

FFA
2019 STATE FINALS
AGRICULTURAL MECHANICS WRITTEN EXAM

Instructions:

1. Remain in your seat at all times until excused by the exam instructor.
2. DO NOT mark on this examination sheet. Mark the SCANTRON only.
3. Use #2 pencil only.
4. Place your contestant name where instructed, on the SCANTRON only.
5. When marking your answers, completely fill in the correct answer box.
6. There is only one best answer for each question.
7. The exam monitor will not answer questions during the exam.
8. This is a **CLOSED BOOK/NOTES EXAM!! NO NOTES OF ANY FORM ARE ALLOWED.**
9. Calculators are provided if you don't have one.
10. When you have finished the exam, turn your paper over and remain in your seat. The exam monitor will collect all the papers and answer sheets at the end of the time period. You will then be excused.

GOOD LUCK!!

1. In arc welding, “stick welding” is also know as:
 - a. GTAW
 - b. SMAW
 - c. NEMA
 - d. GMAW
 - e. All of the above

2. A _____ is any material that permits electrical current to move through it:
 - a. condenser
 - b. cable
 - c. conductor
 - d. capacitor
 - e. conspirator

3. A piece of electrical equipment requires 1300 Watts of power. If the voltage is 120v, how much current will be required?
 - a. 13 amps
 - b. 12 volts
 - c. 1300 volts
 - d. 10.8 amps
 - e. 10.8 ohms

4. Voltage can be considered to be a measure of electrical _____.
 - a. power
 - b. current
 - c. pressure
 - d. energy
 - e. speed

5. A 7018 welding electrode can be used for _____ welding.
 - a. flat
 - b. vertical
 - c. overhead
 - d. horizontal
 - e. all of the above

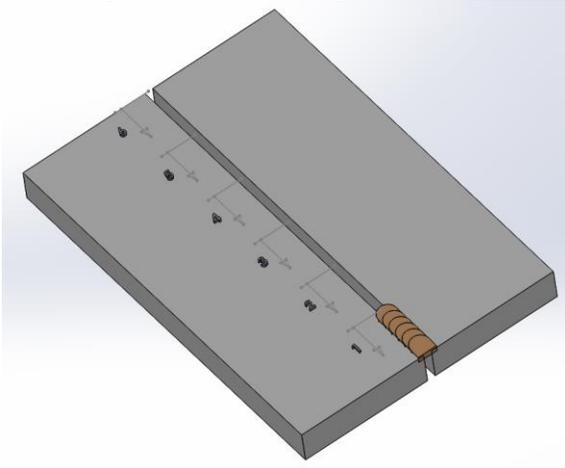
6. In arc welding, the arc temperature is about _____.
 - a. 4000 degrees F
 - b. 6000 degrees F
 - c. 9000 degrees F
 - d. Just enough to melt steel.
 - e. Just enough to melt aluminum.

7. Which of the following welding lenses is the lightest?
- #10
 - #12
 - #14
 - #5
 - #00
8. In welding, SMAW stands for:
- Submerged Metal Arc Welding
 - Shielded Metal Arc Welding
 - Standard Metal Arc Welding
 - Gas Shielded Arc Welding
 - Shielded Metal Anert gas Welding
9. E7018 is a commonly used stick electrode. What does the “E” stand for?
- Electricity
 - Exposed rod
 - Equipment
 - Electrode
 - All of the above
10. When using the GTAW process, the following shielding gas is usually preferred:
- CO₂
 - Argon
 - Helium
 - Oxygen
 - Either b or c above
11. NEMA stands for:
- National Electrical Manufacturers Association
 - National Electrical Motors Association
 - National Engineers and Manufacturers Association
 - National Engineers and Machinists Association
 - None of the above.
12. A welding electrode including “E70” in its designation means:
- It can handle 70,000 lbs of force.
 - It can handle 70,000 psi of tensile stress.
 - It can withstand 70 psi of shielding gas.
 - The electrode can be tilted 70 degrees during welding.
 - Both a and d above

13. For a given length, which of the following welding lead sizes (gauge #) can handle the most current?
- a. 1
 - b. 2
 - c. 1/0
 - d. 2/0
 - e. Not enough information given.

