Sub-District FFA Ag Mechanics Exam **School**_____
February 26, 2013 **Student Names** _____
TEAM TEST _____
_____
_____
Select the one best answer for each question and _____
write it in the blank to the left of the question. _____

Round Balers

_____ 1. Which of the following factors is required to make a good bale?
- A. Properly operating baler density control system.
- B. Proper windrow formation (width, size. Crop distribution)
- C. Operator driving technique (weaving, monitoring strokes/bale)
- D. Properly set tractor (wheel spacing, drawbar, PTO)
- E. All of the above

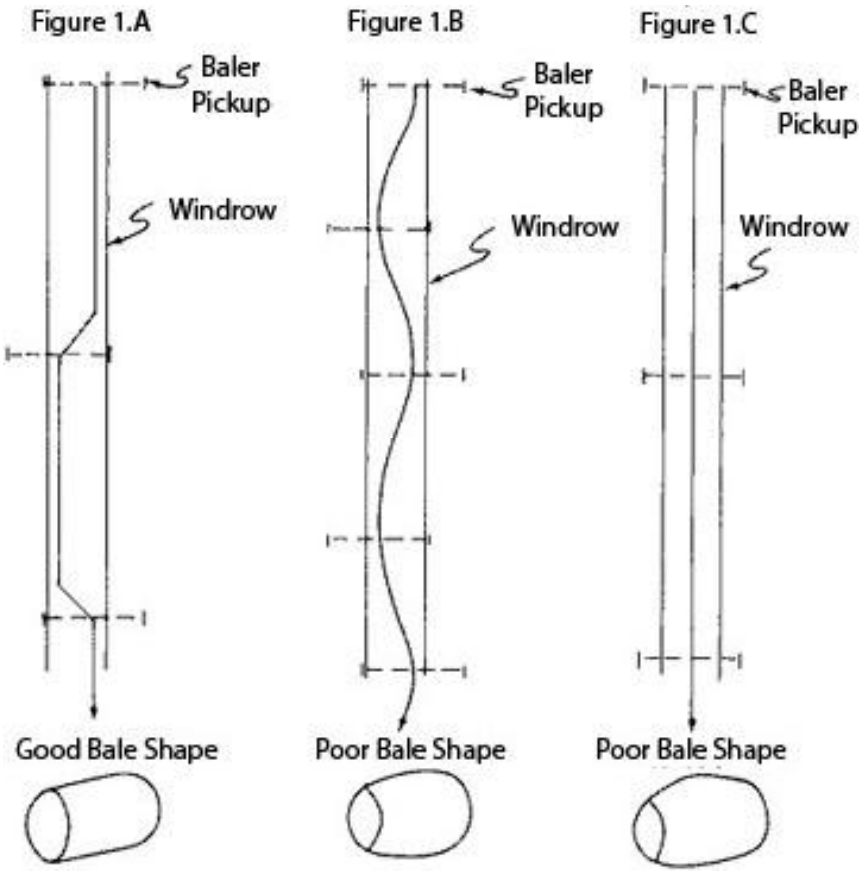
_____ 2. How many tons per hour would a farmer bale if he/she is baling a 21' windrow that yields 2.3 tons/acre. Assume he/she is driving 4.3 mph and operating at 87% efficiency.
- A. 25.17 tons/hour
- B. 21.90 tons/hour
- C. 20.65 tons/hour
- D. none of the above

_____ 3. A baler operator notices that the large round bale is lop-sided. The source of the problem is a/an:
- A. faulty monitor.
- B. twine arm is not wrapping the bale properly.
- C. operator failed to "weave" as he was baling.
- D. none of the above .

_____ 4. What is the proper width of a windrow for a round baler:
- A. is slightly less than the bale length
- B. is slightly more than the bale length
- C. is slightly less than the bale width
- D. is slightly more than the bale width

_____ 5. Which statement best describes the correct time for baling with a round baler?
- A. Bale as quickly as possible after mowing to retain maximum weight and nutrient value.
- B. A good rule of thumb is to use the same moisture content as is acceptable for baling hay with conventional square balers.
- C. To prevent internal molding because bales are much larger, hay should be allowed to dry and cure at least one day longer than is acceptable with conventional square balers.
- D. It really does not matter because most round bales are stored outside and the hay in the bale will continue to dry out if needed.

