BASIC ELECTRICIAL THEORY PRACTICE QUESTIONS

1. The three basic parts of an atom are the proton, _____, and the neutron.

   A. molecule
   B. atoms
   C. compounds
   D. electrons

2. Any electrons located in the outer shell of an atom are known as _____ electrons.

   A. negative
   B. valence
   C. positive
   D. ionized

3. Electrons flowing in a conductor will always create _____.

   A. friction
   B. fluorescence
   C. a magnetic field
   D. ultraviolet light

4. _____ is the ability of a material to permit the flow of electrons.

   A. Voltage
   B. Current
   C. Resistance
   D. Conductance

5. Which of the following is not an electromagnetic?

   A. motor
   B. incandescent light bulb
   C. transformer
   D. fluorescent ballast

6. A _____ is a device that transforms chemical energy into electrical energy.

   A. thermocouple
   B. electron
   C. cell
   D. hydrometer

7. There are _____ basic methods for producing electricity.

   A. five
   B. six
   C. ten
   D. twelve

8. Electrical pressure is measure in _____.

   A. amperes
   B. watts
   C. coulombs
   D. volts

9. The advantage of AC over DC includes which of the following?

   A. better speed control
   B. ease of voltage variation
   C. lower resistance at high currents
   D. impedance is greater

10. AC voltage may be increased or decreased by a _____.

    A. rectifier
    B. motor
    C. transformer
    D. shunt

11. A Kva is equal to _____.

    A. 100 va
    B. 1000 v
    C. 1000w
    D. 1000va

12. To reduce DC voltage you would use a (an) _____.

    A. resistor
    B. transformer
    C. diode
    D. inverter

13. A rectifier is used to _____.

    A. change DC to AC
    B. limit current
    C. change AC to DC
    D. both B and C

14. The most common of all AC waveforms is the _____.

    A. sine wave
    B. triangle wave
    C. cosine wave
    D. square wave

15. What percentage of the peak voltage is the effective voltage?

    A. 68.9%
    B. 69.6%
    C. 70.7%
    D. 71.1%

16. If the maximum value of an AC circuit is 100 amps, the ammeter would read approximately _____ amps.

A. 100
B. 80
C. 70
D. 50

17. The letters Hz refers to _____.

A. Voltage
B. Cycles per second
C. Capacitance
D. Resonance

18. A 60-cycle current passes through 180 electrical degrees in _____ of a second.

A. 1/60
B. 1/90
C. 1/120
D. 1/180

19. A 60 cycle AC waveform changes direction _____ times per second.

A. 120
B. 90
C. 1/120
D. 60

20. One meg-ohm is the equivalent of _____ ohms.

A. 100
B. 1000
C. 100,000
D. 1,000,000

21. The total opposition to current flow in an AC circuit is known as _____ and is expressed in ohms.

A. inductance
B. impedance
C. resistance
D. reactance

22. Impedance is present in which of the following type circuit(s)?

A. resistive only
B. AC only
C. DC only
D. Both AC and DC

23. Inductance is measured in _____.

A. ohms
B. farads
C. volts
D. henrys

24. Inductive reactance is measured in _____.

A. ohms
B. impedance
C. farads
D. resonance

25. Capacitance is measured in _____.

A. ohms
B. volts
C. farads
D. henrys

26. Capacitance reactance is measured in _____.

A. ohms
B. amperes
C. farads
D. henrys

27. When inductance and capacitance are of equal values in a circuit this is called _____.

A. reactance
B. resonance
C. impedance
D. resistance

28. The _____ is the angel between the real power and the apparent power.

A. lag angle
B. power factor angle
C. va angle
D. watt angle

29. Unity is _____ when referring to power factor.

A. 70.7
B. 7.07
C. .707
D. 1.0

30. In a purely inductance circuit, the current lags the voltage by _____.

A. 180°
B. 45°
C. 90°
D. 120°

31. When the current leads the voltage, what type of circuit is it?

A. in phase
B. inductive
C. capacitive
D. all of these

32. A voltmeter is connected in _____ in the circuit.

A. series
B. parallel
C. series-parallel
D. none of these

33. A wattmeter is connected in _____ in the circuit.

A. series
B. parallel
C. series-parallel
D. none of these

CT's use amps (donuts) and volts (wires)

