutrients are pumped directly to the plant.
- D. The need for weed, disease, and insect control is greatly reduced due to the absence of soil.

22. Allelopathy is a plant phenomenon that does the following to plants:

- A. Prevents the formation of bacteria organisms
- B. Stops fungus organisms from growing on plants
- C. Creates a mechanism within the plant to induce flowering
- D. Production of a chemical compound by one plant that slows down or stops the growth of another plant

23. Pesticides can be purchased for use in the greenhouse as a wettable powder (WP) or as an emulsifiable concentrate (EC). Which of the following is true about these two pesticide formulations.

- A. WP are diluted (dissolved) in water and can settle during application while EC are suspended in water and do not settle during application.
- B. There is no difference in the two formulations
- C. EC must be added to water in correct rates where WP are applied as it exist in the container
- D. WP and EC both are purchased as dry formulations

24. Tulle in florist work is:

- A. The ribbon added to any floral piece being created
- B. Florist netting that can add color, texture, and support for some flowers
- C. Silk leaves used instead of fresh foliage in corsages
- D. Other accessories used in corsages such as pearl sprays, rhinestones, butterflies, or chenille letters

25. The country that is the leading exporter of cut flowers to the United States floral industry is:

- A. Holland
- B. Ecuador
- C. Mexico
- D. Columbia

26. The climatic conditions that are needed for carnations to be grown successfully as a cut flower include?

- A. Low light intensity, mild climate requiring minimal amount of protection, uniform temperature and day length
- B. High light intensity, mild climate requiring minimal amount of protection, and cold nights and hot days
- C. High light intensity, mild climate requiring minimal amount of protection, uniform temperature and day length
- D. Low light intensity, mild climate requiring minimal amount of protection, and short days

27. In growing chrysanthemums as cut flowers the plant requires which of the following conditions to maintain a vegetative state of growth?

- A. Day length at less than 9.5 hours growing at 60 degrees
- B. Day length between 11 and 12 hours growing at 80 degrees
- C. Day length at 10.5 hours growing at 60 degrees
- D. Day length greater than 14.5 hours growing at 60 degrees

28. The advantages of an ebb and flood irrigation system in the greenhouse are:

- A. Labor savings
- B. Reduced water and nutrient use
- C. Lower pesticide use
- D. All of the above

29. Which of the following is not a plant hormone that can be used as a plant growth regulator?

- A. ethylene
- B. anthocyanin
- C. abscisic acid
- D. gibberellin

30. The best root medium pH for a majority of spring bedding plants, but not including petunias or geraniums, is:

- A. 4.5 to 5.5
- B. 5.5 to 6.5
- C. 6.5 to 7.5
- D. 7.5 to 8.5

31. In grafting, such as for grafted tomato transplants,

- A. the scion is the top part of the graft and the rootstock is the lower part
- B. the rootstock is the top part of the graft and the scion is the lower part
- C. the scion often imparts disease resistance to the grafted plant
- D. the rootstock often provides desirable fruiting characteristics



32. The pistil is
- A. the female part of the flower
  - B. the male part of the flower
  - C. contains both the male and female parts of a flower
  - D. becomes seeds
33. The pH of the root medium indicates to a greenhouse grower its
- A. volumetric water content
  - B. salt ions dissolved in water
  - C. hydrogen ion concentration
  - D. organic matter content
34. On a financial planning sheet, the costs of the plant materials (i.e. purchase cost of seeds, cuttings, bulbs, or other plant propagule) would be examples of:
- A. wholesale costs
  - B. overhead costs
  - C. fixed costs
  - D. direct costs
35. A 6-inch 'azalea pot' has an inside rim diameter of \_(i)\_inches and a depth of \_\_(ii)\_\_inches.
- A. (i) 6-inches, (ii) 8 inches
  - B. (i) 6-inches, (ii) 6-inches
  - C. (i) 6-inches, (ii) 4.5-inches
  - D. (i) 6-inches, (ii) 3-inches
36. Respiration:
- A. produces sugars in the plant
  - B. occurs only during the night
  - C. releases oxygen to the atmosphere
  - D. none of the above
37. What type of environment do poinsettias require to produce red bracts?
- A. short day photoperiod
  - B. long day photoperiod
  - C. cool day temperature regime
  - D. cool night temperature regime
38. Botanical names are written in:
- A. English
  - B. Latin
  - C. Greek
  - D. German

39. The greenhouse insect pest problem of aphids can be effectively managed by using:
- A. biological control such as lady beetles
  - B. chemical control such as the use of an insecticidal soap
  - C. the cultural control of washing them off the plant with a strong stream of water
  - D. all of the above
40. In order to preserve foliage in a more natural, pliable state, place stems in:
- A. glycerin
  - B. bleach
  - C. antifreeze
  - D. borax
41. Which glazing material for greenhouses allows the greatest light transmittance?
- A. fiberglass
  - B. polyethylene
  - C. glass
  - D. polycarbonate
42. To pasteurize a container root medium, heat it to:
- A. 120 degrees for 30 minutes
  - B. 120 degrees for 60 minutes
  - C. 180 degrees for 30 minutes
  - D. 180 degrees for 60 minutes
43. A guideline for estimating the size for a floral design for a defined space is known as
- A. Rule of Thirds
  - B. Third Rule
  - C. The Golden Ratio
  - D. The Golden Rule
44. The term variegated means?
- A. Leaves can only be both yellow and green.
  - B. Leaves have patches, stripes, or marks of different colors.
  - C. Leaves have only stripes of different colors.
  - D. Leaves are solid green with no other colors.
45. Systemic dyeing occurs by plants absorbing color through the
- A. Petal
  - B. Leaf
  - C. Sepal
  - D. Stem