_____ 6. The slow-moving vehicle (SMV) emblem identifies machinery the normally travels slower than:
- A. 25 MPH.
- B. 30 MPH.
- C. posted speed.
- D. 35 MPH.



http://extension.missouri.edu/explore/agguides/agengin/g01955.htm#reducing

_____ 7. Shown above, is a drawing from University of Missouri's extension publication, G1955, Large Round Bales: Management. This diagram illustrates that:

A. for more uniform bales, you should make sharper turns as shown in Figure 1A. First, crowd material into one side of the pickup for 10-12 seconds; then cross quickly to the other side and crowd material into the opposite side of the pickup for 10-12 seconds
B. you end up with undesirable barrel-shaped bales when you follow a smooth weaving pattern as you move back and forth on narrow windrows (Figure lB)
C. you end up with undesirable barrel-shaped bales when you drive straight down the windrow (Figure 1C).
D. all of the above are true.
E. for the most desirable round bale, you should weave smoothly from side to side or drive straight down the windrow

_____ 8. Which crop(s) or crop residue(s) can be formed with round balers?

A. alfalfa
B. forage sorghums
C. grasses
D. corn stalks
E. all of the above

_____ 9. Which of the following is **NOT** a function of twine on round balers?

A. helps retain round shape
B. helps reduce forage losses if bales are exposed to high wind
C. retards spoilage
D. twine wrapped bales are more durable during transport

_____ 10. Which of the following is **NOT** an advantage of a round baler over a conventional baler?
- A. requires less manpower from harvest to feeding
- B. round bales are more easily stored outdoors
- C. when round bales are left in the field where they are baled and animals are given assess to these bales in the field, very little waste occurs with round bales
- D. the round shape resists water penetration and wind damage

_____ 11. To reduce bale chamber losses:
- A. make windrows as heavy as possible.
- B. make sure hay is conditioned.
- C. bale hay when moisture is at the maximum level that permits safe storage.
- D. shorten time in the baling chamber by keeping feed rate as high as possible.
- E. do all of the above.

_____ 12. Regarding Round Baler Safety:
- A. A round baler is bulky and reduces operator vision to the rear, so be watchful when backing the baler.
- B. Be sure that no one is near the rear gate when it is being raised and lowered.
- C. Large round bales can roll after discharge when on hilly terrain.
- D. Before servicing, cleaning, or adjusting a round baler, disengage the tractor PTO and shut off the engine.
- E. All of the above are important safety rules.

Tractor Power **SD 2011 1-23**

_____ 13. A 540-RPM PTO shaft has _____ splines and a 1000-RPM PTO shaft has _____ splines.
- A. 10 and 21
- B. 6 and 21
- C. 7 and 24
- D. 21 and 24

_____ 14. Tractor tire slippage may be reduced by:
- A. installing larger tires
- B. adding ballast
- C. increasing tire air pressure
- D. a and b

_____ 15. The events in sequence in the operation of the 4-stroke cycle diesel engine are:
- A. intake, compression, injection, power, exhaust
- B. injection, compression, power, exhaust, intake
- C. injection, power, exhaust, compression, intake
- D. intake, injection, compression, power, exhaust

_____ 16. Tractors are now factory equipped with covers over the starter solenoid:
- A. to make the mechanic's life more complicated, because it makes it hard to jump-start the tractor
- B. are provided by the equipment maker at a high cost to the customer
- C. are installed because of the great danger involved in jump starting the tractor
- D. to make the starter look pretty

_____ 17. In diesel engines, _____ is taken into the cylinder on the intake stroke.
- A. air only
- B. air and fuel
- C. fuel only
- D. air, fuel and oil

_____ 18. This heat-operated valve controls the flow of the coolant to maintain the correct engine operating temperature.
A. separator
B. thermostat
C. turbo charger
D. hydraulic trap

_____ 19. Turbochargers increase the power output of the diesel engine by supplying more _____ to the engine.
A. fuel
B. power
C. nitrous oxide
D. air

_____ 20. What is the recommended API specification for the engine lubricating oil for a diesel engine?
A. SA
B. SE
C. CD
D. SG

_____ 21. The air-fuel mixture in ignited in a diesel engine by:
A. compression due to heat
B. spark ignition
C. hot bulb ignition
D. heat due to compression

_____ 22. If the diesel engine overheats, you should:
A. get the radiator cap off as quickly as possible
B. let the engine cool off sufficiently to lower the pressure in the cooling system before attempting to remove the radiator cap.
C. get the cause of the overheating corrected the next rainy day
D. continue to use the tractor until the job is finished

