

WRITTEN EXAMINATION

You will have 60 minutes to complete this examination. Answer the questions by selecting the best answer for each question. Mark your answer on the quick-scan sheet provided.

DO NOT WRITE ON THIS EXAM!!

Electrical Circuits

1. Electricity can be produced or developed by:
 - A. Batteries.
 - B. Generators.
 - C. Alternators.
 - D. Transformers.
 - E. Only a- b- and C.

2. Electrical pressure is measured in :
 - A. Ohms
 - B. Amperes
 - C. Watts
 - D. Volts

3. Current flow is measured in :
 - A. Volts
 - B. Ohms
 - C. Amperes
 - D. Watts

4. If the meter is properly connected and it is connected in parallel it is a:
 - A. Wattmeter
 - B. Voltmeter
 - C. Milliammeter
 - D. Ammeter

5. Normal wall light switches are mounted at a height of:
- A. 4 ½ to 5 ½ feet.
 - B. 6 to 7 feet.
 - C. 3 to 4 feet.
 - D. At eye level for a 6'6" man.
6. Circuits loads that have their own path from the voltage source and back are:
- A. Parallel
 - B. Series
 - C. Series/parallel
 - D. Parallel/series
7. The brass-colored terminals of a receptacle represent the _____ terminals.
- A. Neutral
 - B. White
 - C. Hot
 - D. Ground
8. Sixty cycle AC current alternates from a maximum positive value to a maximum negative value:
- A. 60 times a second.
 - B. 60 times a minute.
 - C. 60 times an hour.
 - D. None of the above.
9. What is the allowable number of conductors under each terminal screw?
- A. 1
 - B. 2
 - C. 3
 - D. 4
10. What is the power factor for a motor drawing 320 watts (true wattage) when ammeter reading is 4.0 amps and voltmeter reading is 120 volts (apparent wattage)?
- A. 1.33
 - B. 1.00
 - C. 0.83
 - D. 0.67
11. It is recommended that duplex outlets be placed along the wall at what intervals?

- A. 24 feet
 - B. 6 feet
 - C. 3 feet
 - D. 18 feet
12. In the service entrance box the neutral is normally:
- A. Not switched or over-current protected.
 - B. Over current protected but not switched.
 - C. Switched but not over current protected.
 - D. Switched and over current protected.
13. The largest fuse that can be used to safely protect 12 gauge wire is:
- A. 10
 - B. 15
 - C. 20
 - D. 30
14. A fuse is always connected in:
- A. Parallel with the load.
 - B. Series with the load.
 - C. Series-parallel with the load.
 - D. Either series or parallel depending upon circuit constants.
15. A wall switch which is normally used to control a light from one location is :
- A. DPST
 - B. SPST
 - C. SPDT
 - D. DPDT
16. The term "hertz" applies to electrical current as:
- A. the frequency of direct current which equals 50 cycles per second in the U.S.
 - B. the frequency of alternating current which equals 50 cycles per second in the U.S.
 - C. the frequency of direct current which equals 60 cycles per second in the U.S.
 - D. the frequency of alternating current which equals 60 cycles per second in the U.S.

Arc Welding

17. The 2 in a 7024 electrode stands for:
- A. Tensile strength
 - B. Welding position
 - C. Special characteristics
 - D. Compressive strength
18. All of these are advantages when MIG welding except:
- A. Easy to learn
 - B. Slag removal is reduced
 - C. No electrodes to change
 - D. Cheaper electrode cost
19. A weld that has excessive spatter can be corrected if the person welding:
- a. Reduces arc length
 - B. Increases amperage
 - C. Decreases AC welder voltage
 - D. Increases arc length
20. The best shielding gas to use when welding aluminum is:
- A. Nitrogen
 - B. Argon
 - C. Neon
 - D. Carbon dioxide
 - E. Compressed air
21. Several situations lead to the weld defect "porosity." Which of the following is a common cause of weld porosity?
- A. Excessive current or amperage
 - B. Too long arc length
 - C. Travel speed is too fast
 - D. All of the above are causes of weld porosity
22. A rod such as an E7018 **should** be stored:
- A. At room temperature

