

Please Print

Name:		School:	
Group Number:	Individual Number:	Score:	

2014 Minnesota Agricultural Mechanics Career Development Event

Drainage, Irrigation, and Conservation Practices

Metal Fabrication

Helpful Items:

Problem solving. 20 points

Match the characteristics with the electrode.

- _____ 1. E7018
- _____ 2. E6012
- _____ 3. E6010
- _____ 4. E7024

- | |
|-----------------|
| A. Fast-freeze |
| B. Fill-freeze |
| C. Fast-fill |
| D. Low hydrogen |

_____ 5. The _____ electrode produces a snappy arc with little slag.

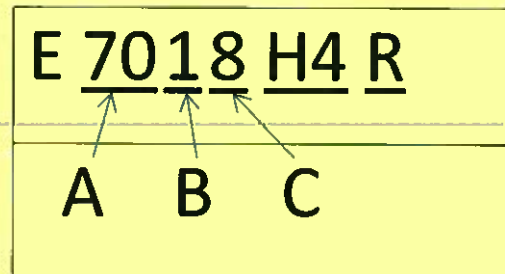
_____ 6. The _____ electrode includes iron powder electrodes.

_____ 7. The _____ electrode is a general purpose electrode.

- | |
|----------------|
| A. Fast-freeze |
| B. Fill-freeze |
| C. Fast-fill |

Identify the parts of the AWS electrode classification

- _____ 8. Welding Position
- _____ 9. Type of coating and current
- _____ 10. Tensile strength



(OVER)

Use the provided Prinsco Drainage Slide Calculator to answer the following questions.

11. (Two points.) How many acres is a field that is 1,162' by 1,500'? (Round to the nearest acre)

 12. (Two points.) What is the largest general drainage coefficient (inches/24 hours) that could be used in a **field crops** field **without surface inlets** with a **mineral soil type**?

 13. (Two points) What is the % grade if there is 4.8' of fall in 800' of run?

 14. (Two points) Based on the data collected in the above questions, what diameter of **GOLDFLO Dual Wall** drainage tile should be used? Circle the correct answer.
 - A. 4 inch
 - B. 6 inch
 - C. 8 inch
 - D. 10 inch
 - E. 1 foot

 15. (Two points.) Calculate the approximate pipe requirements for the entire field if the tile spacing is 100'. (Use the acreage from question #1)
-

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Key

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2014 Minnesota Agricultural Mechanics Career Development Event

Drainage, Irrigation, and Conservation Practices

Metal Fabrication

Helpful Items:

Problem solving. 20 points

Match the characteristics with the electrode.

- D 1. E7018
- B 2. E6012
- A 3. E6010
- C 4. E7024

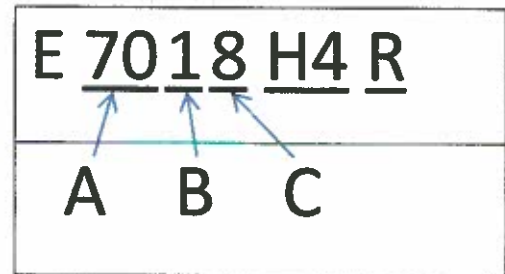
A. Fast-freeze
B. Fill-freeze
C. Fast-fill
D. Low hydrogen

- A 5. The _____ electrode produces a snappy arc with little slag.
- C 6. The _____ electrode includes iron powder electrodes.
- B 7. The _____ electrode is a general purpose electrode.

A. Fast-freeze
B. Fill-freeze
C. Fast-fill

Identify the parts of the AWS electrode classification

- B 8. Welding Position
- C 9. Type of coating and current
- A 10. Tensile strength



Key

Use the provided Prinsco Drainage Slide Calculator to answer the following questions.

11. (Two points.) How many acres is a field that is 1,162' by 1,500'? (Round to the nearest acre)

$$1,162 \times 1500 = 1743000 \div 43,560 = 40.01 \quad \mathbf{40 \text{ acres}}$$

12. (Two points.) What is the **largest** general drainage coefficient (inches/24 hours) that could be used in a **field crops** field **without surface inlets** with a **mineral soil type**?

$\frac{1}{2}$ inch

13. (Two points) what is the % grade if there is 4.8' of fall in 800' of run?

.6%

14. (Two points) Based on the data collected in the above questions, what diameter of **GOLDFLO Dual Wall** drainage tile should be used? Circle the correct answer.

