

IOWA FFA AGRICULTURAL MECHANICS CAREER DEVELOPMENT EVENT
WRITTEN EXAMINATION
IOWA STATE UNIVERSITY
AMES, IOWA
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I. MACHINERY AND EQUIPMENT SYSTEMS: Tractors

1. All of the following statements are correct statements concerning a High Pressure Common Rail (HPCR) fuel system on a JD 7920 tractor, except:
 - a. retains high pressure even when the engine is off
 - b. can be opened safely for repair without bleeding off the residual pressure
 - c. should be serviced by a qualified John Deere dealership technician
 - d. operates at a pressure of several thousand PSI

2. If the JD 7920 has been run out of fuel, do all of the following, except:
 - a. remove fuel filters
 - b. fill fuel filters with fuel, filtered through the pre-fill cup
 - c. fill the filters with a coffee can that you keep in the tool box
 - d. re-install the fuel filters and crank the engine to start

3. Concerning the JD 7920, which of the following is incorrect?
 - a. The 7920 cab filters provide complete protection against inhaling harmful fumes from pesticides.
 - b. The 7920 cab filters do not completely protect against inhaling harmful pesticide fumes
 - c. When harmful pesticide fumes are present, the tractor operator must wear an appropriate respirator
 - d. Protective equipment that is contaminated should be stored in a sealed container if it is to be stored in the cab.

4. The correct procedure for the first start of the day with the 7920 tractor is:
 - a. immediately place the tractor under load
 - b. run the engine at high idle for 5 minutes before placing a load on the tractor
 - c. idle the engine for 2 minutes before placing the tractor under load
 - d. warm up the transmission/ hydraulic system oil (using the procedure outlined in the operator's manual) before placing the tractor under load.

5. Concerning the JD 7920, which of the following is incorrect?
 - a. The extra seat in the cab is provided for baby sitting your little sister
 - b. The extra seat is provided for training new operators
 - c. The extra seat is provided for the JD technician to ride along to diagnose problems with the tractor
 - d. Is designated as the "Instructional Seat."

6. Which of the following is contained in the High Pressure Common Rail (HPCR) on the JD 7920 diesel engine?
 - a. air only
 - b. diesel fuel under very high pressure
 - c. diesel fuel at atmospheric pressure
 - d. air and high pressure diesel fuel

7. The acronym, PLN, stands for:
 - a. Pump Line Nozzle
 - b. Pressure Lubricated Nozzle
 - c. Pressurized Lightweight Nozzle
 - d. none of the above

8. The acronym, IVT, used by John Deere, stands for:
 - a. Infinitely Variable Transport speed
 - b. Infinite Varied Transport
 - c. Infinitely Variable Transmission
 - d. Continuously Variable Transmission

9. Bio-diesel is:
 - a. a mixture of butane and diesel fuel
 - b. a mixture of gasoline and #2 diesel fuel
 - c. a mixture of ethanol and diesel fuel
 - d. a mixture of diesel fuel and processed soybean oil

10. The JD 7920 tractor has what size of engine?
 - a. 6.8 L
 - b. 8.1 L
 - c. 12.1 L
 - d. 13 L

11. The maximum fuel tank capacity for the JD 7920 tractor is approximately this many gallons:
 - a. 25
 - b. 50
 - c. 61
 - d. 103.5

12. Which word is used to identify the most serious safety hazard when working around, or operating the JD 7920?
 - a. caution
 - b. warning
 - c. danger
 - d. safety

II. INDUSTRY AND MARKETING SYSTEMS: Small Engines

13. The Magnetron ignition system, used by Briggs and Stratton includes all of the following except:
 - a. a capacitor
 - b. ignition points
 - c. spark plug wire
 - d. flywheel magnet

14. Current small engines are approved to use all of the following fuels, except:
 - a. regular unleaded gas
 - b. 10% ethanol blend
 - c. E-85
 - d. none of the above

15. Small engines should be operated in well-ventilated areas because of what in the exhaust?
 - a. hydrocarbons
 - b. oxygen
 - c. ozone
 - d. carbon monoxide