34. When an armature makes one complete _____, it passes through 360 mechanical degrees.

A. alternation
B. revolution
C. commutation
D. field loop

35. One horsepower or output equals _____ watts?

A. 1000
B. 746
C. 747
D. 1840

36. Doubling the csa of a conductor will _____.

A. reduce the resistance of the conductor by one-half
B. double the resistance of the conductor
C. not change the resistance of the conductor unless the temperature is increased
D. only effect the resistance in a DC circuit

37. If the voltage is doubled, the ampacity of a conductor _____.

A. increases
B. decreases
C. doubles
D. remains the same

not changing configuration
240 vs 120 needs rewire, so nameplate amps change

38. A "mil" measures _____ of an inch.

A. .100
B. .010
C. .001
D. .0001

39. The larger the conductor the _____.

A. higher the resistance
B. lower the ampacity
C. higher the voltage
D. lower the resistance

40. The potential difference between two conductors is its _____.

A. voltage
B. current
C. resistance
D. wattage

OHM'S LAW & BASIC CIRCUIT PRACTICE QUESTIONS

1. Ohm's Law is _____.

   A. The relationship between Voltage, Current and Power
   B. The relationship between Voltage, Current and Resistance V, I, R
   C. The relationship between Voltage, Wattage and Current
   D. The relationship between Voltage, Current, Power Factor and Efficiency

2. What is the computed load for a 15 KW heater at 240 volts?

   A. 52 amps
   B. 62.5 amps
   C. 65 amps
   D. 80 amps

   $I = \frac{15000}{240} = 62.5$

3. A 20-amp fuse will blow when a load of _____ watts is connected to it (115 volt source).

   A. 1500
   B. 2000
   C. 2500
   D. none of these

   $W = 115 \cdot 20$
   $W = 2300$

   distractor!

4. The number or watts of heat given off by a resistor are expressed by the formula I^2R. If 10 volts are applied to a 5-ohm resistor, the heat given off will be _____ watts.

   A. 500
   B. 250
   C. 50
   D. 20

   $\frac{10^2}{5} = 20\ W$

5. A 10 ohm resistance carrying 10 amperes of current used _____ watts of power.

   A. 100
   B. 200
   C. 500
   D. 1000

   $W = 10^2 \cdot 10$

6. How much power is consumed in a circuit that operates at 115 volts, draws 8 amperes and has a power factor of 80%?

   A. 920 watts
   B. 960 watts
   C. 1150 watts
   D. 736 watts

   $W = 920$ @ unity

   $W = E \times I \times PF$
   $W = 736\ W$

7. A 120-volt circuit has a 10-ohm resistor load. How many amperes are flowing in this circuit?

   A. 8
   B. 10
   C. 12
   D. 20

   $I = \frac{120}{10}$
   $I = 12$

8. Measurements were taken in an AC circuit and the current flowing was 20 amps; the voltage 120. The wattmeter reads 1800 watts. What is the power factor of this circuit?

A. 70%
B. 80%
C. 90%
(D) 75%

VA = 120 · 20 = 2400 VA

W = 1800

$\frac{W}{VA} = \frac{1800}{2400} = 0.75$

1500
4 | 6000

9. A 6000-watt water heater is rated at 240 volts. What would be the wattage if connected to a 120-volt source?

W = 120 V

A. 3000 watts
(B) 6000 watts
C. 1350 watts
(D) 1500 watts

factor of problem 4

① whats resist of element?