A. 4 inch

B. 6 inch

C. 8 inch

D. 10 inch

E. 1 foot

15. (Two points.) Calculate the approximate pipe requirements for the entire field if the tile spacing is 100'. (Use the acreage from question #1)

17,400'

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2014 Minnesota Agricultural Mechanics Career Development Event
Metal Fabrication (SMAW, GTAW, PLASMA)
Read Operational Procedures
Use Appropriate Safety Equipment

Arc Welding Exercise:

SKILLS 25 points

1. Select two precut pieces of metal, one 3/32" E6013, and one 1/8" E6013 electrode.
2. Take one piece of metal and run a bead using the 3/32" electrode.
3. When you have completed cleaning to your satisfaction, cool the weld in the water furnished.
4. Take your first piece of metal with your bead and now complete a Tee weld on the second piece of metal welding only one side.
5. When you have completed cleaning to your satisfaction, cool the weld.
6. Label your project with your name and school before turning into judge.

GTAW and Plasma Questions (one point each)

1. The plug on this machine means it needs a _____ amp circuit.
a. 10
b. 15
c. 20
d. 25
2. What is the name or purpose of Part A? _____
3. What is the operating gas pressure to be used with this plasma cutter? _____
Psi.
4. What should the C.F.H. be for this 1/8" electrode when welding aluminum?

5. What should the amperage range be for this 1/8" electrode when using DC straight polarity? _____

Evaluation score sheet:

- | | |
|------------------------------|----------------|
| 1. Safety and work habits | 4 points _____ |
| 2. 3/32" bead quality | 4 points _____ |
| 3. 3/32" bead penetration | 4 points _____ |
| 4. 1/8" Tee weld quality | 4 points _____ |
| 5. 1/8" Tee weld penetration | 4 points _____ |
| 6. GTAW and Plasma Questions | 5 points _____ |

Total points _____
(25 possible)

Key

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2014 Minnesota Agricultural Mechanics Career Development Event
 Metal Fabrication (SMAW, GTAW, PLASMA)
 Read Operational Procedures
 Use Appropriate Safety Equipment

Arc Welding Exercise:

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1. Select two precut pieces of metal, one 3/32" E6013, and one 1/8" E6013 electrode.
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3. When you have completed cleaning to your satisfaction, cool the weld in the water furnished.
4. Take your first piece of metal with your bead and now complete a Tee weld on the second piece of metal welding only one side.
5. When you have completed cleaning to your satisfaction, cool the weld.
6. Label your project with your name and school before turning into judge.

GTAW and Plasma Questions (one point each)

1. The plug on this machine means it needs a c amp circuit.
 - a. 10
 - b. 15
 - c. 20
 - d. 25
2. What is the name or purpose of Part A? air filter - to keep moisture and debris out
3. What is the operating gas pressure to be used with this plasma cutter? 65 Psi.
4. What should the C.F.H. be for this 1/8" electrode when welding aluminum? 15-23 C.F.H.
5. What should the amperage range be for this 1/8" electrode when using DC straight polarity? 250-400 AMPS

Evaluation score sheet:

- | | |
|------------------------------|----------------|
| 1. Safety and work habits | 4 points _____ |
| 2. 3/32" bead quality | 4 points _____ |
| 3. 3/32" bead penetration | 4 points _____ |
| 4. 1/8" Tee weld quality | 4 points _____ |
| 5. 1/8" Tee weld penetration | 4 points _____ |
| 6. GTAW and Plasma Questions | 5 points _____ |

Total points _____
 (25 possible)

Please Print

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Group Number:	Individual Number:	Score:	

2014 Minnesota Agricultural Mechanics Career Development Event
Building Construction Skills

SKILLS 25 points

Read the following:

Common Rafter Layout with a Tail

You will lay out a rafter for the following building. It will be framed with 2 x 4's. The building will be 12 feet wide with 6 inch overhang. The pitch will be 6 inches of rise per foot of run. The length of this rafter per foot of run is 13.42 inches. There will be a 2 x 6 used as a ridge board when the shed is constructed. Use a pencil to mark the top plumb cut, tail cut, and bird's mouth on the 2 x 4 provided. Put your name and contestant number on the 2 x 4 when you finish.

Hand tool and nail identification. (One point each)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Evaluation Score Sheet

Top Plumb Cut	4 points	_____
Tail Cut	4 points	_____
Bird's Mouth cut	4 points	_____
Correct length	4 points	_____
Hand Tool and Nail ID	9 points	_____

Total points _____ (25 Points)

Please Print

Key

Name:		School:	
Group Number:	Individual Number:	Score:	

2014 Minnesota Agricultural Mechanics Career Development Event
Building Construction Skills

SKILLS 25 points

Read the following:

Common Rafter Layout with a Tail

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Hand tool and nail identification. (One point each)

1. Combination square.
2. Try Square
3. T-Bevel
4. Plumb Bob
5. Nail Claw
6. Finish nail
7. Box Nail
8. Casing nail
9. Common Nail

Evaluation Score Sheet

Top Plumb Cut	4 points	_____
Tail Cut	4 points	_____
Bird's Mouth cut	4 points	_____
Correct length	4 points	_____
Hand Tool and Nail ID	9 points	_____

