**PROBLEM:**
The contestant will be expected to thoroughly explain the operating principle and installation of a single phase 240-volt 1 ½ hp submersible well pump that will be supplying water to the farm shop and livestock watering stations. The 240-volt circuit will consist of overcurrent protection and the supply conductors serving a 240-volt pressure switch, well pump control box, well pump supply conductor and 1 ½ hp submersible well pump. All materials will be mounted on the display board. The pump will be installed in a 4” metal well casing at a depth of 427’. Distance from the service to the well tank, pressure switch and pump control box is 135’. The pump manufacturer recommends limiting voltage drop to 4 percent. All electrical connections will be contained inside of a well house, protected from the elements.

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

1 - Eaton, BR12100 100 Amp Main Breaker Service Entrance Panel
3 - 2 AWG Copper THHN insulated conductors, 24” long
1 - #6 Soft Drawn Bare Copper Conductor installed
1 - 5/8” Grounding Rod attached to display board
1 - 5/8” Grounding Clamps
1 - 20-amp Double Pole Breaker
2 - ½” PVC 90-degree Sweeps
4 - ½” PVC threaded male adaptor w/locking ring
2 - ½” Schedule 40 PVC Conduit
4 - ½” Conduit Straps
1 - 40/60 psi Pressure Switch
1 - Franklin Electric 1/1 ½ hp 230V Well Pump Control Box
1 - 1” Cable Box Connector
2 - ¾” x ½” Rridged Conduit Reducing Washer
12 AWG Stranded THHN/THWN Single Wire
8 AWG Submersible Pump Cable
Forked Connectors/Crimping Tool
Milwaukee Cat 3 400 Amp Clamp On Muti-Meter Catalog # 2235-20

**References:**
2020 National Electrical Code
Student Guide to Wiring
Agricultural Wiring Handbook, 17th Edition
AAVIM Electrical Controls
Franklin Electric Single-Phase Motor and Control Diagram (See Attached)
Square D Pumptrl Pressure Switch Wiring Diagram (See Attached)
Poster Display Board
**Single-Phase Motors & Controls**

**MOTOR MAINTENANCE**

1 - 1.5 hp
282 300 8110
(Date Codes T1C19 & Newer)

**WIRING DIAGRAM**

**DIAGRAMA DE ALAMBRADO**

**SCHEMA DE CABLEAGE**

Grounding provisions: #10-32 screws.
Torque screws to 15-20 lb-in (1.7–2.3 Nm).
Provisiones de puesta a tierra: tornillos no.10-32.
Apriete los tornillos en 1,7–2,3 Nm (15–20 lbs-pulg).
Provisiones de m.a.l.t.: vis n° 10-32.
Serrer les vis à un couple entre 1,7 et 2,3 Nm (15 et 20 lb-po).

- CW = en sentido de las manecillas del reloj / sens horaire
- CCW = en sentido contrario de las manecillas del reloj / sens anti-horaire

Torque screws to 15–20 lb-in (1.7–2.3 Nm).
Apriete los tornillos en 1,7–2,3 Nm (15–20 lbs-pulg).
Serrer les vis à un couple entre 1,7 et 2,3 Nm (15 et 20 lb-po).