$R = \frac{E^2}{W} \rightarrow 240 \cdot 240 = \frac{57,600}{6,000} = \boxed{9.6\ \Omega}$

② what's wattage

$W = \frac{E^2}{R} \rightarrow 120 \cdot 120 = \frac{14,400}{9.6} = \boxed{1500\ W}$

10. A 100-watt light bulb has a resistance of 144 ohms, what is the voltage?

common question

A. 110 volts
B. 115 volts
(C) 120 volts
D. 116.4 volts

$V = \sqrt{100 \cdot 144}$

$V = \sqrt{14400}$

$V = 120\ V$

W =
I =
R =
E =

---

11. Electric current will only flow _____.

A. in an open circuit
(B) in a closed circuit
C. from positive to negative
D. in a copper wire

12. When resistors are connected in series, the total resistance is _____.

A. the equivalent of the smallest resistance value
B. the equivalent of the largest resistance value
(C) the sum of the individual resistance values
D. less than the value of the smallest resistance

13. In a series circuit _____ is common.

A. voltage
B. wattage
(C) current
D. resistance

14. If the circuit is arranged so that the electrons have only one possible path, the circuit is called a _____ circuit.

A. shorted
B. open
C. parallel
(D) series

15. Fuses and circuit breakers are connected in _____ with the devices they are intended to protect.

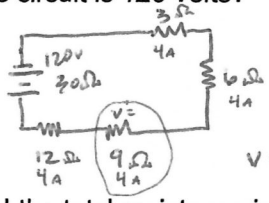
A. series
B. parallel
C. series-parallel
D. none of these

16. Four resistors are connected in series, R1 is 3Ω, R2 is 6Ω, R3 is 9Ω, and R4 is 12Ω. What is the voltage drop across R3 if the total voltage of this circuit is 120-volts?

practice →

A. 120
B. 13
C. 36
D. 3600

V = 120
① add resistances
② find amps ea
③ find R_3 voltage

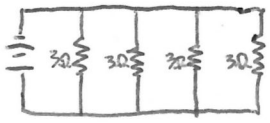


$R_T = 30\Omega$

$V = I \cdot R$

17. When three equal resistors are connected in parallel the total resistance is _____.

A. equal to the resistance of each
B. greater than any one alone
C. less than any one alone
D. none of these



all resistors = 3Ω

18. In a parallel circuit _____ is common.

A. voltage
B. wattage
C. current
D. resistance

19. When a current leaves its intended path and returns to the source, bypassing the load, the circuit is ____.

A. open
B. shorted
C. incomplete
D. broken

20. When three light bulbs are wired in a single fixture, they are connected in _____.

A. series
B. series-parallel
C. parallel
D. order of wattage

21. Three 9 ohm resistors connected in parallel have a total resistance of _____ ohms.

A. 27
B. 9
C. 3
D. none of these

equal parallel

Resistance of all
Resistance of 1

22. Determine the total resistance of the following four resistive electric heaters are connected in parallel,

Heater #1 - 20Ω
Heater #2 - 30Ω
Heater #3 - 60Ω
Heater #4 - 10Ω

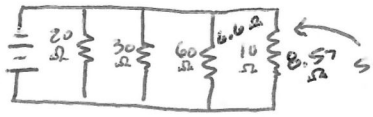
A. 5 ohms
B. 12 ohms
C. 60 ohms
D. 120 ohms

other way reciprocal

drilldown way

total should be lowest than smallest ~~this~~ resistor

unequal parallel



start @ end, work back

$R_T = \frac{R_1 \times R_2}{R_1 + R_2} = \frac{60 \times 10}{60 + 10} = 8.5$ // $\frac{30 \times 8.57}{30 + 8.57} = 6.6$ // $\frac{20 \cdot 6.6}{20 + 6.6} = 4.9$

1 way (prod/sum)

23. If the above parallel circuit was supplied by a 240volt, single phase, power source, what would be the total current?

A. 2 amps
B. 4.8 amps
C. 20 amps
D. 48 amps

$I = \frac{E}{R}$ $\quad I = \frac{240}{4.9}$

24. What is the total power being used in the above parallel heater circuit?

A. 1,152 VA
B. 4,800 VA
C. 11,520 VA
D. 12,000 VA

$VA = E \cdot I$

25. A 230-Volt, single phase, circuit has a 10 KW load that draws 50 Amps of current. What is the power factor of this circuit?

