AREA QUALFIER FFA TRACTOR TECHNICIAN CDE
Written Exam   January 14, 2023

If a statement is correct, bubble <u>True (A).</u> If a statement is false, bubble <u>False (B).</u>

1.	On a single-action cylinder, both sides of the hydraulic cylinder contain fluid.

2.	PTO shafts are phased; assembled with yokes of U-joints in the same plane.

3.	Lock your brakes together for safer tractor operation at high speeds.

4.	The primary purpose of a hydraulic pump is to create pressure in the system.

5.	Charging storage batteries give off hydrogen gas; treat them carefully.

6.	Adjust the timing of a diesel injection pump with the engine running.

7.	Armature rotators have commutator bars; generator rotors have slip rings.

8.	A hydrostatic steering system uses a hydraulic 'drag link.'

9.	The connecting rod 'eye' is the I-beam shape that provides strength.

10.	To calculate the hydraulic force of a cylinder, multiply area by flow rate.

11.	Cylinders or motors in hydraulic systems are considered actuators.

12.	Impedance is defined as internal resistance.

13.	Test lights are the appropriate tool for diagnosing failures in low-voltage circuits.

14.	Digital multi-meters need a minimum impedance rating in the 5,000 Ω / V range.

15.	Check crankshaft end play with dial indicators or flat thickness gauges.

16.	Air velocity increases as it passes through a venturi.

17.	The negative terminal on a battery is larger than the positive terminal.

18.	Corrosion in the terminal pins and sockets is a source of electrical problems.

19.	Stacking spool valves allows the easy addition or removal of extra valves.

20.	Normal clutch wear will increase the clutch pedal free travel.

21.	A hydraulic motor operates in the same way as a hydraulic pump.

22.	A 4:1 ratio gearbox has a different set of gears than a 1:4 ratio gearbox.

23.	Reduce heat transfer by grinding interference angles on valves.

24.	All energy going into a hydraulic system comes out of the system as either loss (heat) or gain (work).

25. Worn bushings or bent armatures can cause dragging starter armatures.

26. Each cell in a 12v storage battery has a potential of approximately 2.2 volts

27. Ohm's law is expressed as volts = amperes X ohms.

28. The evaporator in an air-conditioning system resembles an engine radiator.

29. Air in a hydraulic system can cause the fluid to foam.

30. When operating machinery with a loader or other lifting attachment, the center of gravity remains constant regardless of the height of the load.

31. When operating machinery next to a stream, excavation, or ditch, the cave-off line or shear line is an imaginary line drawn at a 45° angle from the bottom of the ditch to as far away from the edge as the ditch is deep.

32. The specific gravity reading of electrolyte increases as % charge of the battery decreases.

33. Using oxygen in pneumatic accumulators is an acceptable safety practice.

34. The most common hydraulic control valves are pressure valves, directional valves, and volume valves.

35. End lash is clearance or free play between gears.

36. Periodic sampling and analysis of fluids is a preventative maintenance procedure used to monitor internal wear.

37. In a four-stroke engine, the camshaft turns at half the speed of the crankshaft, opening and closing each valve once during two revolutions of the crankshaft.

38. Reserve capacity is the number of amperes a battery can deliver at 0°C for 30 seconds.

39. Compressed coil springs contain stored energy.

40. Fully charged battery electrolyte has a specific gravity of 1.720, and is approximately 75% sulfuric acid, 25% water.

41. Liquids transmit applied pressure equally in all directions.

42. A priority-type flow divider valve allows 10% - 90% of the hydraulic flow to be delivered to the circuit in which it is installed.

43. Air intake systems equipped with primary and secondary filters should never have dust on the secondary filter.

44. A full-flow system operates in the same manner as a bypass system.

45. Brake horsepower is used to determine the amount of time necessary for a tractor to stop when hauling the heaviest rated equipment.

46. Valve lash that exceeds manufacturer's specifications causes valves to open late and close early.

47.   Valve clearance is the distance between the face of the valve and the piston head at TDC.

48.   The rate of current flow in a conductor is measured in volts.

49.   The safety word 'WARNING' indicates the most potentially hazardous condition.

50.   The cutout relay in a charging system opens and closes the circuit between the alternator and the battery to prevent discharging the battery.

Multiple Choice: Mark <u>True (A)</u> or <u>False (B)</u> for each answer on the answer sheet.

The best time to refuel a piece of equipment is _____.
    51.   at noon
    52.   in the evening
    53.   early morning
    54.   when the gauge reads below 1/8 full to achieve full mixing of additives

The most common type(s) of special drive(s) is(are) _____.
    55.   Belts
    56.   Chains
    57.   Gears
    58.   Rotary

Valve stem deposits, a common cause of valve failure, are caused by _____.
    59.   weak valve springs
    60.   excess tappet clearance
    61.   narrow valve seats

The best description of a properly operating cooling system is that it _____.
    62.   Prevents engine overheating
    63.   Regulates engine temperatures at proper levels
    64.   Keeps the engine cool

Assuming the speed of the input driver shaft remains constant, and the diameter of the driven shaft remains constant, increasing the diameter of the driver shaft will _____.:
    65.   decrease the speed of the output shaft on the driven sheave
    66.   increase the speed of the output shaft on the driven sheave
    67.   have no effect on output speed since input remains constant

Common problems in a hydraulic system are _____.
    68.   foaming
    69.   worn pump
    70.   incorrect fluid

During equipment operation, centrifugal force increases _____.
    71.   as the equipment's center of gravity lowers
    72.   as speed of travel increases
    73.   as the wheelbase narrows / is shortened

The most common type of governor on a diesel tractor is a _____.
    74.   vacuum governor
    75.   centrifugal governor

One horsepower (hp) is _____.
76. 33,000 foot-pounds per minute
77. 550 foot-pounds per second
78. 746 watts

Captive air in a hydraulic system will cause _____.
79. noise when pump is in operation
80. oil foaming
81. oil overheating
82. slow system operation.

Crankcase sludge buildup is caused by _____.
83. worn pistons, rings, and cylinders
84. improper thermostat settings
85. use of improper engine oil
86. use of high-sulfur fuel

Piston-type hydraulic pumps are _____.
87. more efficient than gear or vane pumps when operated at the same working pressure.
88. used in systems with working pressures up to 10,000 psi / 70,000 kPA
89. most economical for low pressure applications
90. used only for fixed displacement applications.

Piston rings _____.
91. form a gas-tight seal between the piston and cylinder wall
92. cool the piston by transferring heat to the cylinder walls
93. control lubrication between the piston and cylinder wall.

The formula for determining the force generated by a piston is _____.
94. Force = Area X Pressure
95. Force = Area X Diameter
96. Force = Volume X Diameter
97. None of the above

Hydraulic pumps typically used on equipment may be _____.
98. gear-type pumps
99. bladder-type pumps
100. piston-type pumps