Total points _____ (25 Points)

Please Print

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2014 Minnesota Agricultural Mechanics Career Development Event
Power and Machinery
Small Engines and Round balers

Helpful Items:

Problem solving. 20 points

$2\pi r^2 =$ circumference of a circle

Torque = F X D

Area of a circle = diameter squared X .7854

area of a circle = 3.14 x radius squared

1 cc = 16.39 square inch

psi = Pounds per square inch

Speed of shaft = $\frac{\text{speed X driver diameter}}{\text{Driven diameter}}$

1. (Two points) determine the following, Cubic inch displacement _____ of this engine with the following information:

Number of cylinders 1
Bore 2.7812
Stroke 1.940
RPM's 1750

Cubic inch displacement: Circle the closest answer.

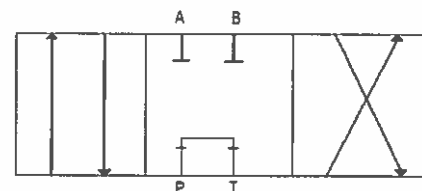
- a. 7.735
- b. 6.075
- c. 11.75
- d. 12.15

2. (Two points) I have a hydraulic cylinder lifting an implement. The cylinder diameter is 4.5 inches with the rod diameter of 1.125 inches with the stroke of 12 inches. The tractor hydraulic operating system is 2250 psi. What is the maximum force exerted by the cylinder when the cylinder is extending? Mark the closest answer.

- a. 1,924.
- b. 35,784
- c. 21,647
- d. 2,164

3. (Two points). This hydraulic symbol identifies the system as a:

- A. Closed hydraulic center system.
- B. Open center hydraulic system.



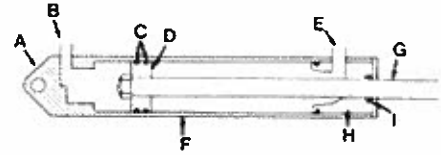
4. (Two point) If a small engine is operating at 3150 RPM. How many times does the intake valve open in 1.5 hours?

- a. 2,362
- b. 14,175
- c. 141,750
- d. 23,620

(over)

5. (One Point) One bar is equal to _____ one PSI.
- A. 12.5
 - B. 21.2
 - C. 14.5
 - D. 16.5

6. One point. Identify this hydraulic cylinder as a:



- A. Single acting hydraulic cylinder.
- B. Double acting hydraulic cylinder.

7. One point. Question number 6 to produce the highest lifting capacity the inlet of this hydraulic cylinder would be:

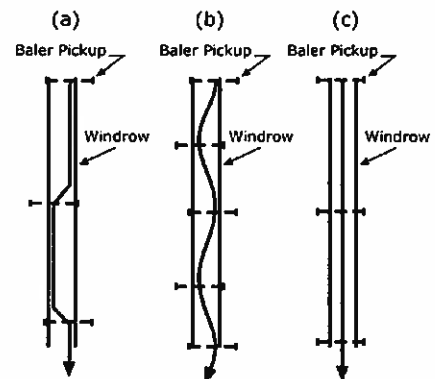
- A. B.
- B. E.

8. (Two points.) Two batteries hooked in parallel: May have more than one answer.

- A. Double voltage.
- B. Voltage stays the same.
- C. Doubles the CCA's
- D. CCA's stays the same.

8. (One point) correct driving procedure when making round bales.

- A.
- B.
- C.



9. (Two points) If I wrap a 6ft diameter bale 3.5 times. How many bales can I make with a 7000ft roll?

10. (Two points.) How many cubic feet in a 4'x5' bale

11. (Two points.) I am making 1300 pound bales at 21% moisture. The application rate for the preservative I am using is 2.5 ounces per percent moisture per ton. How many bales can I make with a gallon?

Key

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2014 Minnesota Agricultural Mechanics Career Development Event
 Power and Machinery
 Small Engines and Round balers

Helpful Items: Problem solving. 20 points

$2\pi r^2 =$ circumference of a circle

Torque = F X D

Area of a circle = diameter squared X .7854

area of a circle = 3.14 x radius squared

1 cc = 16.39 square inch

psi = Pounds per square inch

Speed of shaft = $\frac{\text{speed X driver diameter}}{\text{Driven diameter}}$

1. (Two points) determine the following, Cubic inch displacement _____ of this engine with the following information:

- Number of cylinders 1
- Bore 2.7812
- Stroke 1.940
- RPM's 1750

Cubic inch displacement: Circle the closest answer.