A. 78%
B. 87%
C. 94%
D. 115%

$PF = \frac{W}{VA}$ $\quad \frac{10,000}{230 \cdot 50} = \frac{10,000}{11,500} = 0.869$

230
50
000
11500

$PF = \frac{W}{VA}$ $\quad \frac{10,000}{11,500}$

VOLTAGE DROP STUDY QUESTIONS

WIRE RESISTANCE

1. What is the DC resistance of 85 feet of No.2 uncoated copper conductor?

   A. .01731 Ohms
   B. .01649 Ohms
   C. .19400 Ohms
   D. .17314 Ohms

   $\frac{0.194}{1000} \times L$

2. What is the resistance of 122 feet of No.8 uncoated copper conductor, installed in a raceway?

   A. .77800 Ohms
   B. .09320 Ohms
   C. .09491 Ohms
   D. .00590 Ohms

   $\frac{0.778}{1000} = 0.09492$

3. What is the fault current for 6 feet of No.12 THHN solid uncoated copper conductor connected to a 120 volt 20 AMP breaker?

   Just plain current

   A. 6,383 AMPS
   B. 10,362 AMPS
   C. 20 AMPS
   D. None of these

   table 8: $\frac{1.93\ \Omega}{120} \times \frac{0.006}{1\text{ ft of }1000} = 0.01158\ \Omega$

   $0.01158\ \Omega$ = 10,362 amps @ one instance

4. A No.6 THW uncoated copper conductor has a total resistance of .05 Ohms. What is the approximate length of the conductor?

   A. 102 feet
   B. 108 feet
   C. 96 feet
   D. 150 feet

   $\frac{2KIL}{Cm} = 2(12.9)$

   table 8: $\frac{0.491}{1000} \times L = 0.000491\ \Omega$ per ft

   $\frac{\Omega}{1000} \times L$

   $\frac{0.05\ \Omega \text{ total resistance}}{0.000491\ \Omega \text{ per ft}} = 101.8$ ft

VOLTAGE DROP

5. What is the permitted voltage drop on a 240-volt branch circuit? 3%

   A. 12 volts
   B. 1.2 volts
   C. 0.72 volts
   D. 7.2 volts

6. The voltage drop on two No.12 THW conductors, 150 feet long, connecting a 9.8 amp load to a 115 volt source would be _____ volts.

   A. 3.4542
   B. 5.7572
   C. 5.6742
   D. None of these

   $V_d = \frac{2KIL}{Cm} = \frac{2(12.9)(9.8)(150)}{6530}$ $\frac{37926}{6530} = 5.807$

   ① $K = \frac{R \cdot Cm}{1000} = \frac{1.93 \cdot 6530}{1000} = 12.6029$ exact K factor

   $\frac{2(12.6029)(9.8)(150)}{6530} = 5.6742$

WIRE SIZE

7. What size THW conductor is required for a single-phase, 1-1/2 HP, 230-volt motor with a FLA of 10 amps, located 150 feet from the source?

   A. 14 AWG
   B. 12 AWG
   C. 10 AWG
   D. 8 AWG

① 3% of 230 = 6.9v (permitted)

$Cm = \frac{2KIL}{Vd}$ $\frac{2(12.9)(150)(10)}{6.9}$ = Cm

= 5608 cm

#10 wire too few kcmil

#12 wire (table 8)

8. What size aluminum THW conductor is required to a 60 amp branch circuit, 148 feet from a 240-volt single-phase source?

   A. 4 AWG
   B. 3 AWG
   C. 2 AWG
   D. 1/0 AWG

$Cm = \frac{2KIL}{Vd}$ 3% of 240 = 7.2v

$Cm = \frac{2(21.2)(60)(148)}{7.2v}$ = 52,293 cm

9. What is the minimum size THW stranded uncoated copper feeder conductor permitted to feed a 240-volt sub-panel, 180 feet from the source, with a branch circuit load of 24 amps?