**Figure 1**

46. A Freesia (**Figure 1**) is an example of a \_\_\_\_\_.
- A. Bulb
  - B. Tuber
  - C. Corm
  - D. Rhizome
47. \_\_\_\_\_ is the single most important element to keep flowers fresh after delivery from a supplier.
- A. Air/ Ventilation
  - B. Water
  - C. Light
  - D. Cool Temperatures
48. The three primary ingredients in floral preservatives are sugar, \_\_\_\_\_, and an acidifier.
- A. Biocide
  - B. Salt
  - C. Chlorophyll
  - D. Iodine
49. The sense of stability in a design both physically and visually is known as
- A. Rhythm
  - B. Balance
  - C. Scale
  - D. Unity
50. A floral design with a strong sense of \_\_\_\_\_ shows an organization of elements so they appear to belong together.
- A. Rhythm
  - B. Balance
  - C. Scale
  - D. Unity

**2017 National FFA Floriculture CDE  
General Knowledge Exam  
ANSWER KEY**

| <b>Question #</b> | <b>Answer</b> | <b>Reference</b>   | <b>Page #</b> | <b>Corresponding Standards</b> |
|-------------------|---------------|--|---------------|--------------------------------|
| 1                 | D             | Introduction to Horticulture, Interstate                             | 165           | NRS.01.02.03.b                 |
| 2                 | D             | Introduction to Horticulture, Interstate                             | 226           | PS.01.03.01.c                  |
| 3                 | C             | Introduction to Horticulture, Interstate                             | 719           | PS.01.01.01.c                  |
| 4                 | D             | Introduction to Horticulture, Interstate                             | 720           | PS.02.01.02.c                  |
| 5                 | B             | Introductory Horticulture, Delmar                                    | 24            | PS.02.02.03.c                  |
| 6                 | D             | Introductory Horticulture, Delmar                                    | 13            | PS.02.01.02.c                  |
| 7                 | D             | Introductory Horticulture, Delmar                                    | 52            | PS.01.03.01.c                  |
| 8                 | B             | Introductory Horticulture, Delmar                                    | 165           | BS.02.04.02.a                  |
| 9                 | D             | Introduction to Horticulture, Interstate                             | 83            | PS.02.02.05.c                  |
| 10                | A             | Introduction to Horticulture, Interstate                             | 98            | PS.02.02.06.b                  |
| 11                | C             | Introduction to Horticulture, Interstate                             | 100           | PS.02.02.06.b                  |
| 12                | D             | Introduction to Horticulture, Interstate                             | 141           | PS.01.03.02.c                  |
| 13                | A             | Introduction to Horticulture, Interstate                             | 141           | PS.01.03.01.c                  |
| 14                | C             | Ball Red Book, Ball Publishing, 17 <sup>th</sup> edition, volume 2   | 35            | PS.01.03.01.c                  |
| 15                | A             | Ball Red Book, Ball Publishing, 17 <sup>th</sup> edition, volume 2   | 39            | PS.01.03.01.c                  |
| 16                | D             | Ball Red Book, Ball Publishing, Greenhouse and Equipment             | 209           | BS.02.04.01.b                  |
| 17                | B             | Floriculture, Interstate Publishers                                  | 102           | PS.02.02.01.b                  |
| 18                | A             | Greenhouse Operation and Mgt, Prentice Hall, 4 <sup>th</sup> edition | 395           | PS.01.03.01.c                  |
| 19                | C             | Greenhouse Operation and Mgt, Prentice Hall, 4 <sup>th</sup> edition | 347           | NRS.01.02.05.a                 |
| 20                | B             | Introduction to Horticulture, Interstate, 2 <sup>nd</sup> edition    | 232           | PS.01.01.02.c                  |
| 21                | B             | Introduction to Horticulture, Interstate, 2 <sup>nd</sup> edition    | 109           | PS.03.02.07.b<br>PS.01.01.03.c |
| 22                | D             | Introduction to Horticulture, Delmar, 7 <sup>th</sup> edition        | 60            | PS.01.03.01.c                  |
| 23                | A             | Introduction to Horticulture, Delmar, 7 <sup>th</sup> edition        | 186           | PS.03.03.04.b                  |
| 24                | B             | Floriculture-Greenhouse and Floral Design, Interstate                | 423           | PS.04.02.02.c                  |
| 25                | D             | Floriculture-Greenhouse and Floral Design, Interstate                | 235           | CS.01.01.02.b                  |

