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?
   a. ground
   b. condenser
   c. primary wire
   d. secondary wire

23. Spark is generated in many small engines by:
   a. dielectric spark
   b. electro-magnetic induction
   c. radiation
   d. magic smoke

24. The air-fuel ratio in a small engine, by weight, is:
   a. 7:1
   b. 14:1
   c. 100:1
   d. 1000:1

III. ENERGY SYSTEMS: Electrical Wiring

25. A 14/2 WG wire would have all of the following wires, except a:
   a. wire with black covering
   b. wire with white covering
   c. ground wire with purple striped cover
   d. bare copper wire

26. AC circuits are currently referred to as:
   a. 60 cycles per second
   b. 60 Hertz
   c. 60 Watts
   d. direct current

27. Stray voltage could be caused by all of the following except:
   a. cows refusing to drink out of water cups
   b. faulty electric motors
   c. faulty water heaters
   d. 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. a black wire from each circuit
   b. a white wire from each circuit
   c. a green wire from each circuit
   d. 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?
   a. the hot wire
   b. the green covered or bare wire
   c. the white covered wire
   d. the ground circuit

30. The following must be connected in series.
   a. ohmmeter
   b. volt meter
   c. ammeter
   d. densitometer

31. An ohmmeter measures:
   a. electrical pressure
   b. the amount of current
   c. resistance
   d. 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:
   a. 230V
   b. 120V
   c. 115V
   d. 111V

33. When wiring a plug-in receptacle, which of the following is the correct wiring order?
   a. a white wire to silver screw, bare wire to brass screw and black wire to ground
   b. bare wire to green screw, black wire to silver screw, and white wire to brass screw
   c. white wire to silver screw, black wire to brass screw, and bare wire to green screw
   d. 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?
   a. capacitor
   b. condenser
   c. voltage gadget
   d. transformer

35. Most general household and farmstead wiring uses which gauge of electrical wire?
   a. 6
   b. 8
   c. 12 or 14
   d. 22.5

36. If you find someone being shocked by a live electrical circuit, which should you do first?
   a. find a switch to shut off the electricity to the circuit
   b. try to pull the person away from the source
   c. call 911
   d. administer resuscitation
IV. STRUCTURAL SYSTEMS: Arc Welding

37. The main organization that supports welding education and classification of welding materials is:
   a. SMAW
   b. MIG
   c. TIG
   d. AWS

38. The initials SMAW stand for:
   a. Self Manual Arc Welding
   b. Shielded Metal Arc Welding
   c. Shielded Manual Arc Welding
   d. Stick Metal Arc Welding

39. In the AWS classification of SMAW electrode, 7018, the “70” stands for:
   a. minimum tensile strength
   b. alloy content
   c. flux coating content
   d. weight of a box of electrodes

40. Which of the following is not a function of the coating elements found in SMAW electrodes?
   a. provide mechanical and metallurgical properties of the weld deposit
   b. shield the molten metal from oxygen and nitrogen
   c. keep the arc established when using direct current
   d. 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:
   a. wearing long sleeved shirt and pants
   b. checking welding helmet lenses for cracks and replace any cracked lenses
   c. wearing open-toed sandals to stay cool
   d. not looking at the welding arc without eye protection and shielding

42. Most SMAW welding is done using which polarities?
   a. AC and DC-
   b. AC and DC+
   c. AC- and DC-
   d. it doesn’t matter

43. In the AWS classification of SMAW electrode E7018, the “E” stands for:
   a. Element
   b. Electric
   c. Electrode
   d. Extra
44. SMAW welding is often called:
   a. Manual welding
   b. Code welding
   c. Spatter welding
   d. Stick welding

45. Which of the following is (are) a safety concern when welding with the SMAW process.
   a. Electrical hazard
   b. Fire or explosion
   c. Fumes and gases
   d. All of the above

46. The flux coating on a stick electrode for arc welding is necessary, as it provides:
   a. insulation so you don’t get a shock.
   b. a gaseous shield as it melts to prevent oxygen and nitrogen from contacting the molten weld puddle
   c. only a color code to tell what kind of rod it is
   d. none of the above

47. Which type of rod would be a good choice when welding iron pieces with poor fit-up?
   a. E 6010
   b. E 7018
   c. Nickel-cast
   d. Hard surface

48. “Weaving” is a process used in arc welding to:
   a. make a small bead
   b. weld brass
   c. make it look pretty
   d. fill a large space in the joint to be welded

V. ENV / NATURAL RERSSOURCE SYSTEMS: Manure Management

49. The Iowa “P” Index is the _____ index.
   a. “P”
   b. Production of manure
   c. Phosphorous
   d. Potassium

50. A confinement dairy operation which produces a strong odor:
   a. is always in violation of EPA rules
   b. is harmful to the health of nearby neighbors
   c. affects the quality of life of neighbors
   d. is in violation of the “P” Index
51. Which of the following is the main cause of intense odors produced by stored animal manure?
   a. methanol
   b. hydrogen sulfide
   c. oxygen
   d. sodium chloride

52. Which of the following is a legal area for applying liquid manure from a confinement animal feeding operation?
   a. a ten-acre field adjacent to Walmart
   b. 15 acres between the shopping mall and existing housing
   c. 20 acres between the runways at the Ames airport
   d. 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:
   a. surface run-off
   b. legal separation distance
   c. subsurface drainage
   d. movement with soil particles during erosion

54. Approximately how many tons of manure are produced each year by Iowa livestock operations?
   a. 50
   b. 50 thousand
   c. 50 million
   d. 50 billion

55. A mature dairy cow is considered to be how many animal units?
   a. 014
   b. 0.14
   c. 1.4
   d. 14

56. Which of the following is considered a manure storage lagoon?
   a. an outside confined manure storage area which stabilizes the manure through microbial action
   b. a farm pond
   c. a storage area beneath the slatted floor in a confinement building
   d. 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:
   a. initial cost of a JD 7920 tractor and a liquid manure applicator rig
   b. a handling and storage system for the manure produced
   c. the management and efficient utilization of manure plus commercial fertilizer
   d. 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