   A. 1/0 AWG
   B. 8 AWG
   C. 6 AWG
   D. 4 AWG

still branch 3%; have to use word "total"

$Cm = \frac{2(12.9)(24)(180)}{7.2vd}$ = 15480 cm

10. The source voltage is 120 volts with a branch circuit load of 6000 watts located 200 feet from the source. The minimum size of conductor required by the Code would be a _____ THW.

    A. 3 AWG
    B. 2 AWG
    C. 1/0 AWG
    D. 1 AWG

$I = \frac{W}{E}$ $\frac{6000w}{120v}$ = 50A

~~$Cm = 2($~~

$\frac{2(12.9)(50)(200)}{3.6vd}$ = 71667

AMPACITY STUDY QUESTIONS

1. The maximum overcurrent protection of a No.12 THHN conductor is _____ amps when there are three conductors in a conduit and the ambient temperature is 104°F.

   A. 30
   B. 26.1
   C. 25
   D. 20

2. The ampacity of a No.14 THW conductor, when there are six conductors in a conduit and the temperature is 30°C, would be _____ amps.

   20 × 80 % = 16

   A. 25
   B. 22
   C. 20
   D. 16

3. What is the allowable ampacity of a No.12 THW conductor in a raceway with an ambient temperature of 75°F?

   25 × 1.05 = 26.25 A

   A. 20 amps
   B. 25 amps
   C. 26 amps
   D. 30 amps

4. What is the maximum current allowed on a No.12 THHN copper conductor in an ambient temperature of 122°F with a total of six current-carrying conductors in a conduit?

   30 122° = 0.82 80 %
   19.68

   A. 19.68 amps
   B. 24.68 amps
   C. 32.86 amps
   D. 20 amps

5. What is the maximum current allowed on a No.10 THW when in a conduit with 5 other current-carrying No.10 THW's and two bare No.10 grounding conductors? All are copper conductors. This is a total of 8 conductors in a conduit.

   35 × 80 % = 28

   A. 30 amps
   B. 21 amps
   C. 28 amps
   D. 20 amps

6. A cable contains seven current-carrying No.10 TW conductors in an ambient temperature of 30°C. What is the ampacity of this conductor?

   30 × 70 %

   A. 21 amps
   B. 17 amps
   C. 24 amps
   D. 30 amps

7. Three No.8 XHHW conductors are installed in a wet location with an ambient temperature of 45°C. What is the ampacity of this conductor?

50 × 0.82% = 41

A. 32.8 amps
B. 41 amps
C. 45.1 amps
D. 29 amps

8. Twenty-four No.12 THW current-carrying conductors are installed in a run of conduct 18" long. What is the total derating percent of value for these conductors?

~~25 × 45 = 11.25~~

24" long or more

A. 70%
B. 80%
C. 60%
D. no derating required

310.15 (B)(3)(a)(2)

9. What is the ampacity of 4 No.6 THW copper current-carrying conductors enclosed in a schedule 80 PVC conduit 8 feet in length entering a trench?

A. 65 amps
B. 52 amps
C. 44 amps
D. 40 amps

65 × 80% = 52

310.15 (B)(3)(a)(3)

10. What is the minimum size 60°C copper conductor permitted for a 3 ton air conditioning unit with a load of 25 amps in an ambient temperature of 122°F?

A. 12AWG TW
B. 10AWG TW
C. 8AWG TW
D. 6AWG TW

25 A 0.58 14.5

30 · 0.58 = 17.4
40 · 0.58 = 23.2
55 × 0.58 = 31.9

wire size = load / correction factor

25 / 0.58 = 43.1 A

wire size = load / Cor. Fact

BOX FILL STUDY QUESTIONS

1. What is the volume required per conductor for a No. 12 THHN?

   A. 2.00
   B. 2.25
   C. 2.50
   D. 3.00

   T 314.16(B)

2. What is the volume required for No. 4 THW conductors?

   A. 3.00 cu in for each conductor
   B. 5.00 cu in for each conductor
   C. 8.00 cu in for each conductor
   D. 8 times the conduit size for straight pulls