_____ 23. The cooling system thermostat is rated for 195 degrees. This is the temperature required to :
A. close the thermostat
B. open the thermostat
C. open the radiator pressure cap relief valve
D. maintain the maximum temperature of the cooling system

_____ 24. The engine speed of a diesel engine is varied by regulating:
A. time of fuel injection
B. quantity of air taken in on the intake stroke
C. quantity of fuel injected
D. camshaft timing

Carpentry

_____ 25. The most common hammer used in building construction is the:
A. curved claw
B. mallet
C. ball peen.
D. straight claw.

_____ 26. Lumber measurements are given in this order:
A. thickness, width, length
B. width, length, thickness
C. thickness, length, width
D. width, thickness, length

_____ 27. A standard size sheet of plywood measures:
A. 2' x 4'
B. 4' x 4'
C. 4' x 8'
D. 4' x 12'

_____ 28. Studs are:
A. members between the top plate and ridge board
B. members between the floor joists that are crossed in an "X" fashion
C. horizontal members above windows
D. vertical members between the sole plate and top plate

_____ 29. A 2 x 6 inch piece of lumber actually measures:
A. 2" x 6"
B. 1 5/8" x 5 5/8"
C. 1 1/2" x 5 1/2"
D. 1 1/4" x 5 1/4"

_____ 30. How many studs are needed when placed 2' on center in a 20 foot wall with double studs on each end?
A. 10
B. 11
C. 12
D. 13

_____ 31. A bolt used in wood that has a round head over a square shoulder is a:
A. stove bolt.
B. machine bolt.
C. carriage bolt.
D. none of these.

_____ 32. The lowercase letter "d" is used to designate sizes of:
A. lumber.
B. screws.
C. nails.
D. bolts.

_____ 33. The term "dead load" of a building refers to:
A. the weight of snow and ice which may accumulate on the roof.
B. the weight of livestock and equipment that are supported by a building.
C. the weight of all materials used to construct a building.
D. the wind force which creates an uplifting effect on a building.

_____ 34. A "bird's mouth" is a:
A. part of a bird's tail.
B. part of the top plate.
C. the part of a rafter that fits on the top plate.
D. none of these.

_____ 35. A "square" of roofing material:
A. is cut in square shapes for easier installation.
B. will cover 100 square feet of roof area.
C. will cover 144 square feet of roof area.
D. refers only to roofing and siding shingle materials.

_____ 36. A carpenter cuts three pieces from a 12' length of 2" x 6" and the length of the pieces are 33 3/8", 56 5/8", and 39 7/8". What is left over from the full length, if the saw kerf is 1/8" wide?
A. 12 ¾"
B. 13 ¾"
C. 14 ¾"
D. 15 ¾"

Electricity & Electrical Wiring

_____ 37. If a person is being shocked and cannot move the first thing to do is:
A. to take hold of the person and pull him or her loose
B. to search for a way to de-energize the circuit
C. to find a fire extinguisher
D. telephone for a rescue squad

_____ 38. A switch has two identical colored screws and one different colored screw and:
A. the different colored screw is probably the common
B. it is a 3-way switch
C. it could be called a SPDT switch
D. all of the above

_____ 39. What do the letters 'UL' on electrical devices mean?
A. Utilization Limited
B. Underwriter's Laboratories
C. Universal Lighting
D. United

_____ 40. When attaching wires to a receptacle, the black wire should fasten to the _____ colored screw.
A. brass
B. aluminum
C. green
D. silver

_____ 41. Watts can be described as:
A. the rate of using electrical energy.
B. the measure of electrical power.
C. multiplying volts times amperes.
D. all of the above.