- B. At 250-300 degrees Fahrenheit
 - C. At 500-700 degrees Fahrenheit
 - D. At or near freezing temperatures
23. Which of the following is an advantage of a low hydrogen electrode?
- A. Ability to weld medium to high carbon steel
 - B. Welds rusty metal well
 - C. It works exceptionally well with AC current
 - D. It works well with straight DC current
24. Amperage is primarily controlled on a MIG welder by:
- A. Setting the wire speed
 - B. Setting the arc voltage
 - C. Setting the gas pressure
 - D. Depressing the gas valve
25. The 6011 electrode is designed to be used in which of the following weld positions:
- A. All positions
 - B. Flat only
 - C. Horizontal downhand only
 - D. Overhead only
26. Transverse or Longitudinal Distortion is caused by:
- A. Undercutting a "T" joint on too high of an Amperage setting
 - B. The improper gapping of two pieces of metal in a butt joint
 - C. Long, (more than 12") continuous welding on a flat piece of metal or on a joint between two pieces
 - D. Undercutting a "butt" joint
27. The number of degrees centigrade that the secondary welder coil can heat up above room temperature without damaging the coil is called:
- A. Duty cycle
 - B. Temperature rise
 - C. Power factor
 - D. Efficiency rating
28. Which of the following statements are true about MIG welding?
- A. MIG welding uses a flux coated wire

- B. The weld puddle is protected by an inert compressed gas
 - C. MIG welders have a constant amperage while voltage is adjustable
 - D. The MIG welding process demands that the welder constantly adjust the arc length in order for a good weld to occur
 - E. All of the above are true statements
29. When using a MIG welder on mild steel, the shielding gas that will give you the most penetration is:
- A. 100% Helium
 - B. 100% Argon
 - C. 25% Argon, 75% Carbon Dioxide
 - D. 100% Carbon Dioxide
30. You are about to weld 1/4" steel with a 1/8" filler rod. The minimum number of passes that should be deposited to achieve maximum penetration and complete fusion at the weld zone is:
- A. a single pass.
 - B. two passes.
 - C. three passes.
 - D. four passes.
31. A welder can prevent distortion when arc welding by tack welding:
- A. a minimum of 6 inches apart
 - B. a minimum of 12 inches apart
 - C. a minimum of 24 inches apart
 - D. a minimum of 36 inches apart
32. A coating on the metal, that when welded on, gives off especially dangerous toxic fumes is:
- A. soldering
 - B. galvanized
 - C. latex painted
 - D. none of the above
33. The temperature at which an E7018 electrode should be stored to preserve the flux properly.
- A. room temperature

- B. 190 degrees Fahrenheit
 - C. 250 degrees Fahrenheit
 - D. none of the above
34. The lead or travel angle when arc welding in the flat position should be
- A. 0 degrees
 - B. 5 degrees
 - C. 15 degrees
 - D. 45 degrees

Carpentry

35. Pitch is a ratio of:
- A. rise per foot of run
 - B. run per foot of rise
 - C. rise over span
 - D. run over span
36. Which of the following equals ten board foot of lumber?
- A. 1" X 120" X 1'
 - B. 2" X 6" X 120"
 - C. 3" X 8" X 60"
 - D. all of the above
37. The name given to the horizontal members which metal roofing is attached to in pole building construction is:
- A. purlin
 - B. headers
 - C. girts
 - D. poles
38. A cross-cut circular saw blade would be used to cut:
- A. Across the grain of the wood.
 - B. With the grain of the wood.
 - C. Light steel and/or aluminum
 - D. No such saw blade exists

39. Which of the following wood cutting tools is best suited to cut a circle in plywood?
- A. portable electric circular saw
 - B. electric sabre saw
 - C. back saw
 - D. finishing saw
40. A type of caulk that paint does not stick to very well is:
- A. silicone rubber
 - B. acrylic latex
 - C. oil base
 - D. paint sticks well to each of the above mentioned caulks
41. How are common nails sized?
- A. penny
 - B. wire gage
 - C. diameter
 - D. None of the above
42. What type of square is best for laying out a rafter?
- A. Tri-square
 - B. Combination square
 - C. Framing square
 - D. None of the above can be used
43. The actual size of a 4 x 6 is:
- A. 3 1/2" x 5 1/2"
 - B. 4 1/2" x 6 1/4"
 - C. 4" x 6"
 - D. 3 1/2" x 5 1/4"
44. The function of a vapor barrier or retarder is to:
- A. keep rain from leaking through the walls and ceiling
 - B. keep water vapor from moving from high to low humidity area
 - C. reduce drafts through the wall
 - D. allow water vapor to pass through but prevent water leaks