16. The crankshaft in a small engine rotates _____ degrees when the camshaft has rotated 360 degrees.
 - a. 360
 - b. 720
 - c. 90
 - d. 80

17. The capacitor or condenser in the small engine ignition system prevents:
 - a. arcing at the ignition points
 - b. backfiring
 - c. the engine from starting
 - d. spark at the plug

18. Small engine governors perform all of the following functions, except:
 - a. maintain maximum speed
 - b. maintain speed when a load is applied to the engine
 - c. prevent overspeeding
 - d. maintain minimum speed

19. The ignition switch on a small engine is generally which type of switch?
 - a. knife
 - b. conventional switch supplied with 12V
 - c. grounding
 - d. none of the above

20. A carburetor operates on the “venturi” principal. A venturi:
 - a. is a restriction which causes lower pressure
 - b. is a restriction which causes higher pressure
 - c. has no effect on air pressure in the carburetor
 - d. pushes fuel out of the fuel bowl

21. The throttle butterfly in the small engine carburetor is located:
 - a. nearest the intake end of the carburetor
 - b. nearest the manifold end of the carburetor
 - c. can be at either end of the carburetor
 - d. is operated by the choke lever

22. Which of the following is connected to the spark plug in a small engine?
- ground
 - condenser
 - primary wire
 - secondary wire
23. Spark is generated in many small engines by:
- dielectric spark
 - electro-magnetic induction
 - radiation
 - magic smoke
24. The air-fuel ratio in a small engine, by weight, is:
- 7:1
 - 14:1
 - 100:1
 - 1000:1

III. ENERGY SYSTEMS: Electrical Wiring

25. A 14/2 WG wire would have all of the following wires, except a:
- wire with black covering
 - wire with white covering
 - ground wire with purple striped cover
 - bare copper wire
26. AC circuits are currently referred to as:
- 60 cycles per second
 - 60 Hertz
 - 60 Watts
 - direct current
27. Stray voltage could be caused by all of the following except:
- cows refusing to drink out of water cups
 - faulty electric motors
 - faulty water heaters
 - faulty electric wiring
28. The service entrance panel neutral bar or neutral bus, should have connected to it one of the following (pick the best answer):
- a black wire from each circuit
 - a white wire from each circuit
 - a green wire from each circuit
 - a white wire and a bare copper wire from each circuit

29. Switches in a 120 Volt circuit should be placed in which part of the circuit?
- the hot wire
 - the green covered or bare wire
 - the white covered wire
 - the ground circuit
30. The following must be connected in series.
- ohmmeter
 - volt meter
 - ammeter
 - densitometer
31. An ohmmeter measures:
- electrical pressure
 - the amount of current
 - resistance
 - watts
32. Grandpa still uses the expression “Hundred and Ten” when referring to line voltage in the house or barn. However, line voltage today is nominally:
- 230V
 - 120V
 - 115V
 - 111V
33. When wiring a plug-in receptacle, which of the following is the correct wiring order?
- a white wire to silver screw, bare wire to brass screw and black wire to ground
 - bare wire to green screw, black wire to silver screw, and white wire to brass screw
 - white wire to silver screw, black wire to brass screw, and bare wire to green screw
 - bare wire and white wire to green screw and black wire to brass screw
34. Which of the following is a device that raises or lowers the voltage of a circuit?
- capacitor
 - condenser
 - voltage gadget
 - transformer
35. Most general household and farmstead wiring uses which gauge of electrical wire?
- 6
 - 8
 - 12 or 14
 - 22.5
36. If you find someone being shocked by a live electrical circuit, which should you do first?
- find a switch to shut off the electricity to the circuit
 - try to pull the person away from the source
 - call 911
 - administer resuscitation