_____ 42. A No. 12 wire is _____ a No. 14 wire.
A. thicker than
B. thinner than
C. the same diameter as
D. has thicker insulation than

_____ 43. In an electrical wiring cable, the bare wire is the _____ wire.
A. hot
B. neutral
C. common
D. ground

_____ 44. Amperage refers to:
A. resistance
B. current flow
C. electrical power
D. electrical pressure

_____ 45. A ventilating fan motor with a 4" pulley which operates at 1750 RPM would cause a fan that it is belted to it, with a 6" pulley to turn at about _____RPM.
A. 1750
B. 3500
C. 1170
D. 875

_____ 46. What is the applied voltage on a circuit in which .5A is flowing and 10 W is generated?
A. 2 V
B. 5 V
C. 20 V
D. 50 V

_____ 47. Wires should pass under the head of terminal screws in a _____ direction.
A. clockwise
B. counterclockwise
C. either clockwise or counterclockwise
D. left-handed

Survey and Land Measurement

_____ 48. One acre consists of _____ square feet of area.
A. 1,728 B. 5,280 C. 10,000 D. 43,560

_____ 49. What is a temporary bench mark used to extend the survey a greater distance?
A. Foresite
B. Backsite
C. Hindsite
D. Turning Point

_____ 50. Surveying is:
A. the science of determining the dimensions and contour of the earth's surface by measurements of distance, directions and elevations.
B. most accurately completed by using a measuring wheel.
C. most commonly completed, using hand held GPS units.
E. all of the above are correct

_____ 51. How many total acres are included in the "S ½ of the NW ¼ and NE ¼ of the SW ¼ of Section 15, Twp. 10N, R4W of the 5th Principle Meridian?
A. 80 acres
B. 120 acres
C. 160 acres
D. 240 acres

_____ 52. How many feet of fencing would be required to fence the entire perimeter of a rectangular that measures 1/2 of a mile long and ¼ of a mile wide?
(One mile = 5,280 feet)
A. 3,960'
B. 5,280'
C. 7,920'
D. 10,560'

_____ 53. How many acres are in a quarter section of land?
(One section of land contains 640 acres)
A. 40 acres
B. 160 acres
C. 640 acres
D. 1,000 acres

_____ 54. What is the smallest size of the graduations on a Philadelphia Rod?
A. 1 ft.
B. 0.1 ft.
C. 0.01 ft.
D. 0.001 ft.

_____ 55. In the Public Land Survey System (PLSS), how many acres are in a typical section of a township?
A. 10 acres
B. 160 acres
C. 240 acres
D. 640 acres

_____ 56. A contour line on a map indicates
A. the direction a stream flows
B. a ridge line
C. a uniform slope
D. a series of points of equal elevation

_____ 57. After pacing a 500 ft. distance three times, Farmer Wyatt counts 145, 150, and 155 paces. What is the average length of his pace for the three times?

A. 3 ft./pace
B. 3.3 ft./pace
C. 3.5 ft./pace
D. 4 ft./pace

_____ 58. Points J and K are 700 ft. apart. The difference in elevation between J and K is 28 ft. The average slope between J and K is:

A. 2%
B. 3%
C. 4%
D. 6%

_____ 59. On a contour map, contour lines are getting closer together indicate that:

A. slope in increasing
B. slope in decreasing
C. slope in NOT affected by distance between contour lines
D. terrain is rocky

_____ 60. A farm pond contains 1,401,625 gallons of water. How many acre-feet does it contain? (1 cu. ft. = 7.48 gallons) (1 acre = 43,560 sq. ft.)

A. 1140 acre-ft
B. 4.3 acre-ft
C. 20.4 acre-ft
D. 100 acre-ft

Sub-District FFA Ag Mechanics Contest --- Charles City, Iowa --- February 25, 2013

WRITTEN EXAM KEY

Answers

1.	**E**	**31.**	**C**
2.	**B**	**32.**	**C**
3.	**C**	**33.**	**C**
4.	**A**	**34.**	**C**
5.	**B**	**35.**	**B**
6.	**A**	**36.**	**B**
7.	**D**	**37.**	**B**
8.	**E**	**38.**	**D**
9.	**C**	**39.**	**B**
10.	**C**	**40.**	**A**
11.	**E**	**41.**	**D**
12.	**E**	**42.**	**A**
13.	**B**	**43.**	**D**
14.	**B**	**44.**	**B**
15.	**A**	**45.**	**C**
16.	**C**	**46.**	**C**
17.	**A**	**47.**	**A**
18.	**B**	**48.**	**D**
19.	**D**	**49.**	**D**
20.	**C**	**50.**	**A**
21.	**D**	**51.**	**B**
22.	**B**	**52.**	**C**
23.	**B**	**53.**	**B**
24.	**C**	**54.**	**C**
25.	**A**	**55.**	**D**
26.	**A**	**56.**	**D**
27.	**C**	**57.**	**B**
28.	**D**	**58.**	**C**
29.	**C**	**59.**	**A**
30.	**D**	**60.**	**B**