45. The difference between an 80 grit sandpaper and a 120 grit sandpaper is:
- A. The 80 grit is more coarse than the 120 grit sandpaper
 - B. The 120 grit is more coarse than the 80 grit sandpaper
 - C. There is no difference. There is no such thing as "grit"
46. The name given to a saw that is capable cutting a hole for a door knob.
- A. Keyhole saw
 - B. Crosscut Saw
 - C. Mitre Saw
 - D. Table Saw
47. Which of the following is *not* found on a rafter framing square?
- A. Length of a common rafter
 - B. Length of a valley rafter
 - C. Length of a brace
 - D. The overhang of a hip rafter
48. The power tool in the shop that is most suited to cross-cut an 8' long 2"x 4" piece of lumber is:
- A. Radial arm saw
 - B. Band saw
 - C. Table or bench saw
 - D. Cross-cut hand saw
49. A table saw is sized according to the:
- A. Diameter of the blade arbor.
 - B. Diameter of the blade.
 - C. Length of the table.
 - D. Length of the guard.
50. The device used to size a wood/metal band saw is:
- A. Width of the blade
 - B. Length of the blade
 - C. Size of the table
 - D. Size of the blade wheel

Machinery

51. Name given to the device in the sprayer tank that keeps the chemical to be applied in suspension and promotes a more even application of the chemical.
- A. agitator
 - B. boom valve
 - C. line strainer
 - D. none of the above
52. A SMV (slow moving vehicle sign) should be displayed on all farm vehicles that travel _____ miles per hour or less on public roads.
- A. 0 - 15
 - B. 0 - 20
 - C. 0 - 25
 - D. 0 - 30
53. A rule of thumb to follow when setting the cutter bar lead is 2 percent of the bar cutting width. A seven foot cutter bar should be adjusted with a _____ lead.
- A. $2 \frac{3}{16}$ "
 - B. $21 \frac{5}{8}$ "
 - C. $1 \frac{11}{16}$ "
 - D. $1 \frac{3}{16}$ "
54. The return/tailings auger on a combine:
- A. augers clean grain onto the grain truck or wagon
 - B. augers clean grain into the grain tank of the combine
 - C. augers dirty grain into the grain tank of the combine
 - D. augers dirty grain into the concave/threshing area of the combine
55. Which of the following factors serves to reduce spray drift when applying agricultural chemicals?
- A. raise boom height
 - B. increase pressure to drive the chemical toward the crop faster
 - C. use larger nozzles to produce larger droplets
 - D. spraying on windy days
56. Reel speed on a combine should be _____ percent faster than the ground speed of the combine.

- A. 15 %
 - B. 25 %
 - C. 35 %
 - D. none of the above
57. Which of the following tillage tools is recommended to be operated at 4.5 - 5.5 miles per hour?
- A. moldboard plow
 - B. disk plow
 - C. chisel plow
 - D. All of the above
58. Upon examining the corn in your combine grain tank you notice a number of cracked kernels. What part of the combine should you adjust?
- A. straw chopper
 - B. concave rub bar clearance
 - C. snapping rollers
 - D. b and c
 - E. none of the above
59. Which of the following is **not** a positive displacement pump?
- A. centrifugal
 - B. roller
 - C. piston
 - D. None of the above are correct
60. What are the two types of spray drift?
- A. vapor
 - B. particle
 - C. wind
 - D. both a & b are spray drift
61. Which of the following materials is **not** used to make spray nozzles?
- A. Ceramic
 - B. Copper
 - C. Brass
 - D. Hardened Stainless Steel
62. If a combine is 75% efficient, how long will it take to combine 80 acres? Assume a travel speed of 3.5 mph. Assume he/she has a 20' header.

