Component Number 1: Fluids

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Which of the fluid containers indicates the highest viscosity?
	1. A
	2. B
	3. C
	4. D
2. Which of the fluids present would be most suitable for main oil lubrication in a spark ignition engine?
	1. A
	2. B
	3. C
	4. D
3. When using a 15 psi pressure cap, item F provides freezing protection as low as -340 C.
4. Item E can be used in tractors where Caterpillar TO-2 is called for.
5. Item B is the only single grade lubricant.

Component Number 2: Hydraulic Schematic

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Hydraulic oil for item #10 passes through which of the following components before entering the relief valve.
	1. Hydraulic cylinder block
	2. Engine
	3. Hydraulic pump
	4. Position control valve
2. With a pressure reading of 13.1MPa on hydraulic circuit #11, the relief valve should be in the \_\_\_\_\_\_\_\_\_\_ position.
	1. Open
	2. Closed
	3. Neutral
	4. Forward
3. A customer has reported a three point implement will not raise and makes a terrible noise. An appropriate solution would be to:
	1. Adjust the linkage arm
	2. Replace the position control valve
	3. Replace the hydraulic oil filter
	4. Replace the hydraulic spool valve.
4. This tractor uses the transmission case as the hydraulic oil reservoir.
5. On the three point hydraulic system, oil is filtered before entering the hydraulic pump

Component Number 3: John Deere Shifter Assembly

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Control item E will adjust the maximum travel speed allowed.
2. Tractor is equipped with 2F and 2R speeds
3. The maximum reverse speed is 12.4 M.P.H.
4. Micro switch appears to be a \_\_\_\_ type switch
	1. Normally open
	2. Normally closed
	3. Double pole, double throw
	4. Proximity
5. Micro switch appears to be functional.

Component Number 4: Battery Cable

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Chassis ground should be used with a ½” bolt.
2. Battery cable should be installed using side mount battery terminals
3. Chassis ground terminal appears to be made from \_\_\_\_\_\_\_\_\_\_.
	1. Copper
	2. Steel
	3. Lead
	4. Aluminum
4. Cable insulation shows significant signs of dry cracking.
5. After visual and electrical integrity inspection, cable is in working order and should be reinstalled.

Component Number 5: Air conditioner fan speed resistor

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Thermofuse between terminals A and B is functional.
2. Testing between terminals A and C shows 100 ohms of resistance.
3. Testing from terminals A to E shows the lowest amount of resistance.
4. When fan is connected to terminal C, the fan will turn the slowest.
5. This resistor can be mounted in an area with little to no air flow.

Component Number 6: Fasteners

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Evaluate items 3, 5, 6, and 10. Which bolt has the highest shear strength?
	1. 3
	2. 5
	3. 6
	4. 10
2. Evaluate items 3, 5, 7, and 11. Which bolt would be considered “NF”?
	1. 3
	2. 5
	3. 7
	4. 11
3. Evaluate items 15, 16, 17, and 18, and identify the “Woodruff” key.
	1. 15
	2. 16
	3. 17
	4. 18
4. Which of the following two items would be used in conjunction with one another?
	1. 21 & 18
	2. 16 & 26
	3. 19 & 34
	4. 8 & 35
5. Items 5, 10, & 13 appear to be made from stainless steel.

Component Number 7: Flow meter

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The flow meter must have power for the turbine to turn.
2. If the turbine is binding the flow reading would be inaccurate.
3. Flow meters can measure liquid or gas volume.
4. The flow meter case indicates direction of fluid flow.
5. Turbine shows signs of continued use with corrosive material.

Component Number 8: Printed Circuit Board

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Item A is a \_\_\_\_\_\_\_\_\_\_ .
	1. Voltage regulator
	2. Capacitor
	3. Connection block
	4. Resistor
	5. Integrated circuit
2. Item B is a \_\_\_\_\_\_\_\_\_\_ .
3. Voltage regulator
4. Capacitor
5. Connection block
6. Resistor
7. Integrated circuit
8. Item D is a \_\_\_\_\_\_\_\_\_\_ .
9. Voltage regulator
10. Capacitor
11. Connection block
12. Resistor
13. Integrated circuit
14. Item E is a \_\_\_\_\_\_\_\_\_\_ .
15. Voltage regulator
16. Capacitor
17. Connection block
18. Resistor
19. Integrated circuit
20. Item C appears to be damaged by heat.

Component Number 9: Speed Sensor

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Installation threads appear to be damaged.
2. With a mounting distance of 5/8” the speed sensor will operate properly.
3. If the internal magnet is weak, the speed sensor will still work properly for a short period of time.
4. When evaluated with a digital multimeter, the sensor is within in specification.
5. The magnet to appears to be at least partially functional.