3. What size round box is required for 4-12AWG and 3-14AWG conductors?

   A. 4 x 1-1/4"
   B. 4 x 1-1/2"
   C. 4 x 2"
   D. 4 x 2 1/8"

   2.25 x 4 = 9
   2.00 x 3 = 6
   15 cu in
   T 314.16(B)

4. How many 12AWG conductors are permitted in a 4 X 1-1/2" square box?

   A. 5
   B. 7
   C. 9
   D. 11

5. What is the cubic inch capacity required for a device box containing one duplex receptacle, two cable clamps and two 12AWG-2 with ground nonmetallic sheathed cables?

   A. 13.5
   B. 15.75
   C. 16
   D. 18

   2.25 → duplex
   2.25 - clamps
   2.25 - clamps
   ~~2.25~~ - #12
   ~~2.25~~ - #12
   2.25 - grnd
   } 13.5

6. What is the minimum cubic inch allowed for a box that contains three cable clamps, two-12AWG-2 w/ground nonmetallic sheathed cables connected to one duplex receptacle and one-12AWG-2 w/ground nonmetallic sheathed cable connected to single-pole switch?

   A. 34 Cu In
   B. 31.5 Cu In
   C. 27 Cu In
   D. none of these

   2.25 x 9 =
   1
   4
   2
   2
   2
   1
   } 27 = 12 "items" cu in.

7. What size box is required for the twelve 10AWG THW conductors listed below?

- 4-10AWG THW (black) 4
- 4-10AWG THW (white) 4
- 4-10AWG THW (green) 1

} 9 #10 = 2.5

2.5 x 9 =

A. 27.50 cubic inch
B. 30.00 cubic inch
C. 22.50 cubic inch
D. 20.25 cubic inch

8. How many 12AWG conductors can you install in a 3 X 2 X 2-1/2" device box containing cable clamps and a duplex receptacle?

A. 5
B. 4
C. 3
D. 2

5 - 3 = 2

T 314.16(A)

9. What is the minimum size junction box required for the following combination of conductors?

- 1-14AWG ungrounded conductor 1
- 1-14AWG grounded conductor 1
- 1-14AWG grounding conductor 1
- 2-14AWG fixture wires 2

} 5

#14 = 2.0

2.0 x 5 = 10

A. 4 cubic inch
B. 6 cubic inch
C. 8 cubic inch
D. 10 cubic inch

Can omit #16 or smaller

10. What is the minimum size junction box required for the following combination of conductors and wiring devices?

- 3-10AWG ungrounded conductors
- 1-10AWG grounded conductor
- 1-10AWG grounding conductor
- 3-12AWG ungrounded conductors
- 3-12AWG grounded conductors
- 3-12AWG isolated grounding conductors
- 2 duplex receptacles

2.5 x 3
2.5
2.5
2.25 x 3
2.25 x 3
2.25
5.5 x 2

} 7.5

12.5
6.75
16.75
11

38.25

A. 42 cubic inch
B. 30.50 cubic inch
C. 38.25 cubic inch
D. 42.25 cubic inch

RACEWAY FILL STUDY QUESTIONS

1. The internal diameter of a 1" EMT conduit is _____.

   A. 1"
   B. .824
   C. .86
   D. 1.049 Ch9, T4

2. What size PVC schedule 40 conduit is required for the following conductors?

   - 10- 12AWG THW
   - 12- 10AWG TW
   - 6- 8AWG THHN
   - 8- 6AWG THWN

   ~~0.152~~ x 10 0.0181 = 0.181
   ~~0.176~~ x 12 0.0243 = 0.2916
   ~~0.216~~ x 6 0.0507 = 0.3042
   ~~0.254~~ x 8 0.0366 = 0.2928
   ↑ 1.0696 = 2"

   A. 2"
   B. 2-1/2"
   C. 3"
   D. 3-1/2"

3. An existing 2" rigid steel conduit contains ten #8 THHN conductors, how many #8 XHHW conductors can be added to this existing raceway?