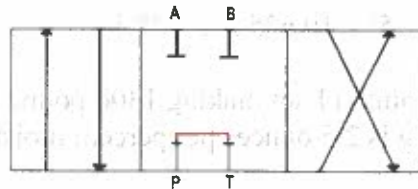
- a. 7.735
- b. 6.075
- c. 11.75**
- d. 12.15

2. (Two points) I have a hydraulic cylinder lifting an implement. The cylinder diameter is 4.5 inches with the rod diameter of 1.125 inches with the stroke of 12 inches. The tractor hydraulic operating system is 2250 psi. What is the maximum force exerted by the cylinder when the cylinder is extending? Mark the closest answer.

- a. 1,924.
- b. 35,784**
- c. 21,647
- d. 2,164

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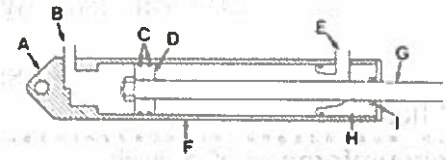
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- a. 2,362
- b. 14,175
- c. 141,750**
- d. 23,620

Key

5. (One Point) One bar is equal to _____ one PSI.
- A. 12.5
 - B. 21.2
 - C. 14.5**
 - D. 16.5

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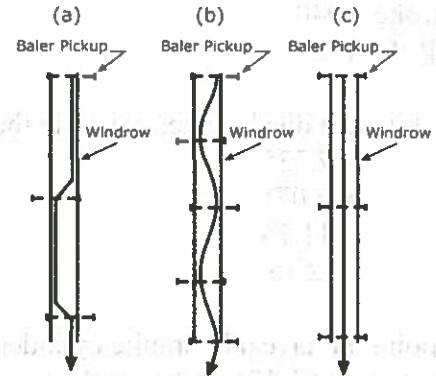
- A. B.**
- B. E.

8. (Two points.) Two batteries hooked in parallel: May have more than one answer.

- A. Double voltage.
- B. Voltage stays the same.**
- C. Doubles the CCA's**
- D. CCA's stays the same.

8. (One point) correct driving procedure when making round bales.

- A.**
- B.
- C.



9. (Two points) If I wrap a 6ft diameter bale 3.5 times. How many bales can I make with a 7000ft roll?

$$2\pi r = 18.85 \times 3.5 = 65.98 = \frac{7000}{65.98} = 106.1$$

10. (Two points.) How many cubic feet in a 4'x5' bale

$$\pi \times 2.5^2 = 19.635 \times 4 = 78.54$$

11. (Two points.) I am making 1300 pound bales at 21% moisture. The application rate for the preservative I am using is 2.5 ounces per percent moisture per ton. How many bales can I make with a gallon?

$$2.5 \times 21 = 52.5 / 2000 = .026 \times 1300 = 34.125 \text{ } 128 / 34.125 = 3.75$$

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2014 Minnesota Agricultural Mechanics Career Development Event
Residential and Low Voltage Circuits
Buildings Construction

Problem solving 20 points

Each question is worth two points

1. After adding the length of all walls and partitions, a carpenter finds there are a total of 270' (add 10% for waste). How many lineal feet of 2 X 4 stock is needed to build the sole and double plates? How many board feet does this equal?

Lineal feet: _____ Board feet: _____

2. The total roof area plus overhang of a house with a gable roof (slope of 5-in-12) is 1880 square feet. Figure 10% for waste and calculate the number of squares of asphalt shingles required. Round your answers to the nearest full square.

Number of squares _____

3. How many pieces of 4' x 8' plywood are required to sheath a flat roof on 30' x 66' building? The roof overhang is 30" on all sides.

Number of sheets of plywood _____

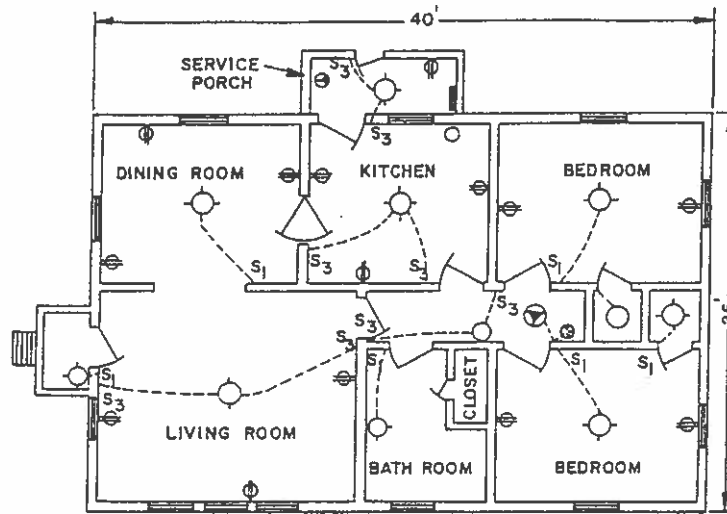
4. How many rafters would you need to cut for a plain gable roof constructed on a rectangular building measuring 24' X 48'? The specified rafter spacing is 16" O.C.

