

**IOWA FFA
CAREER DEVELOPMENT EVENT
AGRICULTURAL MECHANICS**

2005

WRITTEN EXAMINATION

**IOWA STATE UNIVERSITY
AMES, IOWA
JUNE 9, 2005**



LIVING TO SERVE

2005 Iowa FFA Agricultural Mechanics Career Development Event

State of Iowa
 DEPARTMENT OF EDUCATION
 Career Education Division
 Grimes State Office Building
 Des Moines, IA 50319

CONTESTANT NAME _____

CONTESTANT SCHOOL _____

WRITTEN EXAM

Darken the circle 0 under A, B, C, or D indicating the one best answer

| | A | B | C | D | | A | B | C | D | | A | B | C | D |
|-----|---|---|---|---|-----|---|---|---|---|-----|---|---|---|---|
| 1. | 0 | 0 | 0 | 0 | 21. | 0 | 0 | 0 | 0 | 41. | 0 | 0 | 0 | 0 |
| 2. | 0 | 0 | 0 | 0 | 22. | 0 | 0 | 0 | 0 | 42. | 0 | 0 | 0 | 0 |
| 3. | 0 | 0 | 0 | 0 | 23. | 0 | 0 | 0 | 0 | 43. | 0 | 0 | 0 | 0 |
| 4. | 0 | 0 | 0 | 0 | 24. | 0 | 0 | 0 | 0 | 44. | 0 | 0 | 0 | 0 |
| 5. | 0 | 0 | 0 | 0 | 25. | 0 | 0 | 0 | 0 | 45. | 0 | 0 | 0 | 0 |
| 6. | 0 | 0 | 0 | 0 | 26. | 0 | 0 | 0 | 0 | 46. | 0 | 0 | 0 | 0 |
| 7. | 0 | 0 | 0 | 0 | 27. | 0 | 0 | 0 | 0 | 47. | 0 | 0 | 0 | 0 |
| 8. | 0 | 0 | 0 | 0 | 28. | 0 | 0 | 0 | 0 | 48. | 0 | 0 | 0 | 0 |
| 9. | 0 | 0 | 0 | 0 | 29. | 0 | 0 | 0 | 0 | 49. | 0 | 0 | 0 | 0 |
| 10. | 0 | 0 | 0 | 0 | 30. | 0 | 0 | 0 | 0 | 50. | 0 | 0 | 0 | 0 |
| 11. | 0 | 0 | 0 | 0 | 31. | 0 | 0 | 0 | 0 | 51. | 0 | 0 | 0 | 0 |
| 12. | 0 | 0 | 0 | 0 | 32. | 0 | 0 | 0 | 0 | 52. | 0 | 0 | 0 | 0 |
| 13. | 0 | 0 | 0 | 0 | 33. | 0 | 0 | 0 | 0 | 53. | 0 | 0 | 0 | 0 |
| 14. | 0 | 0 | 0 | 0 | 34. | 0 | 0 | 0 | 0 | 54. | 0 | 0 | 0 | 0 |
| 15. | 0 | 0 | 0 | 0 | 35. | 0 | 0 | 0 | 0 | 55. | 0 | 0 | 0 | 0 |
| 16. | 0 | 0 | 0 | 0 | 36. | 0 | 0 | 0 | 0 | 56. | 0 | 0 | 0 | 0 |
| 17. | 0 | 0 | 0 | 0 | 37. | 0 | 0 | 0 | 0 | 57. | 0 | 0 | 0 | 0 |
| 18. | 0 | 0 | 0 | 0 | 38. | 0 | 0 | 0 | 0 | 58. | 0 | 0 | 0 | 0 |
| 19. | 0 | 0 | 0 | 0 | 39. | 0 | 0 | 0 | 0 | 59. | 0 | 0 | 0 | 0 |
| 20. | 0 | 0 | 0 | 0 | 40. | 0 | 0 | 0 | 0 | 60. | 0 | 0 | 0 | 0 |

