

Name \_\_\_\_\_

FFA Chapter \_\_\_\_\_

## **2022 Agriculture Technology & Mechanical Systems Questions**

Mark all answers on the answer sheet using a pencil. Read each question carefully and identify the correct single answer. Use the blank sheet of paper to do all the scratch work. Students will need a calculator to complete this examination, but they are not allowed to share a calculator with another student.

1. What is the name of the device to measure tractor PTO (power take-off) horsepower?

A. Dynamometer

B. Load cell

C. Wattmeter

D. Calorimeter

2. A diesel engine produces blue-colored exhaust. What is the most likely cause?

A. Low engine temperature

B. Combustion of engine oil

C. Restricted air intake

D. Turbocharger failure

3. Which hydraulic system component converts mechanical energy into hydraulic energy?

A. Hydraulic pump

B. Relief valve

C. Directional control valve

D. Actuator (such as a hydraulic cylinder)

4. A twenty-foot-long dump truck bed is 54 inches deep and seven feet wide. What is the approximate capacity of the truck bed in cubic yards if a load is struck level across the top?

A. 23 yd<sup>3</sup>

B. 70 yd<sup>3</sup>

C. 210 yd<sup>3</sup>

D. 630 yd<sup>3</sup>

5. Which of the following is the safest way to drive a loader uphill with a full bucket?

A. Back straight up the hill

B. Drive forward straight up the hill

C. Drive forward diagonally across the slope of the hill

D. One method is not safer than another

6. When the piston of the four stroke small engine reaches the bottom of the cylinder on the intake stroke it starts upward on what stroke?

A. Exhaust

B. Combustion

C. Compression

D. Power

7. The intake valve of a 4-stroke single-cylinder small engine is opened and closed by the action of what component?

A. Piston

B. Throttle

C. Wrist pin

D. Camshaft

8. In four-stroke small gasoline engines, how fast does the camshaft turn with respect to the speed of the crankshaft?

A. The camshaft turns at one-half the speed of the crankshaft

B. The camshaft turns at the same speed as the crankshaft

C. The camshaft turns at twice the speed of the crankshaft

9. What is the name given to the printed safety information that must be kept on file for each hazardous material kept or used in a small engine shop?

- A. Safety Detection Sheet
- B. Safety Deterrent System
- C. Safety Data Sheet
- D. Safety Depreciation System

10. In electrical terminology, what is the meaning of the abbreviation AC?

- A. Arc current
- B. Always current
- C. Alternating current
- D. Acetylene current

11. Which of the following statement is correct with respect to wearing safety glasses while welding?

- A. Safety glasses are not needed for other metal working activities as long as a face shield is worn while welding
- B. Safety glasses should be darkly tinted to protect the eyes at all times while performing metal working activities
- C. Safety glasses should be worn continuously while working with or near metal working activities
- D. Safety glasses are not needed when a welding helmet is worn, because the helmet protects the eyes from all welding related hazards

12. Approximately how much time is required to remove 750 round hay bales from a field if bale transport can be completed at an average hauling rate 11.5 bales per hour?

Note: 1 hour= 60 minutes.

A. 64 hours and 48 minutes

B. 65 hours and 2 minutes

C. 65 hours and 13 minutes

D. 65 hours and 22 minutes

13. A tractor fueled by No. 2 diesel burns 7.75 gallons per hour. When the same tractor is fueled with B20 biodiesel it burns 8.25 gallons per hour. Approximately how many more gallons of fuel will the tractor use during eight hours of operation if it is fueled by B20 biodiesel rather than No. 2 diesel?

A. 2.5 gallons

B. 3.0 gallons

C. 3.5 gallons

D. 4.0 gallons

14. What tractor power train component directs power equally to both rear wheels to prevent the loss of traction that occurs when one wheel is slipping?