Component Number 10: Lamp Assembly

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Lamp A appears to be of the LED type.
2. Lamp B appears to be a sealed beam style light.
3. Lamp A should be reinstalled.
4. The coverage area of lamp A can be adjusted
5. Reflector of lamp B appears to be heat damaged.

Component Number 11: Wheel bearing

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The bearing is a \_\_\_\_\_\_\_\_ type bearing.
	1. Straight roller
	2. Ball
	3. Tapered Roller
	4. Needle
2. Bearing shows discoloration from excessive heat.
3. Race shows scaring from lubrication contamination.
4. Bearing is with in specifications when the I.D. is measured.
5. Bearing is suitable for continued service.

**Specifications:**

 O.D. of race: 2.125 +/- .005

 Bearing end play: .002

 Preload torque: 144 ft.lbs

I.D. of bearing: .994 – 1.000

Component Number 12: Battery

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The abbreviation CCA identifies Constant Cranking Amps
2. Connecting two 12 volt batteries in parallel would result in 24 total volts.
3. This appears to be a nominal 12 volt battery.
4. The terminals of this battery show significant damage.
5. The terminals of this battery are revisable.

Component Number 13: Servo motor assembly

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The gear assembly appears to be made from \_\_\_\_\_\_ type gears.
2. Planetary
3. Helical
4. Rack and pinon
5. Straight cut
6. The switches on this assembly would be described as toggle switches.
7. When the polarity is reversed, the direction of the motor would change.
8. Micro switch activation mechanism appears to be damaged.
9. Final output RPM will be reduced through the gear train.

Component Number 14: Power Module Tether Control

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. All of the switches are wired in a \_\_\_\_\_ circuit
	1. Parallel
	2. Series
	3. Reversed
	4. Balanced
2. All of the switches are \_\_\_\_\_\_\_\_\_\_\_ type
	1. Single pole, single throw
	2. Single pole, double throw
	3. Double pole, single throw
	4. Double pole, double throw
3. Switches C and D are both supplied voltage from the white wire
4. Switches C and D both control circuit # 427
5. Switch A is a momentary type switch with a spring return.

Component Number 15: Hydraulic Cylinder

**Directions: True/False statements**

1. Hydraulic Cylinder appears to be a \_\_\_\_\_\_\_\_\_\_ type cylinder
	1. Double acting
	2. Single acting
	3. Telescoping
	4. Double ended
2. Hydraulic cylinder uses a \_\_\_\_\_\_ type mount on the cylinder base end.
	1. Clevis
	2. Cross tube
	3. Flange
	4. Welded
3. The rod-end mount apparatus would have an adjustable length.
4. The chrome coating on the hydraulic cylinder shows signs of corrosion.
5. The hydraulic hose/line connection points appear to severely damaged.

Component Number 16: Hydraulic control valve

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. Control valve uses \_\_\_\_\_ voltage for operation
	1. 120/110
	2. 50/60
	3. 12/24
	4. 5000/1500
2. This control valve is manufactured for direct connection to a hydraulic hose.
3. Solenoid appears to be shorted to the case.
4. Solenoid wires show continuity between both wires.
5. Valve should be reinstalled for continued use.

Component Number 17: Aluminum cylinder head

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The cylinder head is most likely from a \_\_\_\_\_\_\_\_\_ cylinder engine
2. 2
3. 3
4. 4
5. 5
6. The engine appears to have a cam that is located in the head.
7. The cam bearing journals show signs of significant scoring.
8. The combustion chamber shows signs of impact damage.
9. The cylinder head was most likely used with a combustion ignition engine.

Component Number 18: Head gasket

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The gasket can be installed in any direction.
2. To ensure proper seating of the water jacket, 14 head bolts should be torqued to manufactures specifications.
3. Prior to instillation of the head gasket, the head itself should be checked for warpage with a straight edge and feeler gauge.
4. The head gasket is designed for service with a \_\_\_\_\_ cylinder engine.
	1. 3
	2. 6
	3. 8
	4. 10
5. The head gasket shows obvious signs of coolant leakage.

Component Number 19: Electric Schematic

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The nominal voltage of this electrical system is:
	1. 6
	2. 12
	3. 18
	4. 24
2. The batteries in this tractor should be connected in series.
3. The head lights appear to be part of a series circuit.
4. The front work lights do not need a connection to ground.
5. The key switch appears to be a pushbutton normally open switch.

Component Number 20: Diesel fuel system components

**Directions:** Evaluate each statement or question and provide the most appropriate answer:

1. The diesel exhaust fluid should be added directly to the fuel tank.
2. It is permissible to remove the container from the box for easier storage.
3. Diesel exhaust fluid has no limit on the temperature in which it is stored.
4. This product is made from distilled water.
5. This particular brand of diesel exhaust fluid should only be used with tier 4 diesel engines.