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2005

**IOWA FFA AGRICULTURAL MECHANICS CDE
WRITTEN TEST ANSWER KEY**

- | | |
|--------------|--------------|
| 1. C | 31. C |
| 2. B | 32. A |
| 3. A | 33. D |
| 4. D | 34. A |
| 5. B | 35. B |
| 6. D | 36. D |
| 7. C | 37. B |
| 8. A | 38. A |
| 9. C | 39. B |
| 10. D | 40. C |
| 11. A | 41. D |
| 12. D | 42. A |
| 13. C | 43. D |
| 14. D | 44. B |
| 15. B | 45. A |
| 16. D | 46. C |
| 17. B | 47. C |
| 18. C | 48. A |
| 19. B | 49. C |
| 20. A | 50. D |
| 21. D | 51. C |
| 22. A | 52. A |
| 23. C | 53. B |
| 24. A | 54. A |
| 25. A | 55. C |
| 26. D | 56. D |
| 27. C | 57. A |
| 28. B | 58. B |
| 29. C | 59. A |
| 30. A | 60. D |

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STRUCTURAL SYSTEMS (WOOD & METAL BUILDING CONST.)

1. _____ is a semi-transparent material used in metal building construction to allow light into the building through the sidewalls and/or roof.
 - A. Silicone
 - B. Neoprene
 - C. Filon
 - D. Agri-Rib

2. _____ is a building material made of glued wood particles, pressed into 4' x 8' sheets.
 - A. High density polystyrene
 - B. Oriented Strand Board
 - C. Veneer
 - D. "Green board"

3. If you need to trim the edges of a corrugated, galvanized, steel roof, _____ would be the most practical method.
 - A. cut the edge with a Skil-saw with an old blade installed backwards in the saw
 - B. cut the edge with an oxy-acetylene cutting torch
 - C. cut the edge with a cross-cut handsaw
 - D. cut the edge with a diamond impregnated cut-off saw

4. _____ welding uses the oxy-acetylene welding and cutting torch set.
 - A. Wire
 - B. Arc
 - C. TIG
 - D. Fusion

5. _____ are roof framework units, assembled on the ground at the building site, or at a factory.
 - A. Rafters
 - B. Trusses
 - C. Joists
 - D. Stringers

6. The square poles in pole building construction are generally placed _____ feet O.C.
 - A. 2
 - B. 4
 - C. 6
 - D. 8

7. 2 x 4's used for sidewall girts in pole building construction, are usually placed _____.
- A. 2 feet apart, vertically
 - B. 2 feet apart, in a square pattern
 - C. 2 feet apart, horizontally
 - D. diagonally, 2 feet apart
8. _____ are used for fastening steel sidewall panels on a pole building.
- A. drill-point screws with neoprene washers
 - B. sheet metal screws
 - C. wood screws
 - D. aluminum screws
9. _____ should not be used in covering the roof and sidewalls of a pole building.
- A. ridged, enameled steel panels
 - B. galvanized, corrugated steel panels
 - C. completely flat steel panels
 - D. wood
10. Safety considerations for pole building construction should include _____.
- A. precipitation
 - B. wind
 - C. on-lookers
 - D. all of the above
11. Pole building sidewall and roofing sheets are generally 28 _____ thickness.
- A. gauge
 - B. thousandths
 - C. inches
 - D. mm
12. A _____ is the framing member, placed over a large door opening, in constructing a pole building.
- A. stud
 - B. plate
 - C. sill
 - D. header

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| MACHINERY AND EQUIPMENT SYSTEMS (CROP SPRAYERS) |
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13. Current self-propelled sprayers can be operated at speeds up to _____ MPH in smooth fields when spraying crop chemicals.
- A. 2
 - B. 5
 - C. 15-18
 - D. 40
14. Broadcast spraying of non-specific pesticides should be _____.
- A. the first choice in controlling weeds
 - B. used to control giant foxtail
 - C. used on organically grown crops
 - D. used as a last resort to control weeds