- A. 10 hours
 - B. 12 hours
 - C. 16 hours
 - D. 18 hours
63. The planting of crops with a grain drill in row spacings too close to permit cultivating or other cultural practices between them is called:
- A. row-crop planting.
 - B. hill planting.
 - C. drop planting.
 - D. solid planting.
64. Over inflation of a grain drill's tires will cause:
- A. an increase in the planting population.
 - B. the seeds to be planted too deep.
 - C. a decrease in planting population.
 - D. none of the above.
65. If the crop is planted in rows far enough apart to permit the operation of machinery, such as cultivators and harvesters, it is called:
- A. solid planting.
 - B. drill planting.
 - C. broadcast planting.
 - D. row-crop planting.
66. What type of pump is recommended for use when spraying wettable powders?
- A. centrifugal
 - B. turbine
 - C. piston
 - D. None of the above are correct

Small Gas Engines

67. The solvent or cleaning solution that is recommended to use when cleaning a foam

element style air cleaning filter:

- A. Water soluble oil
 - B. Hot soapy water
 - C. Gasoline
 - D. Diesel fuel
68. The engine lubricating oil should be changed at _____ intervals in 1996 Briggs and Stratton engines according to the service manual.
- A. 25 days
 - B. 25 hours
 - C. 50 hours
 - D. 75 hours
69. A small 4-stroke gasoline engine is equipped with a:
- A. Piston which has a domed head.
 - B. Piston that has a flat head.
 - C. Piston that has a concave head.
 - D. None of the above are correct.
70. The sparkplug in a Briggs & Stratton engine (4 - stroke) sparks every _____ (assume that the electrical system is functioning properly).
- A. revolution of the crankshaft.
 - B. every other revolution of the crankshaft.
 - C. every fourth revolution of the crankshaft.
 - D. two times during each complete revolution of the crankshaft.
71. On a single cylinder 4-stroke engine the crankshaft completes _____ revolutions in one full cycle.
- A. 1
 - B. 2
 - C. 3
 - D. 4
72. The condenser on your Briggs & Stratton has failed. The recommended repair procedure that your Briggs & Stratton dealer will bring to your attention is for you to:

- A. buy a new engine.
 - B. replace the condenser.
 - C. install a magneton ignition system.
 - D. install an off-brand condenser.
73. The camshaft of a 2-stroke engine rotates:
- A. twice as fast as the camshaft in a four-stroke engine.
 - B. 1/2 as fast as the camshaft in a two-stroke engine.
 - C. 1/4 as fast as the camshaft in a two-stroke engine.
 - D. none of the above are correct.
74. The least amount of cylinder wear in a small gasoline engine should be found:
- A. near the top of the cylinder.
 - B. near the bottom of the cylinder.
 - C. near the middle of the cylinder.
75. Piston slap results from excessive clearance between:
- A. the piston and the rings.
 - B. the piston and the cylinder.
 - C. the piston and the cylinder head.
 - D. the piston and the exhaust valve.
76. The air filter cleaning interval for Briggs & Stratton engines is:
- A. 10 hours
 - B. 15 hours
 - C. 20 hours
 - D. 25 hours
77. The recommended cleaning agent to use when cleaning an aluminum block engine after boring the cylinder is:
- A. parts cleaner such as "stoddards" solvent.
 - B. carburetor cleaner.
 - C. diesel fuel diluted with engine cleaning solvent.
 - D. hot soapy water.
78. The purpose of the engine governor is:
- A. maintain desired engine speed.
 - B. allow the engine to respond to different loads.

- C. to close the throttle and choke the engine.
 - D. a and b are correct.
 - E. only a is correct.
79. After measuring the crankshaft PTO journal you determine that it measures .89 inches. According to Briggs & Stratton, the crankshaft should measure .90.
- A. This is an acceptable measurement.
 - B. This measurement suggests that much repair is in order.
80. Crankshaft end play on Briggs & Stratton engines that are equipped with sleeve bearings on the crankshaft is corrected by:
- A. using fewer gaskets between the sump cover and the block.
 - B. using a thrust washer.
 - C. using a thrust washer and additional gaskets.
 - D. replacing the worn parts.
81. Which of the following should be taken to a grinder if the valve clearance is incorrectly set?
- A. Tappet
 - B. Valve stem
 - C. Valve Seat
 - D. None, a new valve should be secured.
82. You have just examined the flywheel and determined that the flywheel key is sheared. This would:
- A. Not affect the operation of the engine
 - B. Put the engine out of time
 - C. Prevent the engine from starting easily.
 - D. Increase the compression ratio.
83. How do you check the compression of a Briggs and Stratton engine?
- A. Roll the engine backward, if it rebounds, compression is ok
 - B. Use a Briggs compression tester
 - C. Use an automotive compression tester

