Title: **Article 300, 310 and Voltage Drop** Test: 3

Course: Electrical Applications Unit: Code CLO: 1

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Station \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall identify the correct answers as they relate to the National Electrical Code.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Test. Grading shall be based on the answer key.

**Instructions**

Select the best answer to each multiple-choice question below.

**Article 300**

1. Where protected from corrosion solely by enamel \_\_\_\_\_\_\_\_\_ shall not be used in wet locations or outdoors.
   1. ferrous metal raceways & cable trays
   2. aluminum boxes & cable sheathing
   3. metal elbows, couplings & nipples
   4. all items in “a”, “b”, and “c”
   5. items listed in “a” and “c” only
2. Cables installed parallel to exposed studs shall be so secured that the nearest outside surface of the cable is not less than \_\_\_\_\_ from the nearest edge of the stud.
   1. 1½”
   2. 1”
   3. 1¼”
   4. 0”(it can be “flush”)
3. Where the distances in question #2 (directly above) cannot be maintained, the cable shall be protected from penetration from nails or screws by a steel plate, sleeve or equivalent at least 1.6mm (1/16”) thick.
   1. True
   2. False
4. Insulated conductors and cables installed in conduit underground shall be listed for use in wet locations.
   1. True
   2. False
5. \_\_\_\_\_\_\_\_ insulation, can be used at 90°C in both Dry and Wet locations.
   1. XHH
   2. XHHW
   3. XHHW-2
   4. both “b” and “c”
6. A 15A-120V, GFCI protected Type UF Cable circuit originates from a panel in a single family dwelling unit, travels across the yard and under an unpaved driveway used exclusively for that dwelling’s related vehicles. The N.E.C. requires the cable to be buried to a minimum depth of \_\_\_\_\_\_\_.
   1. 1 ft.
   2. 1.5 ft.
   3. 2 ft.
   4. 3 ft.
   5. 4 ft.

**Article 310**

1. Excluding any other articles, Conductors shall be insulated.
   1. True
   2. False
2. The operating temperature of a conductor shall be allowed to be temporarily exceeded when bundled together with conductors that have a higher operating temperature.
   1. True
   2. False
3. A \_\_\_\_\_\_\_\_ conductor that carries only the unbalanced current from other conductors of the same circuit \_\_\_\_\_\_\_\_ be required to be counted as current carrying when applying the adjustment factors of 310.15(B)(3)(a)
   1. grounding; shall
   2. neutral; shall
   3. integrated; must
   4. neutral; shall not
4. “Generally”, when paralleling conductors, each conductor shall be larger than # 1 AWG.
   1. True
   2. False
5. When paralleling conductors in separate cables or raceways, the cables or raceways with conductors shall have the same number of conductors and shall have the same electrical characteristics.
   1. True
   2. False
6. Where installed in raceways, only conductors larger than #8 AWG must be stranded.
   1. True
   2. False
7. Each current-carrying conductor of a paralleled set of conductors \_\_\_\_\_\_ be counted as a current-carrying conductor.
   1. should
   2. shall not
   3. shall
   4. need not
8. To still have the capacity to carry current, conductors installed in an ambient temperature of 71°C would require a minimum insulation rating of \_\_\_\_\_\_.
   1. 60°C
   2. 75°C
   3. 90°C
   4. can use any of these
9. Conductor sizes are expressed in American Wire Gage (AWG) or in circular mils (cmils). The largest conductor expressed in AWG is \_\_\_\_\_\_\_.
   1. #1
   2. #250
   3. #0
   4. #4/0
10. The smallest size 600V conductor (AWG) for general wiring is \_\_\_\_\_\_\_\_ .
    1. #12 Al
    2. #14 Al
    3. #10 Cu
    4. #8

Questions 17-thru-20: Match the Insulation (on the left) with its Properties (on the right).

1. THHN a) 75°C Insulation, Dry & Wet locations
2. TW b) 90°C Insulation, Dry & Damp locations
3. THWN-2 c) 60°C Insulation, Dry & Wet locations
4. THWN d) 90°C Insulation, Dry & Wet locations

**Ampacity**

1. What is the ampacity of a 1250kcmil THHN conductor in a dry location with an ambient temperature of 179°F?
   1. 171.1A
   2. 158.1A
   3. 140.7A
   4. 192.9A
2. What is the ampacity of a 900Kcmil THW Al conductor in a Damp location with an ambient temperature of 106°F?
   1. 426.4A
   2. 369.8A
   3. 348.5A
   4. 452.4A
3. What is the ampacity of a 4/0awg THWN-2 Cu conductor in a Wet location with an ambient temperature of 36°C?
   1. 178.4A
   2. 235.8A
   3. 236.6A
   4. 299A
4. What is the ampacity of a 1 AWG THWN AL conductor in a Wet location with an ambient temperature of 50°C?
   1. 75A
   2. 115A
   3. 149.5A
   4. 97.5A

**Voltage Drop**

1. A 24A, 240V load is located 160ft from a panelboard and is wired with #10 AWG. What is the approximate voltage drop of the branch circuit conductors?
   1. 9.5V
   2. 4.8V
   3. 15.7V
   4. 7.8V
2. For the question directly above (question #25): does the calculated voltage drop fall within the N.E.C. recommended amount of “allowable” lost voltage?
   1. Yes
   2. No
3. For the same question (question #25): what size conductor is needed in order to meet the N.E.C. recommendation, “if” the given conductor is not properly sized?
4. #10 AWG
5. #8 AWG
6. #6 AWG
7. Meets recommendation
8. A 590ft, 480V branch circuit has a load of 100A: if using THWN, what size conductor is required to limit the voltage drop to 3%?
   1. #1/0 AWG
   2. #2/0 AWG
   3. #1 AWG
   4. #2 AWG

**Article 100**

1. A location that may be temporarily subject to dampness or wetness.
   1. moist
   2. wet
   3. dry
   4. damp
2. Conduit that is installed underground or is in a concrete slab in direct contact with the earth is considered to be in a \_\_\_\_\_\_\_\_\_ location.
   1. moist
   2. wet
   3. dry
   4. damp