

Name \_\_\_\_\_ School \_\_\_\_\_ Contestant Number \_\_\_\_\_

**2016 Wyoming State FFA CDE  
Agricultural Technology and Mechanical Systems  
Electrical Systems – Wiring Skill**

You are currently completing an internship at D & S Cattle Feed Yards in South Central Wyoming, satisfying a requirement for Dr. Ludden’s Feeds and Feeding course. Your employer upon analyzing your resume has become aware that you have background experience in electrical work, and has contracted you to complete some electrical work in your off hours at his ranch. One of the calving sheds not used in past seasons needs to be rewired prior to the coming calving season. Your employer has assigned you the job of re-wiring the duplex receptacles in your calving shed with new wire, as the old was becoming hazardous. You are to be as cost efficient as possible, therefore your boss wants you to utilize new wire while reusing the duplex receptacles provided.

**Using the duplex receptacle provided, complete the wiring process necessary to operate the duplex receptacle off of two electrical circuits.**

**Using the resources provided, solve the following.**

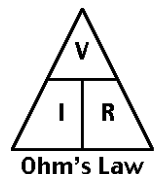
<b>Resources</b>	VA Load/VA Strap
Total Circuit load in VA = V X A	VA = Volt Ampere

1. If NEC standards state that the **minimum load** for 120V commercial general use duplex receptacle outlet (strap) is 180 VA, how many duplex receptacle outlets can be wired inline for a 15-amp breaker maximum load? Show your work.

$$120V \times 15A = 1800VA$$

$$1800VA / 180VA = 10 \text{ Duplex Receptacles}$$

2. Voltage drop is a reduction in voltage that occurs between power supply and load. According to the National Electric Code (NEC), 3% voltage drop is acceptable for branch circuits, with a 5% acceptable voltage drop for feeder circuits. Calculate the following different circuits, considering the use of #12 Copper wire with a resistance ( $\Omega$ ) of 0.65.



Circuit Classification	Circuit Voltage	Amperage	Volts	Voltage Drop	% Voltage Drop	Acceptable?
Branch	120	15	9.75	110.25	8.12%	No
Feeder	240	15	9.75	230.25	4.06%	Yes
Branch	240	30	19.50	220.50	8.12%	No

Criterion	Points Possible	Points Earned
Wiring skill	15	
Questions	13 (1 point each)	
Safety	2	