**2023-2024 FFA/GEMC**

**Speech/Demonstration Topic**

**PROBLEM:**

The contestant will be expected to thoroughly explain the calculations and installation of a Pole Mounted Main Farm Service. This installation will consist of a Self-Contained Pole Mounted Meter with a pole-mounted 200-amp Main Breaker Load Center serving as the site disconnect. Power will be supplied to the following locations. A farm residence located 120 feet from the Pole, a farm shop located 110 feet from the pole, and a beef show barn located 85 feet from the pole. Voltage drop should not exceed 3%. All connections and calculations will be made in accordance with the National Electric Code and Agriculture Wring Handbook.

**Load Calculations:**

Determine diversified demand in accordance with Section 20 of the Agriculture Wiring Handbook. The loads used to calculate demand for size service equipment and over current protection are:

 Residence – 90 amps, 240V

 Farm Shop – 45 amps, 240V

 Beef Barn – 25 amps, 240V

**Materials List:**

The following list of materials will either be attached to the demo frame or laid out for the contestants to use as they explain the installation of the circuits.

1 - 200 Amp Meter Base

1 - Eaton Type BR 200-Amp 8 Spaces Main Breaker Load Center

1 - #6 Soft Drawn Bare Copper Conductor installed

2 - 5/8” Grounding Rod attached to display board

2 - 5/8” Grounding Clamps

1 - 100 Amp Double Pole Breaker

1 - 50 Amp Double Pole Breaker

1 - 30 Amp Double Pole Breaker

6 - 4/0 AL Type USE-2 or RHH or RHW-2 Cable Service Entrance Cable

1 - #2 AL Type USE-2 or RHH or RHW-2 Multiwire Cable Serving Residence

1 - # 6 CU UF Multiwire Cable Serving Farm Shop

1 - # 10 CU UF Multiwire Cable Serving Livestock Barn

1 - 2 ½” Service Entrance Cap

3 - 2 ½” Ridge PVC Schedule 40 Conduit (Length Varies)

4 - 2 ½” Male Conduit Fitting

2 - 2 ½” Rain Tight Hub (One for Meter Base, One for Load Center)

**References:**

2023 National Electrical Code

Agricultural Wiring Handbook, 17th Edition

Poster Display Board

2 ½” Schedule 40 PVC Conduit

2 ½” Schedule 40 PVC Conduit

#6/3 w Ground Stranded Copper

UF cable to Ag Shop 110 ft From

Pole

Cable Dimension 1.223” Width x .361” Thickness = Cable Area .4415 in2

#2-2-2-4 AL USE RHH/RHW-2 cable to Farm Residence 120ft From Pole

Cable Area = .944 in2

4/0 AL USE-2/RHH

#10/3 w Ground Copper

UF cable to Ag Shop 85 ft From

Pole

Cable Dimension .727” Width x .215” Thickness = Cable Area .1563in2

The grounding conductor, grounded conductor, and meter base enclosure are bonded.

The meter base grounding conductor is bonded to an assumed driven ground

2 ½” Schedule 40 PVC Conduit less than 24”