|    |   |  |         |                                  |
|----|---|--|---------|----------------------------------|
| 26 | C | Introduction to Floriculture, Academic Press             | 46      | PS.03.05.04.b                    |
| 27 | D | Introduction to Floriculture, Academic Press             | 15      | PS.03.05.03.b                    |
| 28 | D | Ball Red Book, Ball Publishing, Greenhouse and Equipment | 75      | PS.01.01.03.c                    |
| 29 | B | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 381-383 | PS.01.03.06.c<br>PS.02.03.0.a    |
| 30 | B | Greenhouse Operation & Management, 7 <sup>th</sup> ed.   | 207     | PS.01.03.02.c                    |
| 31 | A | Greenhouse Operation & Management, 7 <sup>th</sup> ed.   | 207     | PS.03.01.03.c                    |
| 32 | A | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 432-433 | PS.02.02.05.c<br>PS.03.03.04.a   |
| 33 | C | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 214-215 | PS.01.03.03.b<br>PS.01.03.02.c   |
| 34 | D | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 572-576 | CRP.03.02.01.a<br>CRP.03.02.02.a |
| 35 | C | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 587     | CRP.11.01.02.b                   |
| 36 | D | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 319     | PS.02.03.01.a<br>PS.02.03.02.c   |
| 37 | A | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 354-355 | PS.01.01.01.b<br>PS.01.01.01.c   |
| 38 | B | Introduction to Horticulture, Interstate                 | 74      | PS.02.01.02.c                    |
| 39 | D | Greenhouse Operation & Management, 7 <sup>th</sup> ed    |         | PS.03.03.01.c<br>PS.03.03.02.b   |
| 40 | A | Principles of Floral Design, Scace and DelPrince         | 441-444 | PS.03.05.04.b                    |
| 41 | C | Introduction to Horticulture, Interstate                 | 41      | PS.01.01.01.c                    |
| 42 | C | Greenhouse Operation & Management, 7 <sup>th</sup> ed    | 238     | PS.01.02.01.c                    |
| 43 | A | Principles of Floral Design, G-W Publisher               | 121     | PS.04.02.01.c                    |
| 44 | B | Principles of Floral Design, G-W Publisher               | 210     | NRS.01.02.02.b                   |
| 45 | D | Principles of Floral Design, G-W Publisher               | 141     | PS.02.02.05.c                    |
| 46 | C | Principles of Floral Design, G-W Publisher               | 87      | PS.02.02.05.c                    |
| 47 | B | Principles of Floral Design, G-W Publisher               | 100     | PS.03.05.04.b                    |
| 48 | A | Principles of Floral Design, G-W Publisher               | 102     | PS.03.05.04.b                    |
| 49 | B | Principles of Floral Design, G-W Publisher               | 115     | PS.04.02.01.c                    |
| 50 | D | Principles of Floral Design, G-W Publisher               | 127     | PS.04.02.01.c                    |



**2018 National FFA Floriculture  
Career Development Event  
General Knowledge Exam**



**Directions:** Select the best answer for each question and mark your selection on the separate scantron sheet provided. *Mark answers in the General Knowledge Exam section on the scantron located in the left side of the scantron.*

1. A circular design does not have \_\_\_\_\_.
  - a. Balance
  - b. Filler flowers
  - c. A focal point
  - d. Massing flowers
2. Most fungal diseases grow best in \_\_\_\_\_.
  - a. Dry, arid air
  - b. Low moisture conditions
  - c. High moisture conditions
  - d. Seasons with drought
3. Mums are considered a short-day crop; that is, the plant sets flower buds and blooms only when \_\_\_\_\_.
  - a. Nights and days are long
  - b. Nights are long and days are short
  - c. Nights are short and days are long
  - d. Nights and days are short
4. During respiration, plants \_\_\_\_\_.
  - a. Use the sun's energy
  - b. Produce sugars
  - c. Use oxygen
  - d. Form complex compounds
5. If green plants show a \_\_\_\_\_ color, this suggests a nitrogen deficiency.
  - a. White
  - b. Yellow
  - c. Dark green
  - d. Purple

6. \_\_\_\_\_ exists when the terminal bud produces hormones that inhibit or prevent the growth of axillary buds on the same shoot.
- Cell dominance
  - Root dominance
  - Atypical dominance
  - Apical dominance
7. Floral foam is sufficiently soaked when \_\_\_\_\_.
- It changes to a darker shade of green
  - The foam floats back to the top of the water
  - Particles of the foam begin to float in the water
  - Air bubbles are no longer coming out of the foam
8. \_\_\_\_\_ seeding is when seeds are sown in a separate place from where the plants will eventually grow to maturity.
- Direct
  - Sideways
  - Indirect
  - Top
9. \_\_\_\_\_ is used to accentuate the flowers and colors used in a design.
- Harmony
  - Unity
  - Accent
  - Repetition
10. \_\_\_\_\_ are chemicals used to control snails and slugs.
- Fungicides
  - Rodenticides
  - Molluscicides
  - Nematocides
11. Small green insects with piercing mouth parts are \_\_\_\_\_.
- Aphids
  - Mealybugs
  - Scale
  - Mites

12. The recommended daytime temperature range for indoor plants is \_\_\_\_\_.  
a. 60-70° F  
b. 55-80° F  
c. 60-85° F  
d. 50-85° F
13. \_\_\_\_\_ is one of the basic floral design shapes.  
a. Fan  
b. Diagonal  
c. Oval  
d. Circular
14. In the list of flowers/materials below, which list is not all line flowers:  
a. Liatris, gladiolus, snapdragons, cattail  
b. Bells of Ireland, carnations, branches, snapdragons  
c. Liatris, delphinium, gladiolus, bells of Ireland  
d. Foxglove, branches, lupine, cattail
15. Joe placed a box of apples in his flower cooler. The next day he saw some cut flowers looking bad and deteriorating. Could the apples have caused this problem?  
a. Yes, fruit produces ethylene gas which can cause flowers to senesce.  
b. Yes, diseases on fruit are easily transferred to cut flowers causing their deterioration.  
c. No, storing fruit in a cooler with cut flowers is never a problem. The flowers deteriorated from some other pathogen,  
d. No, the apples could not have caused damage to the cut flowers in such a short time.
16. Floral foam should be hydrated before use in a flower arrangement. Which of these methods is the best for accomplishing the soaking of the foam?  
a. The foam is forced by weight to be totally immersed in the water  
b. The foam is pushed down into the water by hand  
c. The foam is allowed to float on the surface until it is soaked  
d. The foam is placed in the bottom of a water reservoir one-half of the height of the block of foam