15. _____ pesticides can be used to control pests in organic crops.
- All chemical
 - Naturally sourced
 - No
 - Only Monsanto
16. _____ are used to mark the edge of the last pass with the crop sprayer.
- Foam markers
 - Mechanical markers
 - GPS guidance
 - A or C
17. The nozzle flow rate in GPM in the following example, is _____ gallons per minute.
(30 inch rows, 2 nozzles per row)
- Formula: $GPM = \frac{GPA \times S \times W}{5940}$ $GPM = \frac{20 \times 6 \times 15}{5940}$
- GPM= gallons per minute
 GPA= gallons per acre (20)
 S= field speed in miles per hour (6)
 W= width of nozzle, in inches (15)
 5940= constant
- 3.003
 - 0.3003
 - 30.03
 - 20
18. Integrated Pest Management is an effective and environmentally sensitive approach to pest management that relies on _____.
- a single pest control method
 - non-chemical control of pests, only
 - all appropriate pest management options
 - chemicals, only to control pests
19. Asian Soybean Rust is a(n) _____.
- weed
 - fungus
 - insect
 - bug
20. Asian Soybean Rust is a potential problem which will likely invade Iowa.
_____ can be used to spray for this pest.
- Syngenta Quadris
 - Roundup
 - Northstar
 - GreenStar
21. _____ when you are operating a sprayer for the local coop.
- Eat in the cab of the sprayer to save time
 - Dispose of excess spray in the ditch, before returning to town
 - Spray upwind of vulnerable plants, trees and gardens
 - Be safety conscious at all times, both on-road and off-road.

22. All of the following companies, except _____ manufacture field sprayers.
- A. GM
 - B. AGCO
 - C. John Deere
 - D. CNH
23. The John Deere 4920, self-propelled sprayer, owned by the Fort Atkinson Farmers Coop, can be operated by _____.
- A. any employee of the coop
 - B. any farmer-member of the coop
 - C. an employee with a commercial pesticide applicators license
 - D. only the chemical manager of the coop
24. Self-propelled sprayers, including the JD 4920 and the CaseIH Patriot, should be operated with the spray boom _____.
- A. at the recommended clearance above the crop
 - B. as high as possible
 - C. 6 inches below the top of the crop
 - D. 30 inches above the crop, minimum

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| ENVIRONMENT AND NATURAL RESOURCES |
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25. All of the following, except _____, are brand names of integrated farm equipment GPS systems.
- A. OnStar
 - B. AFS
 - C. GreenStar
 - D. Fieldstar
26. The _____ Survey is an operational program within the Bureau of Land Management, US Department of the Interior.
- A. NAVSTAR
 - B. Navistar
 - C. TempStar
 - D. Cadastral
27. NAVSTAR (NAVigation System with Time and Ranging) is a constellation of _____ satellites orbiting the earth that are used in the GPS.
- A. 3
 - B. 12
 - C. 27
 - D. 48
28. A leveling rod is used in conjunction with another tool by a surveyor to _____.
- A. record compass headings
 - B. determine elevation
 - C. determine distance
 - D. none of the above

29. There are _____ sections in a township.
- A. 640
 - B. 6
 - C. 36
 - D. 16
30. Satellites in geosynchronous orbits, _____.
- A. orbit 19,100 miles above a fixed spot on the earth
 - B. orbit the earth on a regular orbit
 - C. orbit the earth in a random pattern
 - D. orbit the earth at 500 miles above the surface
31. Determining position, using 4 satellites to determine DISTANCE, is called _____.
- A. GDOP
 - B. selective availability
 - C. trilateration
 - D. triangulation
32. GPS satellites orbit the earth at _____ elevation above the earth's surface.
- A. 12,600 miles
 - B. 12,600 kilometers
 - C. 126,000 miles
 - D. 1260 miles
33. _____ is used to determine location by using angles.
- A. GDOP
 - B. Selective Availability
 - C. trilateration
 - D. triangulation
34. There are _____ acres in a section.
- A. 640
 - B. 40
 - C. 80
 - D. 120
35. The John Deere GreenStar, AutoTrac, assisted steering, used on the 4920 self-propelled sprayer, can provide an accuracy in steering the sprayer, as close as _____.
- A. plus or minus 7 feet
 - B. plus or minus 4 inches
 - C. plus or minus 27 feet
 - D. plus or minus .001 inch
36. There are _____ acres in an area measuring 40 rods by 120 rods.
- A. 80
 - B. 20
 - C. 120
 - D. 30