Number of rafters _____

5. What would be the length of a common rafter for a building with a span of 24' with no overhang? The slope to the roof is 4-in-12 which has a length per foot of run of 12.65". There is no ridge board. Round you answer to the nearest $\frac{1}{16}$ ".

Length of common rafter _____

(over)



6. You are ordering the electrical supplies for the wiring of the above building. How many single pole, single throw switches will you order?
 - A. 3
 - B. 4
 - C. 5
 - D. 6

7. How many single pole, double throw switches will you order?
 - A. 5
 - B. 6
 - C. 7
 - D. 8

8. There is one room that you can enter and be in the dark, therefore, another circuit should be added. It is the _____
 - A. Kitchen
 - B. Dining room
 - C. Bedroom
 - D. Bathroom

9. A four way switch could be added for convenience sake when exiting the: _____
 - A. Bathroom
 - B. Living room
 - C. Bedroom
 - D. Dining room

10. Receptacles near sinks should be: _____
 - A. Waterproof
 - B. GFCI
 - C. Non-arcing
 - D. At least 20 amp rating

Key

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Name:		School:	
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2014 Minnesota Agricultural Mechanics Career Development Event
 Residential and Low Voltage Circuits
 Buildings Construction

Problem solving 20 points

Each question is worth two points

1. After adding the length of all walls and partitions, a carpenter finds there are a total of 270' (add 10% for waste). How many lineal feet of 2 X 4 stock is needed to build the sole and double plates? How many board feet does this equal?

Lineal feet: 891 Board feet: 594

2. The total roof area plus overhang of a house with a gable roof (slope of 5-in-12) is 1880 square feet. Figure 10% for waste and calculate the number of squares of asphalt shingles required. Round your answers to the nearest full square.

Number of squares 21

3. How many pieces of 4' x 8' plywood are required to sheath a flat roof on 30' x 66' building? The roof overhang is 30" on all sides.

Number of sheets of plywood 78

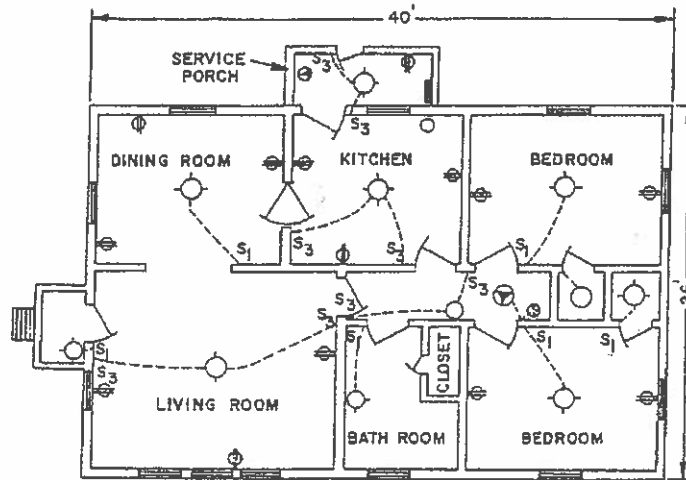
4. How many rafters would you need to cut for a plain gable roof constructed on a rectangular building measuring 24' X 48'? The specified rafter spacing is 16" O.C.

Number of rafters 74

5. What would be the length of a common rafter for a building with a span of 24' with no overhang? The slope to the roof is 4-in-12 which has a length per foot of run of 12.65". There is no ridge board. Round you answer to the nearest 1/16".

Length of common rafter 12' 7 13/16"

Key



6. You are ordering the electrical supplies for the wiring of the above building. How many single pole, single throw switches will you order?
- A. 3
B. 4
C. 5
D. 6
7. How many single pole, double throw switches will you order?
- A. 5
B. 6
C. 7
D. 8
8. There is one room that you can enter and be in the dark, therefore, another circuit should be added. It is the _____
- A. Kitchen
B. Dining room
C. Bedroom
D. Bathroom
9. A four way switch could be added for convenience sake when exiting the: _____
- A. Bathroom
B. Living room
C. Bedroom
D. Dining room
10. Receptacles near sinks should be: _____
- A. Waterproof
B. GFCI
C. Non-arcing
D. At least 20 amp rating

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2014 Minnesota Agricultural Mechanics Career Development Event
Power and Machinery
Round Baler