- A. Drawbar lock
- B. Differential lock
- C. Transmission lock
- D. Final drive lock

15. If the measured tractor wheel slippage is zero, what adjustment can increase wheel slippage?

- A. Drive 2 miles per hour slower
- B. Drive 2 miles per hour faster
- C. Add more ballast on the tractor
- D. Remove ballast from the tractor

16. Why do engine manufacturers recommend that fuel stabilizer be added to fuel left in gasoline engines, such as lawnmowers and snow blowers, when the equipment will not be used from one season to the next?

- A. To prevent the engine valves from rusting
- B. To prevent the cylinder liner(s) from rusting
- C. To prevent the gasoline from breaking down
- D. To prevent the oil from entering the gasoline

17. When a hydraulic leak is suspected to originate from an implement hose, which of the following is the correct procedure to locate the leak?

- A. Use your finger to find the origin of the leak
- B. Use the back of your hand to locate the origin of the leak
- C. Wrap duct tape around the hose to locate the origin of the leak
- D. Use a piece of cardboard to locate the origin of the leak

18. Which of the following statements about the American Wire Gauge (AWG) conductor rating system is true?

- A. The smaller the AWG number the larger the wire
- B. The larger the AWG number the larger the wire
- C. The smaller the AWG number the smaller the wire
- D. The smaller the AWG number the longer the wire

19. A non-metallic sheathed cable that contains two #12 insulated conductors (white and black) and one bare grounding conductor would be identified by which of the following markings?

- A. 12-3WG
- B. 12-2 WG
- C. 14-2 WG
- A. 10-2WG

20. At least how many inches of free conductors shall be left at each outlet, junction, and switch point for splices or the connection of fixtures or devices?

- A. 2 inches
- B. 6 inches
- C. 12 inches
- D. 5 inches

21. When operating a tractor on a road or highway, which of the following is correct regarding brakes?

- A. Lock the left and right brake pedals together so that the both the left and right brakes assist while braking
- B. Make sure the left and right brake pedals are not locked together so the brakes can assist with steering
- C. Use the left brake for low speed braking and the right brake for high speed braking
- D. Do not use the brakes to control speed when traveling on roads or highways

22. When servicing the engine on a push mower always:

- A. disconnect the spark plug wire
- B. remove the gasoline
- C. engage the engine stop lever
- D. attach the grass catcher

23. The major danger posed to a bystander by a walk behind rotary mower is

A. thrown object

B. rollover

C. crushing

D. pinch points

24. Which of the following is appropriate footwear for mowing with a walk behind rotary mower?

A. bare feet

B. sandals

C. canvas shoes

D. leather shoes

25. Under what circumstance must a slow moving vehicle (SMV) sign be displayed on agricultural machinery?

A. When machinery will NOT be operated on public roads

B. When machinery is operated on public roads

C. Only on machinery that will operate on interstate highways.

D. Only on machinery that will be transported on a trailer

26. Which of the following statements about a tractor-loader's center of gravity is true?

- A. It is always in the same place
- B. It changes depending upon the operator's hours of use
- C. It changes as the position of the loader changes
- D. It is located ten feet behind the loader

27. The National Electric Code (NEC) requires that conductor insulation be color-coded. Which of the following conductor insulation colors indicates the grounded conductor?

- A. Green
- B. Black
- C. White
- D. Red

28. What is the recommended eye protection shade number for a welding helmet lens used when arc welding with 1/8-inch electrodes?

- A. No. 4 lens shade
- B. No. 6 lens shade
- C. No. 8 lens shade
- D. No. 10 lens shade

29. When pulling or towing a trailer with a tractor, what is the correct place to connect the load?

- A. The tractor's rear axle
- B. The lower arms of the tractor's three-point hitch
- C. The tractor's drawbar
- D. The top link of the tractor's three-point hitch

30. When "stick" welding the protective cloud that surrounds the weld zone is produced by \_\_\_\_\_.

- A. argon that is added from a hi pressure tank
- B. the flux on the outside of the consumable rod
- C. oxygen and acetylene supplied by the welding torch
- D. the flux located on the inside of the consumable wire