17. A wholesale greenhouse operation has grown 4,250 six inch pots of poinsettias. At the end of the Christmas season, 3,789 pots were sold. The wholesale selling price was \$3.85 per pot. The retail businesses sold the pots of poinsettias for \$6.89. The cost per pot grown was \$2.16 per pot. What was the net return on the poinsettia crop to the greenhouse operation?
- \$14,587.65
  - \$6,403.41
  - \$5,407.65
  - \$11,518.56
18. You work for a retail flower shop in Bloomington, Indiana. You are figuring a bill for a customer. In Bloomington the state sales tax is 5%, the city sales tax is 0.5%, and the county sales tax is 1%. The cost of the arrangement for the customer is \$72.45. What is the total of the customer's bill?
- \$72.45
  - \$72.81
  - \$77.16
  - \$76.07
19. The wire services that a retail flower shop can use are:
- Society of American Florists, FTD, and Teleflora
  - FTD, Teleflora, Florafax, American Floral Services, and Carik
  - Florafax, FTD, American Floral Services
  - American Floral Services, American Academy of Floriculture, Florafax, and Carik
20. In growing potted chrysanthemums, the desirable temperature range for flower bud initiation is:
- 62 to 65 degrees F at night
  - Above 68 degrees F at night
  - 60 to 62 degrees F at night
  - 65 to 68 degrees F at night
21. As a grower you want to use "soft" pesticides for plant pest control. Which group below includes "soft" pesticides?
- Fungicides, bactericides, insect growth regulators
  - Insect growth regulators, botanical insecticides, horticultural oils
  - Horticulture oils, insecticidal soaps, insecticides
  - Miticides, insecticidal soaps, horticulture oils
22. The place in the plant where the process of photosynthesis occurs is:
- In all plant cells
  - In all cells within the leaf
  - In green chloroplasts within cells
  - In cells in the leaf petiole

23. A solenoid valve is used in greenhouses:
- As an electrical device used to control the flow of water in greenhouses
  - As a valve controlled totally by water pressure to cut water on and off
  - As a valve controlled by temperature to cut heat on and off
  - As an electrical shut on and off system for ventilation fans
24. A manometer is used in a greenhouse to measure:
- Water pressure in an irrigation system line
  - Difference between low and high temperature
  - Air pressure between layers of plastic
  - Gas pressure in a gas heater
25. In horticulture, the term “explant” is:
- A cross between cultivars within a species
  - A plant that came from a genetic mutation
  - A plant part other than stem or leaves such as a bulb or corm
  - Small pieces of plant material used in tissue culture
26. In greenhouse plant growing a zero DIF will result in:
- Shorter plants compared to plants grown with a positive DIF
  - Taller plants compared to plants grown with a positive DIF
  - A decrease in how much light a plant receives each day
  - A wide range between daytime and nighttime temperatures in a greenhouse
27. The three secondary colors in flower arrangements are:
- Red, yellow, and blue
  - Orange, green, and violet
  - Purple, yellow, and blue
  - Green, purple, and red
28. The nutrient iron is essential in plants because:
- Iron is required for strong stems
  - Iron is required for leaf formation
  - Iron is required for root development
  - Iron is required to produce chlorophyll
29. \_\_\_\_\_ buds are found at the base of a leaf petiole and next to the stem.
- apical
  - axillary
  - dominant
  - epidermal

30. A plant with a tunicate bulb is a(n) \_\_\_\_\_.  
a. peony  
b. tulip  
c. iris  
d. Easter lily
31. Binomial classification of a plant requires a \_\_\_\_\_ and \_\_\_\_\_ for the name.  
a. genus and specific epithet  
b. family and order  
c. common and scientific component  
d. species and family
32. A tissue in a seed that provides stored food for the embryo is \_\_\_\_\_.  
a. endosperm  
b. zygote  
c. seed coat  
d. hypocotyl
33. The process of propagating plants on an agar gel or nutrient medium is known as \_\_\_\_\_.  
a. grafting  
b. budding  
c. micropropagation  
d. none of the above
34. A florists' wire with a gauge of 18 will be \_\_\_\_\_ than florists' wire with a gauge of 28.  
a. shorter  
b. longer  
c. thinner  
d. thicker
35. On a financial planning sheet, the costs of the plant materials (i.e. purchase cost of seeds, cuttings, bulbs, etc.) would be examples of \_\_\_\_\_.  
a. wholesale costs  
b. overhead costs  
c. direct costs  
d. fixed costs