Skill 25 points

1. (1 point) List the serial number for this round baler. _____
2. (2 points) Find the torque charts and list the bolt torque of a M24 class 10.9 dry bolt.
_____ (list in lb.-ft.)
3. (2 points) Use the twin provided and tie a square knot.
4. (3 points) identify the PTO shafts. PTO sizes are found under adjusting drawbar height.
 - A. _____
 - B. _____
 - C. _____
5. (2 point) Tighten the baler hitch bolts to a torque of _____ lb.-ft.
6. (1 point) Minimum horse power needed to operate this baler _____ hp.
7. (1 point) Oil capacity in qt. of baler gear case is _____ quarts.
8. (2 points) Check belt pins every _____ bales _____ bales in sandy conditions.
9. (2 points) Adjust pickup float springs. List dimension of spring tightness _____ inches.
10. (2 points) Referring to wire harness diagram on page 60-7 terminal 314 and 315 control what function? _____
11. (2 points) Identify tire pressure and list the pressure _____ psi. What is the tire specification? _____
12. (2 points) I need to order this pipe. I need to know the length and the size.
 - A. length _____
 - B. Pipe size _____
13. (1 point) Moisture content of hay is _____% or drier before baling.
14. (2 points) Troubleshooting drive chain difficulties. Prematurely failed drive chains. Identify which does **not** apply. _____
 - A. Operating too tight or too loose.
 - B. Misalignment of drive sprockets and idlers.
 - C. Operating too hot of conditions.
 - D. Lack of lubrication

Please Print

Key

Name:		School:
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2014 Minnesota Agricultural Mechanics Career Development Event
Power and Machinery
Round Baler

Skill 25 points

- (1 point) List the serial number for this round baler. 80-1
- (2 points) Find the torque charts and list the bolt torque of a M24 class 10.9 dry bolt.
850 (list in lb.-ft.) 76-10
- (2 points) Use the twine provided and tie a square knot. 25-1
- (3 points) identify the PTO shafts. PTO sizes are found under adjusting drawbar height.
 - A. _____
 - B. _____ 20-2
 - C. _____
- (2 point) Tighten the baler hitch bolts to a torque of 258 lb.-ft. 25-13
- (1 point) Minimum horse power needed to operate this baler 75 mim hp. 75.8
- (1 point) Oil capacity in qt. of baler gear case is 1.25 quarts. 75-6 & 7
- (2 points) Check belt pins every 2000 bales 1000 bales in sandy conditions.
- (2 points) Adjust pickup float springs. List dimension of spring tightness
_____ inches. Baler options??
- (2 points) Referring to wire harness diagram on page 60-7 terminal 314 and 315 control what function? x5 twine actuator connector 60-8
- (2 points) Identify tire pressure and list the pressure _____ psi. What is the tire specification? _____ check tire size need tire gauge 25-17
- (2 points) I need to order this pipe. I need to know the length and the size.
 - A. length _____ need to get
 - B. Pipe size _____
- (1 point) Moisture content of hay is 20 % or drier before baling. 40-2
- (2 points) Troubleshooting drive chain difficulties. Prematurely failed drive chains. Identify which does **not** apply. 55-3
 - A. Operating too tight or too loose.
 - B. Misalignment of drive sprockets and idlers.
 - C. Operating too hot of conditions.
 - D. Lack of lubrication

Please Print

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2014 Minnesota Agricultural Mechanics Career Development Event
Power and Machinery
Small Engine

Skill 25 points

1. (One point) Read the depth micrometer provided. Do not move depth micrometer setting.
 - a. .265
 - b. .015
 - c. .340
 - d. 2.65

2. (Two point) List the serial number of this small engine. (Black) _____

3. (Three points) Using the serial number from #2 above and the attached information answer the following questions.

What month was this engine manufactured?

- a. January
- b. February
- c. March
- d. April

What is the cubic inch displacement of this engine?

- a. 9
- b. 17
- c. 13
- d. 12

What type of bearings does this engine have?

- a. Plain bearing auxiliary drive (PTO).
- b. Plain bearing auxiliary drive parallel to crankshaft.
- c. Plain bearing flange mounting.
- d. Ball bearing Gear Reduction.

4. (One point) Measure shim using a caliper! _____

5. (One point) Using the head provided. Identify the valve which is marked. This valve is set at recession or protrusion?

- a. Protrusion:
- b. Recession:

6. (Two Points) Identify the intake valve clearance.

- | | |
|---------|--------|
| A. .04 | B .005 |
| C. .004 | D .003 |

(OVER)

7. (One Point) Refer to question 6. This valve is adjusted by:
- Grind the lifter.
 - Adjust the rocker arm.
 - Grind the valve tip end.
 - Grind the push rod.
8. (Three points) find the model number of my Horizontal Briggs and Stratton engine using the information in your packet identify the following:
- Flywheel nut torque. _____
 - Intake valve clearance. _____
 - Armature air Gap. _____
9. (Two points) Using the micrometers provided what is the cam lobe lift? Measure the intake lobe. (Without the decompression) _____
10. (One point) Identify this tool. _____
11. (Two points) Using the carburetor provided identify the marked parts.
- Adjusting screw adjusts what? _____
 - Adjusting screw adjusts what? _____
12. (One point) Identify this part. _____
13. (Two points) identify the information I need to order this bolt.
- Length _____.
 - Thread pitch _____.
 - Diameter _____.
 - Hardness _____.
14. (Two points) identify the information I need to order this bolt.
- Length _____
 - TPI _____
 - Diameter _____
 - Hardness _____
15. (One point) 200 bar equals _____ PSI.
- 290 PSI
 - 2900 PSI
 - 3900 PSI
 - 260 PSI