14. A piece of material with a 2.0 in^2 cross sectional area has a tensile strength of 60,000 psi. How much **force** will cause it to fail in tension?
- a. 60,000 psi
 - b. 60,000 lb
 - c. 120,000 lb
 - d. Both a and c
 - e. None of the above

15. The process of welding in the order shown below is referred to as:



- a. Skip welding.
 - b. Fillet welding.
 - c. Back-step welding
 - d. Forward welding.
 - e. None of the above.
16. Which of the following welding electrodes requires the largest current setting?
- a. E6010
 - b. E7018
 - c. E7016
 - d. E6013
 - e. E6011

17. A weldment is to require several passes. The first pass is known as the _____.
- Base pass.
 - Base bead.
 - Route pass.
 - Root weld.
 - Root pass.
18. Which vertical arc weld below will result in the greatest penetration?
- Vertical down
 - Vertical up
 - Horizontal down
 - Horizontal up
 - c and d above
19. In MIG welding, what term is used to describe when the wire is fused to the contact tip?
- Birdbath
 - Burnback
 - Arc Blow
 - Short arc
 - Spray transfer
20. A “horizontal” weld is when you move _____
- Horizontally.
 - Horizontally along a piece that is flat.
 - Horizontally along a piece that is vertical.
 - Vertical along a piece that is horizontal.
 - Vertical along a piece that is vertical.
21. In an electrical calculation, normally what does “I” refer to?
- Power.
 - Energy.
 - Voltage.
 - Current.
 - None of the above.
22. In an electrical calculation, normally what does “R” refer to?
- Reluctance.
 - Resistance.
 - Reactance.
 - Voltage.
 - Current.

23. In an electric motor, a rotating (turning) magnet is referred to as _____.
- the capacitor.
 - the coil.
 - the armature.
 - the commutator.
 - the electromagnet.
24. Which device below is used to pull wires through a conduit?
- Snake
 - Plumber's helper
 - Fish tape
 - GFCI
 - None of the above
25. Which device below produces direct current?
- Electrical director
 - Alternator
 - Generator
 - Turbine
 - Engine
26. An electric meter on a house will total the number of _____ used each month.
- kilowatts
 - volts
 - volt-amps
 - kilowatt-hours
 - volt-hours
27. A wiring plan includes the designation "S₃". What does this designation represent?
- Service outlet #3
 - Switch #3
 - Three-way switch
 - There are three switches in this circuit
 - c and d above
28. What is required in a circuit to control a light fixture with 3 switches.
- Three 3-way switches
 - Three single pole switches
 - Two 3-way switches and One 4-way switch
 - Two single pole switches and One 3-way switch
 - None of the above

29. All receptacles wired downstream of a GFCI will be GFCI protected:
- True
 - False
 - It depends on how the wires are attached to the GFCI.
 - It depends on the GFCI current rating.
 - None of the above

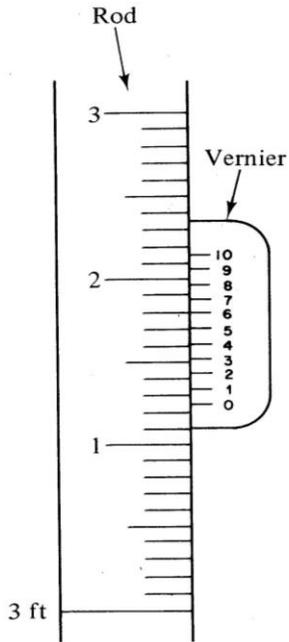
30. The following receptacle is rated at:



- 120 v, 50 amps
 - 250 v, 50 amps
 - 120 v, 30 amps
 - 250 v, 30 amps
 - None of the above.
31. Which type of surveying refers to determining the relief or roughness or 3-dimensional qualities of the earth's surface?
- land surveying
 - topographical surveying
 - route surveying
 - construction surveying
 - city surveying
32. The number 36.060 has how many significant figures?
- 36
 - 4
 - 0.060
 - 5
 - 6
33. A length and width of a rectangular piece of property are measured by two different techniques (the length measurement is more accurate than the width). The resulting measurements are 205' by 306.35'. What is the correct area of this rectangle?
- 62801.75 ft²
 - 62801.8 ft²
 - 62800 ft²
 - 62802 ft²
 - 63000 ft²