36. Floral preservatives for cut flowers should contain all of the following except \_\_\_\_\_:
- a. nitrogen fertilizer
  - b. a sugar source
  - c. an acidifier
  - d. a microbiocide
37. What type of environment do chrysanthemums require to produce flowers?
- a. short day photoperiod
  - b. long day photoperiod
  - c. cool day temperature regime
  - d. cool night temperature regime
38. Injecting dilute sulfuric acid into the irrigation system during greenhouse production will:
- a. increase the root medium pH
  - b. decrease the root medium pH
  - c. decrease and then increase the root medium pH
  - d. not change root medium pH
39. What are the organelles that capture and process the light that a plant intercepts?
- a. mitochondria
  - b. nuclei
  - c. chlorophylls
  - d. chloroplasts
40. The process of \_\_\_\_\_ is when a plant loses water through stomates.
- a. transpiration
  - b. translocation
  - c. transduction
  - d. acclimatization
41. Which glazing material for greenhouses allows the lowest light transmittance?
- a. fiberglass
  - b. polyethylene
  - c. double-layer polyethylene
  - d. polycarbonate

42. The calculated difference between the day temperature and night temperature in a greenhouse production situation is known as \_\_\_\_\_.  
a. HID  
b. STS  
c. DIF  
d. IPM
43. Before using a chemical you should refer to the SDS or  
a. Safety Detail Sheet  
b. Safety Data Sheet  
c. Storage Detail Sheet  
d. Storage Data Sheet
44. The binomial system for naming plants is  
a. used on the North American continent only.  
b. used only in the United States.  
c. used Internationally.  
d. no longer used today.
45. Plants that have two \_\_\_\_\_ are known as dicots.  
a. nucleus  
b. cells  
c. flowers  
d. cotyledons
46. Chloroplasts contain chlorophyll that \_\_\_\_\_ green light giving plants their green color.  
a. reflect  
b. absorb  
c. produce  
d. create
47. \_\_\_\_\_ insecticides are pesticides that are translocated throughout the plant and kill any insects that feed on the plant.  
a. Insecticidal Soaps  
b. Horticulture Oils  
c. Botanical  
d. Systemic

48. When dealing with plant diseases, there must be \_\_\_\_\_ things present for any plant disease to form.
- a. one
  - b. two
  - c. three
  - d. four
49. \_\_\_\_\_ plants are plant material kept specifically for the purpose of propagation.
- a. Stock
  - b. Parent
  - c. Cutting
  - d. Hardwood
50. Grasshoppers begin their life cycle as an egg, transition into a larva, and change into an adult. This would be classified as \_\_\_\_\_ metamorphosis.
- a. complete
  - b. incomplete
  - c. holometabolous
  - d. ametabolous



**2018 National FFA Floriculture  
Career Development Event  
General Knowledge Exam  
Answer Key**



| Number | Answer | Standard(s)   |
|--------|--------|---|
| 1      | c      | <a href="#"><u>PS.04.02.01.c.</u></a>   |
| 2      | c      | <a href="#"><u>PS.01.01.03.c.</u></a>   |
| 3      | b      | <a href="#"><u>PS.03.02.05.c.</u></a>   |
| 4      | c      | <a href="#"><u>PS.02.03.02.c.</u></a>   |
| 5      | d      | <a href="#"><u>PS.01.03.01.c.</u></a>   |
| 6      | d      | <a href="#"><u>PS.03.05.01.b.</u></a>   |
| 7      | d      | <a href="#"><u>PS.04.02.02.c.</u></a>   |
| 8      | c      | <a href="#"><u>PS.03.02.05.c.</u></a>   |
| 9      | d      | <a href="#"><u>PS.04.02.01.c.</u></a>   |
| 10     | c      | <a href="#"><u>PS.03.03.01.c.</u></a>   |
| 11     | a      | <a href="#"><u>PS.03.03.02.b.</u></a>   |
| 12     | d      | <a href="#"><u>PS.03.02.05.c.</u></a>   |
| 13     | d      | <a href="#"><u>PS.04.02.01.c.</u></a>   |
| 14     | b      | <a href="#"><u>PS.02.02.05.c.</u></a>   |
| 15     | a      | <a href="#"><u>PS.03.05.04.b.</u></a>   |
| 16     | c      | <a href="#"><u>PS.04.02.02.c.</u></a>   |
| 17     | c      | <a href="#"><u>CS.02.02.03.b.</u></a>   |
| 18     | c      | <a href="#"><u>CRP.02.01.01.c.</u></a>  |
| 19     | b      | <a href="#"><u>ABS.05.03.02.a.</u></a>  |
| 20     | a      | <a href="#"><u>PS.03.02.05.c.</u></a> ; <a href="#"><u>PS.01.01.01.c.</u></a> |
| 21     | b      | <a href="#"><u>PS.03.03.01.c.</u></a>   |
| 22     | c      | <a href="#"><u>PS.02.02.05.c.</u></a>   |
| 23     | a      | <a href="#"><u>NRS.01.02.05.a.</u></a>  |
| 24     | c      | <a href="#"><u>NRS.01.02.05.a.</u></a>  |
| 25     | d      | <a href="#"><u>PS.03.01.03.c.</u></a>   |
| 26     | a      | <a href="#"><u>PS.01.01.02.c.</u></a>   |
| 27     | b      | <a href="#"><u>PS.04.02.01.c.</u></a>   |
| 28     | d      | <a href="#"><u>PS.02.02.04.c.</u></a>   |
| 29     | b      | PS.03.01.03.c.  |
| 30     | b      | NRS.01.02.  |
| 31     | a      | PS.02.01.02.c.  |
| 32     | a      | PS.03.01.03.b.  |
| 33     | c      | <a href="#"><u>PS.03.01.03.c.</u></a>   |
| 34     | d      | CRP.10.04.01.c.   |
| 35     | c      | CRP.03.02   |