Please Print

Name:	School:	
Group Number:	Individual Number:	Score:

2014 Minnesota Agricultural Mechanics Career Development Event

Drainage, Irrigation, and Conservation Practices

Skill 25 points

The line – transect method used by the Natural Resource Conservation Service (NRCS), is an easy and accurate way of estimating residue cover that is lying on the soil surface. A 100-foot measuring tape is most often used, but other tape lengths will work. When using a 100-foot tape the percent cover is equal to the number of marks (each “foot” line) underlain with a piece of residue. When using a 50-foot tape double the figures to determine the percentage. When using a 25-foot tape quadruple the figures to determine the percentage. To get an accurate measurement, count only those marks that have residue exactly under them.

Find the % of residue remaining on the two residue problems. Circle the correct answer.

1. (5 points) A. 9 % B. 18 % C. 27 % D. 36 %

2. (5 points) A. 10% B. 20% C. 30% D. 40%

Determining crop residue is most accurately accomplished by using the line – transect method (above). However if this is not possible, an average value can be used. Table 7-1 presents typical after-harvest percent residue cover values for various crops. Table 7-2 presents the amount of residue remaining after specific implements and field operations. To calculate a rough estimate of surface residue remaining the % of cover after harvest should be multiplied by all field operations and over-weathering.

Assume four operations are used on a field with soybean residue. Also assume 90% of the residue remains after weathering.

****PLEASE NOTE THAT IN TABLES 7-2 THE PERCENTAGE OF RESIDUE REMAINING IS GIVEN IN A RANGE—USE THE HIGHEST PERCENTAGE OF THE RANGE WHEN CALCULATING. (50-70% = .70)**

Fall Tillage

- a. Combination tool: Disk-Subsoiler (7.2)



- b. Over Weathering (90%).

Spring Tillage (7.2)

- c. Early spring anhydrous ammonia knife applicator with rigid shanks (page 46)



- d. Combination finishing disk with shanks and leveling attachment (7.2)
e. Conventional Row-crop planter with double disk openers (7.2)



3. (1 point) Determine the % cover after harvest for soybeans _____ %
(7.1)
4. (1 point) Soybean residue is considered (circle one) fragile / non- fragile.
(7.1)
5. (3 points) Calculate the percentage of residue cover next spring after all tillage and overwintering is completed. Follow the breakdown:

Residue remaining after harvest (7-1) _____
 Over Weathering (90%). 90%
 Knife applicator with rigid shanks _____
 Finishing disk _____
 Row-crop planter _____

Circle correct answer:

- | | |
|----------|-----------|
| a. 3.74% | c. 47.3 % |
| b. 37.4% | d. 73.4% |

6. (Two points) Using the colored nozzle chart look at the gold colored nozzle marked #12 with a system pressure of 50 psi what is my GPM?
 A. 1.11
 B. 1.24
 C. 1.76
 D. 1.57
7. (Three points) Using the information provided. This is information on a center pivot irrigation system. Looking at (sprinkler number) spk no 20: What is the nozzle size?
 A. 22
 B. 25
 C. 24
 D. 21

What color?

- A. white
- B. red
- C. Purple
- D. Maroon

What is the GPM with 50 psi

- A. 7.06
- B. 6.31
- C. 7.61
- D. 6.40

8. (One point) When a field has been thoroughly wet and then allowed to drain freely for 48 hours, the remaining moisture in the soil is known as

-
- A. Saturation point
 - B. Field capacity
 - C. Infiltration rate
 - D. Soil permeability

9. (One point) True or False. Installing tile will increase yield on all soil types.

10. (One point) True or False. Surface drainage works best on fine textured soils with impermeable subsoil.

11. One point) True or False. Land smoothing or leveling is a method of surface drainage.

12. (One point) True or False. Drain tile accept water only when saturation occurs above the tile.

Please print

Name		School
Group Number	Individual Number	Score

2014 Minnesota Agricultural Mechanics Career Development Event
Residential and low voltage circuits

(20 minutes)

skill 25 Point

THERE ARE TWO PARTS TO THIS SKILL AREA!

PART 1

On the table you will find an outlet box a 15 amp outlet a length of wire a utility knife, wire strippers, screwdriver and needle nose pliers.