34. Which surveying tool is 6' to 10' long, round, and painted with alternate bands of red and white paint?
- Philadelphia rod
 - Range pole
 - Surveyor's arrow
 - Tripod
 - None of the above.
35. A surveyor normally **looks through** a hand level.
- True
 - False
36. In surveying with an automatic level, the HI can be determined by:
- Checking the GPS coordinates on your cell phone
 - Knowing the BS on a point of known elevation
 - Knowing the FS
 - Knowing a local BM
 - None of the above
37. A temporary point whose elevation is determined during the process of leveling is known as:
- Temporary point
 - Typical point
 - Turning point
 - Foresight
 - None of the above

38. The rod reading below is:

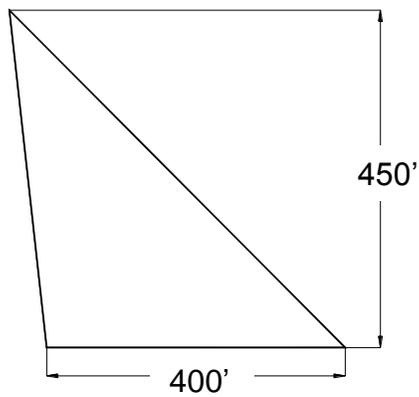


- a. 1.20'
- b. 2.9'
- c. 3.126'
- d. 3.11'

39. A line parallel to the direction of gravity is known as:

- a. a horizontal line
- b. a level line
- c. a vertical line
- d. a level line
- e. None of the above

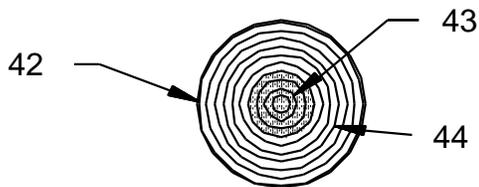
40. The following triangular piece of land has what area?



- a. 4.13 acres
- b. 180000 ft²
- c. 2.07 acres
- d. 45000 ft²

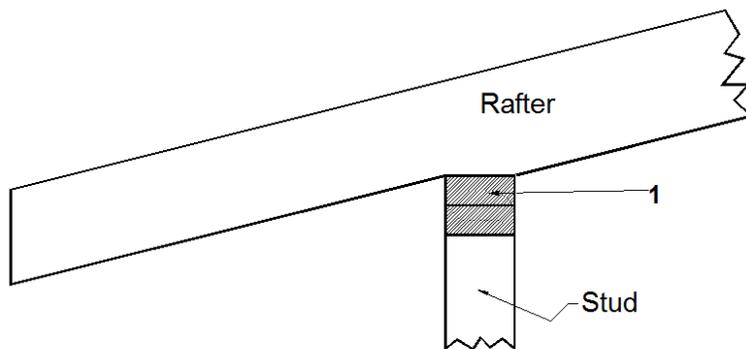
41. What is the best grade below for structural framing lumber?
- Construction
 - Select Structural
 - No. 1
 - Standard
 - None of the above

Choose the best name for each section of a harvested log shown below.



- 42.
- Sapwood
 - Heartwood
 - Softwood
 - Cambium
- 43.
- Heartwood
 - Softwood
 - Cambium
 - Sapwood
- 44.
- Sapwood
 - Heartwood
 - Softwood
 - Cambium

45. A partial view of a stud wall and rafter is shown below. What is the correct name for item 1?



- Stud
- Sill
- Plate
- Block
- Bird's eye

46. The slope of a roof rafter is known as _____?.
- the rise.
 - the span.
 - the run.
 - the pitch.
 - the work line.
47. Calculate the board footage for 13 pieces of 2" x 12" x 14' (S4S)
- 28 bd-ft.
 - 364 bd-ft.
 - 4368 bd-ft.
 - 2184 bd-ft.
 - None of the above.
48. What diameter hole will a #10 auger bit produce?
- 5/16"
 - 5/8"
 - 10/8"
 - 10/10"
 - 1.0"
49. Which of the following nails has a smaller diameter shank?
- 16 d box
 - 16 d common
 - Too much information given.
50. For normal jointer operation, the rear table is _____ the front table.
- higher than
 - lower than
 - at the same height as

References

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2. Modern Agricultural Mechanics, 2nd Edition. Burke, Wakeman. Interstate Publishers
3. Electrical Wiring, 7th edition. AAVIM publishers.
4. Leveling and Land Measurement Practices for Agriculture. University of Arizona