|    |   |  |
|----|---|--|
| 36 | a | CRP.10.04.01.c.                        |
| 37 | a | PS.01.01.02.c.                         |
| 38 | b | PS.01.03.05.b.                         |
| 39 | d | PS.02.02.03.c.                         |
| 40 | a | PS.02.02.03.c.                         |
| 41 | c | CRP.10.04.01.c.                        |
| 42 | c | ESS.01.01.                             |
| 43 | b | <u>PS.03.03.04.b. ; BS.02.04.02.a.</u> |
| 44 | c | <u>NRS.01.02.02.b.</u>                 |
| 45 | d | <u>NRS..01.02.02.b.</u>                |
| 46 | a | <u>PS.01.01.01.c.</u>                  |
| 47 | d | <u>PS.03.03.01.c.</u>                  |
| 48 | c | <u>PS.03.03.01.c.</u>                  |
| 49 | a | <u>PS.03.01.03.c.</u>                  |
| 50 | b | <u>PS.03.03.02.b.</u>                  |





# 2019 Floriculture Career Development Event

Created: Oct-19

Select the best answer for each question and mark your selection on the separate scantron sheet provided. Mark answers in the **Exam** section on the scantron located in the bottom right hand corner.

## MULTIPLE CHOICE

1. Wreaths, garlands, loose flowers and petals were the floral design styles used during which historical floral period?
  - A. Greek and Roman
  - B. Victorian
  - C. Art Deco
  - D. Art Nouveau
2. Which historical floral period includes floral design styles that were massed, rounded and fan shaped?
  - A. Egyptian
  - B. Art Deco
  - C. American Colonial
  - D. Oriental
3. Which principal of design is defined as '*a oneness or being complete in itself*'?
  - A. Harmony
  - B. Unity
  - C. Proportion
  - D. Line
4. What color adaptation is created by adding gray to a pure hue?
  - A. Chroma
  - B. Tint
  - C. Tone
  - D. Shade
5. Which color scheme or color harmony includes hues that are adjacent to each other on the color wheel?
  - A. Complementary
  - B. Analogous
  - C. Monochromatic
  - D. Triadic

6. When an arrangement is too small for its surroundings, it is said to be out of \_\_\_\_\_.
  - A. Harmony
  - B. Tone
  - C. Rhythm
  - D. Proportion
  
7. Which color harmony uses two hues that are directly opposite to each other on the color wheel?
  - A. Complementary
  - B. Analogous
  - C. Monochromatic
  - D. Triadic
  
8. An appropriate lightweight wire to use for corsage construction is:
  - A. #18 gauge
  - B. #9 gauge
  - C. #22 gauge
  - D. #28 gauge
  
9. Chrysanthemums, Asters, Daisies, and other flat-faced flowers are wired for corsages using which method?
  - A. Pierce
  - B. Hook-Wiring
  - C. Stitch
  - D. Clutch or Wrap-Around
  
10. Which item is a floral piece worn by a man and typically worn on the right-side jacket lapel, near the buttonhole?
  - A. Corsage
  - B. Wristlet
  - C. Boutonniere
  - D. Clutch

11. Which of the following elements of design allows each flower/form to have its own individual importance?
- A. Depth
  - B. Space
  - C. Form
  - D. Line
12. Which bouquet style would be best for a full wedding gown with a long train?
- A. Tussy Mussy
  - B. Cascading
  - C. Presentation
  - D. Round Cluster
13. A Hogarth Curve floral design is created by
- A. An "O" shape
  - B. A "C" shape
  - C. A "S" shape
  - D. A "H" shape
14. Clogged stems in cut flowers are caused by an air embolism. An air embolism is
- A. Where disease organisms move into the flower from the air clogging the stem.
  - B. Where a bubble of air enters the xylem preventing water from reaching the flower.
  - C. Where the difference between room and flower cooler temperature clog the stem.
  - D. Where the flower stem clogs when the flower cooler temperature drops below 36 degrees F.
15. Which wiring method should be used for carnations when they are to be used in corsages and boutonnieres?
- A. Piercing
  - B. Clutch
  - C. Hook
  - D. Stitch
16. The part of the plant stem that produces all new cells is the
- A. Heartwood
  - B. Xylem
  - C. Phloem
  - D. Cambium

17. In the following list of pesticides the \_\_\_\_\_ must be mixed with water to apply.
- A. Emulsifiable concentrate
  - B. Granules
  - C. Dusts
  - D. Baits
18. An acid loving crop grows best at a pH of \_\_\_\_\_.
- A. 6.8-7.4
  - B. 6.2-6.8
  - C. 4.5-5.8
  - D. 5.8-6.2
19. Auxins and gibberellic acid are hormones in plants that promote growth through \_\_\_\_\_.
- A. Cell division
  - B. Cell enlargement
  - C. Cell specialization
  - D. Cell protection
20. Double layer poly should have how much space between layers for proper inflation and full insulation?
- A. 1 inch
  - B. 12-14 inches
  - C. At least 2 feet
  - D. 6-8 inches
21. In a horticulture business, the product you choose to produce and retail should be at what price above the total production and marketing costs (all fixed and variable costs) to make it feasible to produce and sell?
- A. 100%
  - B. 150%
  - C. 250%
  - D. 500%