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| INDUSTRY AND MARKETING |
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37. One of these 3 signal words; _____, must be used on the pesticide label to describe the relative toxicity to humans of the active ingredient in the pesticide.
- A. danger, lethal, irritant
 - B. caution, warning, danger
 - C. notice, caution, danger
 - D. dangerous, extreme, lethal
38. "Routes of Entry" statements on pesticide labels describe _____.
- A. how pesticides can enter the human body
 - B. how pesticides can enter waterways
 - C. how pesticides can enter the environment
 - D. how pesticides enter the targeted pest
39. Restricted use pesticides can be applied by _____.
- A. any applicator
 - B. trained and certified applicators
 - C. Terminex employees only
 - D. only employees of the pesticide manufacturer
40. BT hybrids produce insect specific toxins that make the corn plant resistant to _____.
- A. cutworms
 - B. wireworms
 - C. European corn borers
 - D. SCN
41. Glyphosate is the active ingredient in _____ herbicide.
- A. Liberty Link
 - B. Fortress 5G
 - C. Northstar
 - D. Roundup
42. Rinsates are _____ wastes.
- A. water used to rinse spraying equipment, which contains some remaining pesticide.
 - B. clear water added to mix the ingredients in the spray tank
 - C. pesticides at strength of use
 - D. pure pesticide
43. Cutworms can be controlled with _____.
- A. Roundup
 - B. Northstar
 - C. SPF 250
 - D. Fortress 5G
44. If allowed by the pesticide label, pesticide containers should be disposed of _____ in the landfill.
- A. immediately after emptying
 - B. after proper rinsing
 - C. after incineration
 - D. after being stored empty for 1 year

45. Pesticides can be applied at _____ rate.
- A. only the rate specified on the label
 - B. up to twice the recommended amount
 - C. only $\frac{1}{2}$ of the rate specified on black soil
 - D. none of the above
46. Roundup is a contact herbicide. This means that it must be applied _____.
- A. before the weeds emerge
 - B. before working the soil
 - C. after the weeds have emerged and are 2-6 inches tall
 - D. while planting the crop
47. If the corn field was sprayed with Roundup last year, the farmer can _____ this year.
- A. plant only Roundup Ready crops
 - B. plant Roundup Ready corn and get residual effects from last year's Roundup
 - C. plant any crop he desires, because Roundup is not a residual herbicide
 - D. Plant Pioneer corn only
48. _____ is a pre-emerge herbicide for corn.
- A. Lumax
 - B. Roundup
 - C. DuPont Resolve
 - D. Northstar

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| ENERGY SYSTEMS (SMALL ENGINES) |
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49. The electronic ignition module on a Briggs and Stratton engine is a(n) _____.
- A. electron
 - B. Delcotron
 - C. Magnetron
 - D. Spark-O-Matic
50. Valve overlap on a small 4-stroke cycle engine occurs on the _____ stroke.
- A. intake
 - B. compression
 - C. power
 - D. exhaust
51. On a diesel small engine, _____ is compressed on the compression stroke.
- A. air and diesel fuel
 - B. air and gasoline
 - C. air only
 - D. fuel only
52. When stopping a small engine with magneto ignition, the following happens:
- A. the ignition is grounded
 - B. the wire from the switch to the ignition is open
 - C. the wire from the switch to the ignition is powered
 - D. none of the above

53. Briggs and Stratton is now owned by _____.
- A. Honda
 - B. MTD
 - C. Cub Cadet
 - D. Kubota
54. Small engines _____ 10% ethanol blended gasoline.
- A. are approved to use
 - B. can not use
 - C. can use for light loads only
 - D. can only be used at high altitudes
55. Small engines should be operated in a well-ventilated area because of _____ in the exhaust.
- A. carbon dioxide
 - B. H O
 - C. carbon monoxide
 - D. heat
56. When using the small engine for the last time in the fall, do all of the following, except _____.
- A. run the engine out of fuel
 - B. clean off all debris
 - C. put Sta-Bil in the fuel tank
 - D. fill the tank with clean fuel
57. The choke on a small engine _____.
- A. enriches the fuel mixture
 - B. leans out the fuel mixture
 - C. allows less air and fuel into the combustion chamber
 - D. advances the timing
58. In a 4-stroke cycle small engine, the crankshaft rotates _____ degrees and the camshaft rotates _____ degrees in one complete sequence.
- A. 360, 360
 - B. 720, 360
 - C. 360, 720
 - D. 720, 720
59. _____ is the air-fuel ratio, by weight, in a small engine.
- A. 100-1
 - B. 14-1
 - C. 1-1
 - D. 1-14
60. Late timing in a small engine, used on a lawnmower, could be caused by _____.
- A. the flywheel key is completely sheared and the flywheel can rotate on the crankshaft
 - B. the engine is flooded
 - C. the spark plug is grounded out
 - D. the flywheel key is partially sheared by having struck a big rock with the lawnmower blade