Practice quiz: Master Electrician (national, 2023 NEC)

9 questions. The answer key is on page 2.

Name _____ Date _____

1. **In the circular mil voltage drop formulas, what length is L?**
   A. Twice the one-way length, out and back
   B. The total length of every conductor in the run
   C. The one-way length multiplied by 1.732
   D. The one-way length, from the source to the load

2. **A 120 V single-phase load draws 15 A at 100 ft one way on 12 AWG copper. Take 12 AWG as 6,530 cmil and K as 12.9. What is the voltage drop?**
   A. 2.96 V
   B. 5.13 V
   C. 5.93 V
   D. 11.85 V

3. **A 480 V three-phase feeder carries 100 A for 400 ft one way on 2 AWG copper. Take 2 AWG as 66,360 cmil and K as 12.9. What is the voltage drop as a percent of 480 V?**
   A. 1.62%
   B. 2.81%
   C. 3.24%
   D. 5.61%

4. **A 240 V single-phase load draws 50 A at 175 ft one way. The design limit is 3%. Take K as 12.9 and these copper areas: 6 AWG 26,240 cmil, 4 AWG 41,740 cmil, 3 AWG 52,620 cmil, 2 AWG 66,360 cmil. What is the smallest conductor that meets the limit?**
   A. 6 AWG
   B. 4 AWG
   C. 3 AWG
   D. 2 AWG

5. **A 208 V three-phase feeder carries 80 A to a panel 200 ft away. The design limit is 3%. Take K as 12.9 and these copper areas: 3 AWG 52,620 cmil, 2 AWG 66,360 cmil, 1 AWG 83,690 cmil, 1/0 105,600 cmil. What is the smallest conductor that meets the limit?**
   A. 1/0 AWG
   B. 1 AWG
   C. 2 AWG
   D. 3 AWG

6. **A 240 V single-phase load draws 30 A on 10 AWG copper. Take 10 AWG as 10,380 cmil and K as 12.9. At 3% drop, what is the longest one-way run allowed?**
   A. 48.3 ft
   B. 96.6 ft
   C. 111.5 ft
   D. 193.1 ft

7. **A 480 V three-phase feeder carries 200 A for 300 ft one way on 250 kcmil aluminum. Take K as 21.2 for aluminum and 250 kcmil as 250,000 cmil. What is the voltage drop?**
   A. 8.81 V
   B. 10.18 V
   C. 15.26 V
   D. 17.62 V

8. **A 277 V single-phase lighting branch circuit is fed from a panel whose feeder already drops 2.5%. The design target is 5% total at the load. How many volts may the branch circuit drop?**
   A. 24.00 V
   B. 13.85 V
   C. 12.00 V
   D. 6.93 V

9. **What is the 2023 NEC status of the 3% branch-circuit and 5% combined voltage drop figures for general circuits?**
   A. Recommendations in informational notes, not requirements
   B. Mandatory limits for every circuit
   C. Limits enforced only on feeders over 100 A
   D. Requirements only for 277 V lighting circuits

Original practice questions, never real or recalled exam questions. Not affiliated with or endorsed by TDLR, PSI, Prov or NFPA. Exam names are used descriptively. Free 10-question check:
https://bondingjumper.com/nec-master?utm_source=print&utm_medium=pdf&utm_campaign=nec-master_content_202611&utm_content=quiz-pdf

Answer key

Master Electrician (national, 2023 NEC). One line of why for each answer.

1. **D** L is the one-way length.
2. **C** VD = 2 x 12.9 x 15 x 100 ÷ 6,530 = 38,700 ÷ 6,530 = 5.93 V.
3. **B** VD = 1.732 x 12.9 x 100 x 400 ÷ 66,360 = 893,712 ÷ 66,360 = 13.47 V, and 13.47 ÷ 480 = 2.81%.
4. **B** Allowed drop 240 x 0.03 = 7.2 V.
5. **C** Allowed drop 208 x 0.03 = 6.24 V.
6. **B** Allowed drop 240 x 0.03 = 7.2 V.
7. **A** VD = 1.732 x 21.2 x 200 x 300 ÷ 250,000 = 2,203,104 ÷ 250,000 = 8.81 V.
8. **D** Total budget at 277 V: 0.05 x 277 = 13.85 V.
9. **A** For general circuits the figures appear in informational notes in Articles 210 and 215, which are advisory, not mandatory.

Full explanations

Every question here has its full explanation in the free sample lesson. No signup.
bondingjumper.com/nec-master/sample

Take the free 10-question check

Original practice questions, never real or recalled exam questions. Not affiliated with or endorsed by TDLR, PSI, Prov or NFPA. Exam names are used descriptively. Free 10-question check:
https://bondingjumper.com/nec-master?utm_source=print&utm_medium=pdf&utm_campaign=nec-master_content_202611&utm_content=quiz-pdf