22. The amount of light a plant receives greatly influences root growth, shoot growth, and flowering. The highest quality greenhouse plants need \_\_\_\_\_ foot candles of light per day?
- A. 500-1,000
  - B. 2,000-3,000
  - C. 4,000-6,000
  - D. 7,000-8,000
23. Botrytis often presents itself on flowers as gray mold. This disease is caused by a(an) \_\_\_\_\_.
- A. Fungus
  - B. Virus
  - C. Bacteria
  - D. Environmental Condition
24. The \_\_\_\_\_ container is  $\frac{1}{2}$  as high as it is wide.
- A. Standard pot
  - B. Bulb pan
  - C. Azalea pot
  - D. Mum pot
25. Greenhouse production often requires insecticides to be sprayed to prevent insect damage on flowers. Insecticides that are applied in gaseous form are \_\_\_\_\_.
- A. Systemic
  - B. Fumigants
  - C. Contact
  - D. Repellents
26. Rubber Plants are commonly reproduced through an asexual propagation method known as \_\_\_\_\_, which is shown to the right.
- A. Air layering
  - B. Compound layering
  - C. Whip or tongue grafting
  - D. Cleft grafting



27. Most plants grow best in the 40-80 percent relative \_\_\_\_\_ range. This is the amount of moisture that is contained in the air surrounding the plant.
- A. Foot candles
  - B. Particles
  - C. Humidity
  - D. Dew point
28. One popular way of identifying plants is to observe their leaf \_\_\_\_\_; which will tell the person if the leaves are opposite, alternate, whorled, etc.
- A. Arrangement
  - B. Margins
  - C. Shape
  - D. Forms
29. A growing media amendment that is grown primarily in marshes, bogs or swamps and has a high-water holding capacity is known as \_\_\_\_\_.
- A. Perlite
  - B. Vermiculite
  - C. Sand
  - D. Peat Moss
30. In order to have a year-round supply of cut flowers, such as Tulips and Crocus, that grow from bulbs; greenhouse growers are known to \_\_\_\_\_ bulbs. This means they plant bulbs out of season and grow them in a cold or refrigerated area for 10-12 weeks.
- A. Force
  - B. Fertilize
  - C. Prune
  - D. Divide
31. The waxy coating on the outside of a leaf, called the \_\_\_\_\_, serves to prevent excessive water loss from the leaf tissues.
- A. Petiole
  - B. Stoma
  - C. Cuticle
  - D. Vein

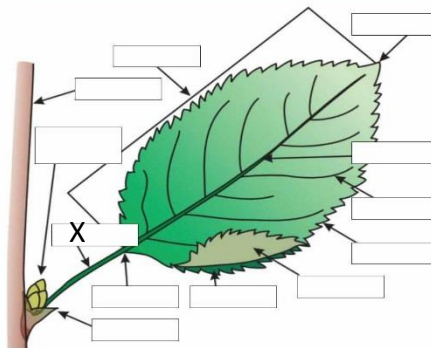
32. When a plant is showing signs of \_\_\_\_\_ deficiency, you might notice the leaves turning a dark to reddish leaf color.

- A. Nitrogen
- B. Phosphorus
- C. Potassium
- D. Sunlight

33. The item “labeled X” in the figure below, is the \_\_\_\_\_, which attaches the leaf to the stem.

- A. Petiole
- B. Stipule
- C. Midrib
- D. Apex

**PARTS OF A SIMPLE DICOT LEAF**



34. The \_\_\_\_\_ civilization is credited with being one of the first cultures to use floral arrangements in their homes.

- A. American
- B. Greek
- C. European
- D. Egyptian

35. The height of an arrangement should be at least \_\_\_\_\_ times the container's greatest dimension.

- A.  $\frac{1}{2}$
- B.  $1\frac{1}{2}$
- C. 3
- D. 5

36. Flowers, such as Baby's Breath or Aster, are commonly referred to as \_\_\_\_\_ flowers in floral arrangements.
- A. Texture
  - B. Focal
  - C. Filler
  - D. Form
37. Which of the following greenhouse substrate components is derived from volcanic rock?
- A. Vermiculite
  - B. Perlite
  - C. Peat
  - D. Bark Medium
38. Which of the following flowers could be used as a focal point in a floral design?
- A. Wax flower
  - B. Bird-of-Paradise
  - C. Miniature Carnation
  - D. Leatherleaf Fern
39. The primary benefit(s) of shading a greenhouse is (are):
- A. To keep the greenhouse temperatures lower
  - B. To reduce light intensity
  - C. To reduce pest populations
  - D. A and B
40. The process of \_\_\_\_\_ is when a plant loses water through stomata.
- A. Transduction
  - B. Translocation
  - C. Transpiration
  - D. None of the above
41. A greenhouse pest that is small with tan, feather-like wings would likely be a \_\_\_\_\_.
- A. Fungus gnat
  - B. Greenhouse whitefly
  - C. Western flower thrip
  - D. Shore fly



