

2019 MN FFA Ag Mechanics CDE Exam

Answer the questions by selecting the best answer. Mark your answers on your scantron.
DO NOT WRITE ON THIS EXAM.

LARGE OR SMALL ENGINES

1. When checking valve-tappet clearance, place cylinder at
 - A. bdc of power stroke
 - B. tdc of intake stroke
 - C. tdc of compression stroke
 - D. bdc of exhaust stroke

2. A common compression ratio for a diesel engine is
 - A. three to one
 - B. sixteen to one
 - C. twenty five to one
 - D. eighty to one

3. The principle which states that air flow will increase and air pressure decrease through a narrowed passage is known as
 - A. Venturi principle
 - B. Bernoulli's principle
 - C. air/fuel ration
 - D. displacement principle

4. The difference in angle between the valve face and the valve seat is called the
 - A. interference angle
 - B. valve differential angle
 - C. clearance angle
 - D. valve guide angle

5. Oil in the cylinder is usually an indication of a worn
 - A. exhaust valve guide
 - B. main bearing
 - C. intake valve guide
 - D. head gasket

6. A glossy, dry appearance to the insulator nose of a spark plug is a sign of
 - A. oxidation
 - B. overheating
 - C. dry fouling
 - D. proper operation

7. A number of 5W-30 on an oil container identifies its
 - A. service classification
 - B. quality grade
 - C. performance rating
 - D. viscosity

8. Bent valve stems and push rods are typically caused by
- A. excessive tappet clearance
 - B. lack of tappet clearance
 - C. cylinder pre-ignition
 - D. delayed ignition
9. The side-to-side movement of a crankshaft in the block is referred as its
- A. vertical clearance
 - B. endplay
 - C. bearing clearance
 - D. variance
10. New valves must be _____ prior to installation to assure a perfect seal.
- A. lapped
 - B. sealed
 - C. deglazed
 - D. lubricated

ROW CROP PLANTER

11. What is $1/1000^{\text{th}}$ of an acre?
- A. 56.04
 - B. 35.64
 - C. 64.05
 - D. 43.56
12. What is the row length of $1/1000^{\text{th}}$ of an acre with a row spacing 22 inches?
- A. 23.76
 - B. 17.42
 - C. 1.833
 - D. 2.5
13. What is the seed to seed spacing if our population is 33,000 with a row spacing of 30 inches?
- A. 7.560 inches
 - B. 5.5670 inches
 - C. 6.336 inches
 - D. 3.3245 inches
14. What will the plant population be if I count 30 seeds in $1/1000^{\text{th}}$ of an acre and a germination of 90%
- A. 33,000
 - B. 28,000
 - C. 30,000
 - D. 27,000
15. What can cause a W bottom seed trench?
- A. the double disk openers need adjusting
 - B. the double disk openers are too small a diameter
 - C. the double disk openers are not touching
 - D. all of the above

16. Corn seed should not be planted deeper than _____ inches.
- A. 1 inch
 - B. 2.0 inches
 - C. 3.0 inches
 - D. 4.0 inches
17. After the planting season is complete the operator needs to store the vacuum corn meter unit. The following is steps to follow to store the metering unit. Fine the one that **DOES NOT** belong.
- A. Remove the cover to relieve pressure on the seal
 - B. Remove the metering plate and store in a cool dry place
 - C. Completely wash the metering unit with soap and water
 - D. After washing off the units completely cover with engine oil to prevent rust
18. Seed size determines the following. Identify the one that does not belong
- A. vacuum setting
 - B. finger pressure adjustment
 - C. planter speed MPH
 - D. size of seed plate used
19. The primary function of a planter is to make the V trench. Identify what part of the planter makes the V trench?
- A. metering plates
 - B. fluted and rippled coulters
 - C. the double disk openers
 - D. covering the wheels
20. What is the earliest soil temperature that corn and soybean seeds will germinate quickly?
- A. 60 to 65 degrees F
 - B. 50 to 55 degrees F
 - C. 40 o 45 degrees F
 - D. 35 to 40 degrees F

MASONRY AND PLUMBING

21. Overlap of reinforcing bar should be at least _____ times the diameter of the re-bar and no less than 12 inches.
- A. 5
 - B. 12
 - C. 20
 - D. 24
22. A mix ratio of 1-2-3 will contain:
- A. 1 part sand, 2 parts aggregate, and 3 parts cement
 - B. 1 part water, 2 parts cement, and 3 parts fine and course aggregate
 - C. a part cement, 2 parts water, and 3 parts fine and course aggregate
 - D. 1 part cement, 2 parts fine aggregate, and 3 parts course aggregate
23. A bag of Portland cement is
- A. @ 70 lbs.
 - B. ½ cubic yard of material
 - C. 1 cubic yard of material
 - D. 1 cubic foot of material