D. None of the above are correct. Briggs does not recommend testing compression.

Soil and Water

84. The horizontal space of terraces can be varied up to 20 percent in order to:
- A. balance the cuts and fills in the terrace channel
 - B. estimate the surface distance between the terraces
 - C. have an even multiple of machine width
 - D. none of the above
85. The backsight taken when using a leveling instrument:
- A. determines the height of the instrument
 - B. looks back at a known elevation
 - C. looks toward an unknown elevation
 - D. both a and b
 - E. none of the above
86. The foresight taken when using a leveling instrument:
- A. determines the height of the instrument
 - B. looks back at a known elevation
 - C. looks toward an unknown elevation
 - D. both a and b
 - E. none of the above
87. The trickle spillway in a farm pond (earthen embankment):
- A. maintains a constant water level
 - B. should have a drop inlet
 - C. protects the emergency spillway
 - D. none of the above
88. Grassed waterways can provide:
- A. adequate protection to the soil when under continuous flow
 - B. Limited protection to the soil when under continuous flow
 - C. No protection to the soil when under continuous flow
89. The average grade necessary for the satisfactory operation of a tile drainage system is 3

to 6 percent. How much drop in elevation should be planned for a 200 foot tile drain?

- A. 3 - 6 feet
 - B. 6 - 12 feet
 - C. 7.5 - 15 feet
 - D. none of the above
90. Under similar tillage practices, which of the following crops would provide the least protection against soil erosion?
- A. cultivated corn
 - B. hard red winter wheat
 - C. barley
 - D. none of the above
91. If a field is 2,640 feet long and 60 rods wide, how many acres are in the field?
- A. 10 acres
 - B. 20 acres
 - C. 40 acres
 - D. 60 acres
92. Farmer Pete has decided to utilize contour strip cropping to reduce wind erosion problems. When Pete lays out his strips he should:
- A. place the strips parallel to the prevailing winds
 - B. place the strips perpendicular to the prevailing winds
 - C. neither of the above
93. The formula to determine an allowable error for a differential leveling exercise is:

$$.0014 \sqrt{\text{Distance traversed in feet}}$$

If your differential leveling exercise covered 400 feet and the actual error calculated from your field notes was .05, should you rerun the leveling exercise?

- A. yes, the error was too great
 - B. no, its ok
94. Only one other state has a greater soil erosion problem than Missouri.

- A. true
 - B. false
95. You have recorded the following readings while conducting a profile leveling exercise: 5.32, 6.35, 6.31, 5.30 and 4.33. Which of the statements below is true of your readings?
Note: the instrument has not been moved.
- A. the backsight readings taken above are nearly level
 - B. the foresight readings taken above are nearly level
 - C. the readings taken above indicate a great deal of fill dirt is needed
 - D. none of the above
96. When using the universal soil-loss equation $A = RKLSCP$, the "L" stands for:
- A. rainfall
 - B. soil erodibility
 - C. slope length
 - D. slope gradient
 - E. none of the above
97. The outlet of a drainage tile must be protected because:
- A. Animals like to nest in them
 - B. Tillage equipment, as large as it is, can damage the outlet
 - C. Both are correct.
98. Which of the following factors provides the greatest opportunity for erosion control?
- A. greater percent ground cover
 - B. shorter slope length
 - C. changing direction of tillage
 - D. terracing
99. The Universal Soil Loss Equation estimates:
- A. storm by storm soil loss from the lower end of a waterway
 - B. storm by storm soil loss from a uniformly sloping hillside
 - C. average annual soil loss from the lower end of a waterway
 - D. average annual soil loss from a uniformly sloping hillside
100. The benefits of a farm pond include:

- A. cleaner water leaving the pond
- B. reduced peak runoff rate leaving the pond
- C. recreational uses
- D. both a and c
- E. all of the above