42. \_\_\_\_\_ is when a plant secretes a substance to inhibit growth of another plant.
- A. Allelopathy
  - B. Anthesis
  - C. Transcription
  - D. Translation
43. The first thing to do before applying a pesticide is \_\_\_\_\_.
- A. Fill the spray tank
  - B. Read the label
  - C. Put on personal protective equipment
  - D. Rinse out the sprayer tank
44. \_\_\_\_\_ is the development of a plant from a seed or spore.
- A. Scarification
  - B. Stratification
  - C. Vernalization
  - D. Germination
45. Aluminum can affect the color of what florist's flower?
- A. Hydrangea
  - B. Dahlia
  - C. Zinnia
  - D. Asiatic Lily
46. If one were to make a tint of yellow, what color would be added?
- A. Black
  - B. Gray
  - C. White
  - D. Any of the above
47. Which of the following could be used to preserve or dry flowers and foliage?
- A. Silica gel
  - B. Sand
  - C. Glycerin
  - D. All of the above

48. Which of the following would be a direct cost in a floral shop:

- A. Cut flowers in the cooler
- B. Insurance for the shop's building
- C. Energy bills
- D. Membership fee for FTD

49. The following is not a characteristic of an insect:

- A. Two tentacles
- B. Six legs
- C. Two pairs of wings
- D. Three body segments

50. Most indoor foliage plants need which kind of lighting?

- A. Direct sunlight
- B. Bright indirect light
- C. Medium light
- D. Bright light



# 2019 Floriculture Career Development Event

Created: Feb-20

## FLORICULTURE: EXAM SECTION KEY

| Question | Answer | Point Value | Standard        | Standard | Standard |
|----------|--------|-------------|-----------------|----------|----------|
| 1.       | A      | 4           | CS.02.02.02.C.  |          |          |
| 2.       | C      | 4           | CS.02.02.02.C   |          |          |
| 3.       | B      | 4           | PS.04.02.01.C.  |          |          |
| 4.       | C      | 4           | PS.04.02.01.C.  |          |          |
| 5.       | B      | 4           | PS.04.02.01.C.  |          |          |
| 6.       | D      | 4           | PS.04.02.01.C.  |          |          |
| 7.       | A      | 4           | PS.04.02.02.C.  |          |          |
| 8.       | D      | 4           | C3.03.04.02.C.  |          |          |
| 9.       | B      | 4           | PS.04.02.02.C.  |          |          |
| 10.      | C      | 4           | PS.04.01.01.C.  |          |          |
| 11.      | B      | 4           | PS.04.02.01.C.  |          |          |
| 12.      | B      | 4           | PS.04.01.01.C.  |          |          |
| 13.      | C      | 4           | PS.04.02.01.C   |          |          |
| 14.      | B      | 4           | PS.02.03.02.C.  |          |          |
| 15.      | A      | 4           | PS.04.02.02.C.  |          |          |
| 16.      | D      | 4           | PS.02.02.03.C.  |          |          |
| 17.      | A      | 4           | PS.03.03.01.C.  |          |          |
| 18.      | C      | 4           | PS.01.03.02.C.  |          |          |
| 19.      | B      | 4           | PS.02.02.01.B.  |          |          |
| 20.      | D      | 4           | CS.04.01.02.B.  |          |          |
| 21.      | C      | 4           | ABS.01.01.01.B. |          |          |
| 22.      | C      | 4           | PS.01.01.01.C.  |          |          |

[Type here]

|     |   |   |                 |  |  |
|-----|---|---|-----------------|--|--|
| 23. | A | 4 | NRS.04.02.01.B. |  |  |
| 24. | B | 4 | C3.03.04.02.C.  |  |  |
| 25. | B | 4 | PS.03.03.01.C.  |  |  |
| 26. | A | 4 | PS.03.01.03.C.  |  |  |
| 27. | C | 4 | PS.01.01.02.C.  |  |  |
| 28. | A | 4 | NRS.01.02.02.B. |  |  |
| 29. | D | 4 | PS.01.02.01.C.  |  |  |
| 30. | A | 4 | PS.02.02.05.C.  |  |  |
| 31. | C | 4 | PS.02.02.04.C.  |  |  |
| 32. | B | 4 | PS.01.03.01.C.  |  |  |
| 33. | A | 4 | PS.02.02.04.C.  |  |  |
| 34. | D | 4 | CS.02.02.02.C.  |  |  |
| 35. | B | 4 | PS.04.02.01.C   |  |  |
| 36. | C | 4 | PS.04.01.01.C.  |  |  |
| 37. | B | 4 | PS.03.02.02.B.  |  |  |
| 38. | B | 4 | PS.04.01.01.C.  |  |  |
| 39. | D | 4 | PS.01.01.01.C.  |  |  |
| 40. | C | 4 | PS.02.03.02.C.  |  |  |
| 41. | C | 4 | NRS.01.02.03.B. |  |  |
| 42. | A | 4 | PS.01.03.01.C.  |  |  |
| 43. | B | 4 | PS.03.03.04.B.  |  |  |
| 44. | D | 4 | PS.02.02.05.C.  |  |  |
| 45. | A | 4 | PS.01.03.01.C.  |  |  |
| 46. | C | 4 | PS.04.02.02.C.  |  |  |
| 47. | D | 4 | PS.03.05.03.B.  |  |  |
| 48. | A | 4 | ABS.01.01.01.B. |  |  |
| 49. | A | 4 | NRS.01.02.03.B. |  |  |
| 50. | B | 4 | PS.02.03.01.C.  |  |  |