24. The chemical reaction which turns concrete from a plastic to a hardened state is known as
- A. heat of hydration
 - B. thermal bonding
 - C. Hydro-dynamics
 - D. polymer bonding
25. Concrete that is kept moist for three days will be _____ percent stronger than concrete that has been air cured after placement.
- A. 25
 - B. 40
 - C. 55
 - D. 70
26. A slump test is designed to
- A. check consistency of the mix
 - B. test water-cement ratio
 - C. check quality of aggregate used
 - D. determine reinforcing needs of the concrete
27. Galvanized steel pipe has a coating of _____ on the outside to prevent rusting.
- A. zinc
 - B. nickel
 - C. tin
 - D. magnesium
28. A properly soldered copper joint, using lead-free solder, is how strong when compared to the pipe itself.
- A. stronger
 - B. equal
 - C. weaker
 - D. twice as strong
29. Plastic pipe that will handle both cold and hot water applications is labeled:
- A. PVC
 - B. CPVC
 - C. ABS
 - D. DMV
30. Which material is not used for PEX fittings?
- A. brass
 - B. copper
 - C. engineered plastic
 - D. galvanized steel

FUEL/GAS CUTTING AND WELDING; COLD METAL

31. The size of a gas cylinder is measured in
- A. cubic inches
 - B. pounds
 - C. cubic feet
 - D. inches

32. Acetylene cylinders are packed with a porous material saturated with _____, used to absorb a large quantity of acetylene under pressure.
- A. acetone
 - B. benzene
 - C. alcohol
 - D. kerosene
33. Oxy-acetylene system design restricts the oxygen line from being placed in the acetylene side by
- A. marking the different hoses with “oxygen” and “acetylene” respectively
 - B. making the oxygen green and the acetylene red
 - C. cutting a groove on the outside of the acetylene connection nut
 - D. making the threads of the acetylene connections left handed
34. Which type of flame will have an “acetylene feather”, indicating that more oxygen needs to be added
- A. neutral
 - B. carbonizing
 - C. oxidizing
 - D. brazing
35. When cutting with oxy-acetylene, what is the common reason for a rough edge and uncut material?
- A. excessive preheat
 - B. travel speed too slow
 - C. lack of preheat
 - D. travel speed too fast
36. When piercing plate or pipe, approach the material surface at a _____ angle.
- A. 45 degree
 - B. 90 degree
 - C. 0 degree
 - D. right
37. A braze weld color that is darker than the original brazing rod is an indication of
- A. improper type of flux
 - B. too little heat or too fast a travel speed
 - C. too much heat or too slow a travel speed.
 - D. quality of brazing job
38. When cutting with a hacksaw, select a blade tpi size that allows at least _____ teeth to contact the material at one time.
- A. one
 - B. three
 - C. five
 - D. seven
39. The hole size for a tap is typically _____ than the tap size for course threads.
- A. 1/16” larger
 - B. 1/8” larger
 - C. 1/16” smaller
 - D. 1/8” smaller

40. Adjust the tool rest of a stationary grinder within _____ of the wheel
- A. 7/16"
 - B. 5/16"
 - C. 3/16"
 - D. 1/16"

ELECTRIC MOTORS, CONTROLS AND SENSING DEVICES

41. This component responds to changes in moisture in a grain drying system.
- A. thermostat
 - B. humidistat
 - C. rheostat
 - D. relay
42. A _____ switch is used to shut off an auger when the grain bin is full.
- A. limit
 - B. overload
 - C. solenoid
 - D. overflow
43. All of the following are factors that can affect the life of a motor except _____.
- A. dust
 - B. water and moisture
 - C. dry air
 - D. excessive oiling
44. The windings of three-phase induction motors are located approximately _____ degrees out of phase from each other.
- A. 90
 - B. 120
 - C. 180
 - D. 240
45. The type of electric motor enclosure that must be used to move grain in a feed bin is:
- A. totally enclosed
 - B. drip proof
 - C. splash proof
 - D. open enclosure
46. Squirrel Cage is a term used to describe
- A. the shaft
 - B. the frame
 - C. the windings
 - D. the rotor
47. If electric motors are not cooled properly problems can occur by
- A. insulation breaking down in the windings
 - B. shorts developing in the windings
 - C. an increase in amperage draw resulting in a voltage drop
 - D. all of the above

48. The stationary electromagnet in an electric motor is called a:
- A. stator
 - B. rotor
 - C. armature
 - D. None of the above
49. Sealed ball bearings on an electric motor should be:
- A. greased one a month
 - B. greased every other month
 - C. cannot be greased
 - D. greased once a year
50. The type of motor that would be found operating a timeclock:
- A. direct current
 - B. synchronous
 - C. induction
 - D. three phase

2019 MN FFA Ag Mechanics CDE Exam Key

1. C
2. B
3. B
4. A
5. C
6. B
7. D
8. B
9. B
10. A
11. D
12. A
13. C
14. D
15. D
16. B
17. D
18. C
19. C
20. B
21. D
22. D
23. D
24. A
25. A

26. A
27. A
28. B
29. B
30. D
31. C
32. A
33. D
34. B
35. D
36. A
37. C
38. B
39. C
40. D
41. B
42. A
43. C
44. B
45. A
46. D
47. D
48. A
49. C
50. B