Carefully strip the wire to the correct length and wire the outlet into the outlet box. All connections must be made under the correct screw. DO NOT USE THE PUSH IN HOLES IN THE BACK OF THE RECEPTCLE!!

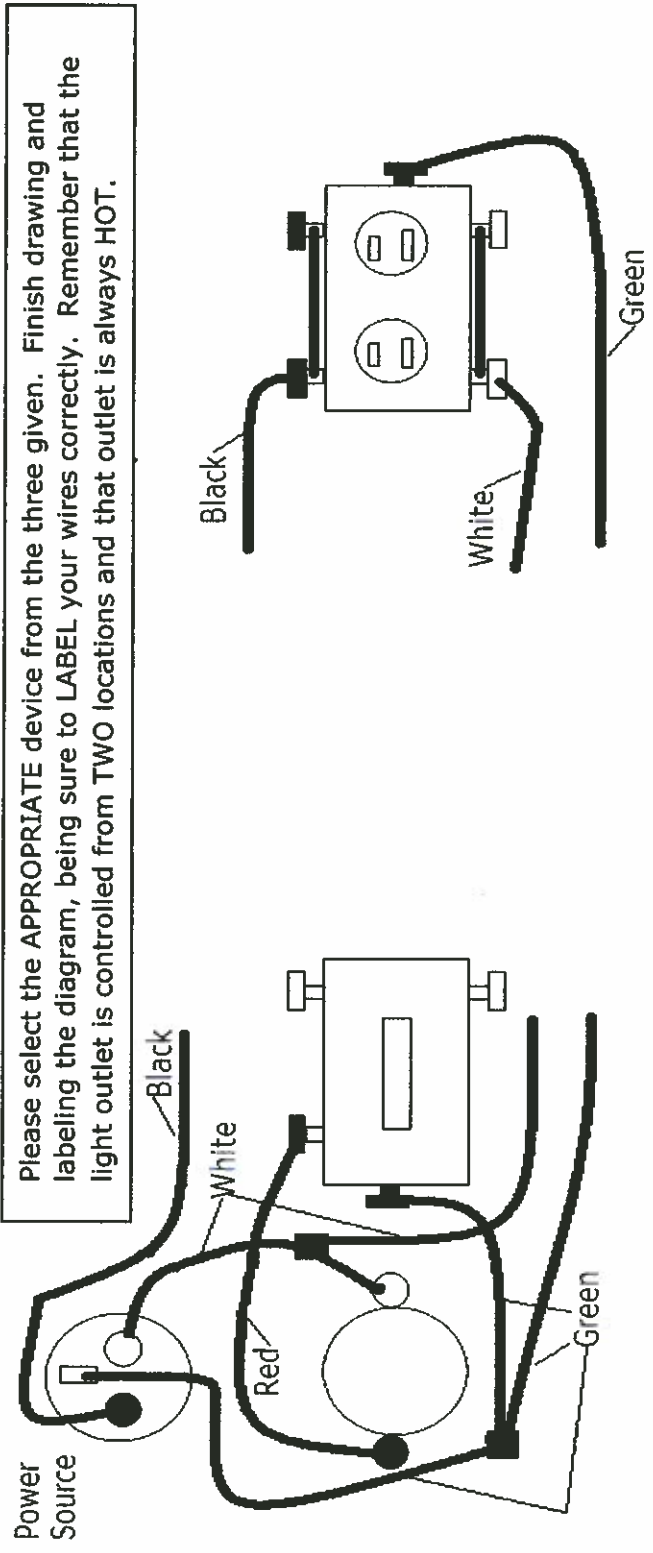
SCORING

SAFETY	3pt	_____
WIRE STRIPPING	3pt	_____
CONNECTIONS CORRECT	3pt	_____
WIRE LENGTH CORRECT	3pt	_____
LOOPED UNDER SCREW	3pt	_____
TOTAL	15pt	_____

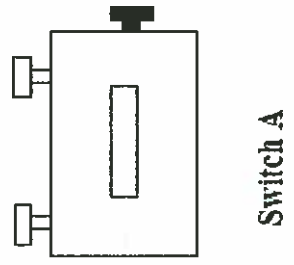
(OVER)

PART 2

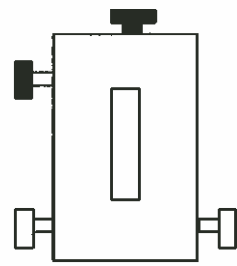
Read the directions and complete the circuit below.



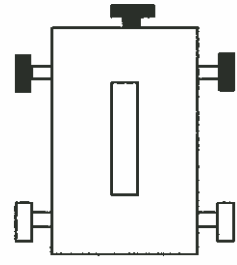
KEY:
■ Solderless Connector



Switch A



Switch B



Switch C