IV. STRUCTURAL SYSTEMS: Arc Welding

37. The main organization that supports welding education and classification of welding materials is:
- SMAW
 - MIG
 - TIG
 - AWS
38. The initials SMAW stand for:
- Self Manual Arc Welding
 - Shielded Metal Arc Welding
 - Shielded Manual Arc Welding
 - Stick Metal Arc Welding
39. In the AWS classification of SMAW electrode, 7018, the “70” stands for:
- minimum tensile strength
 - alloy content
 - flux coating content
 - weight of a box of electrodes
40. Which of the following is not a function of the coating elements found in SMAW electrodes?
- provide mechanical and metallurgical properties of the weld deposit
 - shield the molten metal from oxygen and nitrogen
 - keep the arc established when using direct current
 - produce slag coverage to protect the cooling weld metal
41. Safety is the foremost requirement when arc welding. All of the following, are good safety practices, except:
- wearing long sleeved shirt and pants
 - checking welding helmet lenses for cracks and replace any cracked lenses
 - wearing open-toed sandals to stay cool
 - not looking at the welding arc without eye protection and shielding
42. Most SMAW welding is done using which polarities?
- AC and DC-
 - AC and DC+
 - AC- and DC-
 - it doesn't matter
43. In the AWS classification of SMAW electrode E7018, the “E” stands for:
- Element
 - Electric
 - Electrode
 - Extra

44. SMAW welding is often called:
- Manual welding
 - Code welding
 - Spatter welding
 - Stick welding
45. Which of the following is (are) a safety concern when welding with the SMAW process.
- Electrical hazard
 - Fire or explosion
 - Fumes and gases
 - All of the above
46. The flux coating on a stick electrode for arc welding is necessary, as it provides:
- insulation so you don't get a shock.
 - a gaseous shield as it melts to prevent oxygen and nitrogen from contacting the molten weld puddle
 - only a color code to tell what kind of rod it is
 - none of the above
47. Which type of rod would be a good choice when welding iron pieces with poor fit-up?
- E 6010
 - E 7018
 - Nickel-cast
 - Hard surface
48. "Weaving" is a process used in arc welding to:
- make a small bead
 - weld brass
 - make it look pretty
 - fill a large space in the joint to be welded

V. ENV / NATURAL RERSOURCE SYSTEMS: Manure Management

49. The Iowa "P" Index is the _____ index.
- "P"
 - Production of manure
 - Phosphorous
 - Potassium
50. A confinement dairy operation which produces a strong odor:
- is always in violation of EPA rules
 - is harmful to the health of nearby neighbors
 - affects the quality of life of neighbors
 - is in violation of the "P" Index

51. Which of the following is the main cause of intense odors produced by stored animal manure?
- methanol
 - hydrogen sulfide
 - oxygen
 - sodium chloride
52. Which of the following is a legal area for applying liquid manure from a confinement animal feeding operation?
- a ten-acre field adjacent to Walmart
 - 15 acres between the shopping mall and existing housing
 - 20 acres between the runways at the Ames airport
 - A field which is at least 750 feet from a public use area or existing housing
53. The Iowa "P" Index considers all of the following, except:
- surface run-off
 - legal separation distance
 - subsurface drainage
 - movement with soil particles during erosion
54. Approximately how many tons of manure are produced each year by Iowa livestock operations?
- 50
 - 50 thousand
 - 50 million
 - 50 billion
55. A mature dairy cow is considered to be how many animal units?
- 014
 - 0.14
 - 1.4
 - 14
56. Which of the following is considered a manure storage lagoon?
- an outside confined manure storage area which stabilizes the manure through microbial action
 - a farm pond
 - a storage area beneath the slatted floor in a confinement building
 - a blue metal structure with an airtight lid
57. The Comprehensive Nutrient Management Plan for Iowa considers all of the following in developing a conservation plan for an animal feeding operation, except:
- initial cost of a JD 7920 tractor and a liquid manure applicator rig
 - a handling and storage system for the manure produced
 - the management and efficient utilization of manure plus commercial fertilizer
 - a complete record keeping system

58. Which type of manure produces the highest amount of available phosphorous relative to crop needs?
- a. capons
 - b. white turkeys
 - c. cross-bred hogs
 - d. holstein dairy cattle
59. What percent of manure from an animal feeding operation in Iowa must be land applied in a manner that will not cause surface or ground water pollution.
- a. 10%
 - b. 50%
 - c. 75%
 - d. 100%
60. A confinement hog feeding operation with 501 animals is considered which size of feeding operation in Iowa?
- a. small animal
 - b. large animal
 - c. large animal, in some counties
 - d. none of the above