   A. 23
   B. 22
   C. 27
   D. none of these

   Remember 40% rule
   10 x #8 THHN = 10 x 0.0366 = 0.366
   #8 XHHW = __ x 0.0437 = 22.8
   2" rigid = 1.363
   0.997

   T.4 2"@40% fill = 1.363
   T.5 #8 THHN = 0.366 x10 = 0.366
   1.363 - 0.366 = 0.997 left to fill
   T.5 #8 XHHW = 0.437
   .997/.0437 = 22.8 or 23 conductors

4. What is the area square inch of an 8AWG bare conductor installed in a 2" raceway?

   A. .34
   B. .86
   C. 0.013
   D. 0.017

   #8 bare 0.013
   Table 8
   T8 ch9 stranded
   310.106 (c)

5. How many 12 RHW* conductors can you install in a 2" EMT conduit?

   A. 38
   B. 51
   C. 66
   D. 90

   0.212 = #12 RHW
   1.342 = 2" EMT
   6.33
   T.C1
   app C

   stranded rule, in 2", can't be solid

TRANSFORMER STUDY QUESTIONS

1. The transformer winding that is connected to the source is called the _____ winding and the transformer winding connected to the load is called the _____.

   A. Secondary, Primary
   B. Primary, Secondary
   C. Delta, Wye
   D. Delta, Delta

2. If the primary phase voltage is 480V and the secondary phase voltage is 240V, the coil turns ratio is _____.

   A. 1:4 B. 1:2 C. 2:1 D. 4:1

3. Given the number of turns on the primary of a transformer is equal to 800 and the secondary has 3200 turns and a secondary current of 0.5 amps, find the primary current.

   A. 2 B. 4 C. 0.5 D. 800

   $\frac{800 \times 4}{\cancel{0.125} \times 4} \quad \frac{3200}{0.5}$

4. A 112.5 kVA, three phase, 480-208/120 volt transformer will deliver how many amps of current on the secondary?

   A. 540
   B. 312
   C. 200
   D. 400

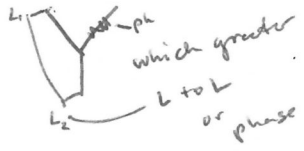
   I_{LP} $\frac{112.500}{480 \times 1.732} = \frac{112500}{831.36}$ 135.32 ← didn't need to do, only asked for secondary

   remember use 208, not 120

   I_{LS} $\frac{112500}{208 \times 1.732} = \frac{112500}{360.36}$ 312.28

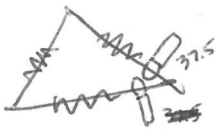
5. A 480-208/120v three-phase transformer is delta-wye connected. The secondary line voltage of the transformer is _____ in the secondary.

   A. less than the phase voltage
   B. equal to the phase voltage
   C. greater than the phase voltage
   D. none of these

6. A delta-wye 480/208/120 volt three phase transformer has a secondary line current of 150 amps. What is the primary line current?

   A. 37.5 amps
   B. 150 amps
   C. 3.75 amps
   D. 65 amps

   $\frac{150A}{4} = 37.5 \times 1.732$

   I_{LP} $\frac{VA}{480 \times 1.732} \quad \frac{311.76}{831.36} = 37.5$ $V_A = 54038.4$ VA

   1 way right

   4:1 ratio ★ find first ★

   I_{LS} $\frac{VA}{208 \times 1.732} = 150A$ $\frac{x}{360.36} = \frac{150}{1}$ just remember use 208, not 120

   $\frac{207.84}{x} = \frac{150}{1}$

7. What is the turn's ratio of a three-phase 480-208/120v transformer?

   A. 1:4 B. 2.3:1 C. 4:1 D. 480/208

8. Three 10 kVA single-phase transformers are connected delta-wye. The primary voltage is 480. What is the maximum primary line current?

   A. 72 amps
   B. 36 amps
   C. 18 amps
   D. 12 amps

   $I_L = \frac{10,000}{480 \times 1.732} \quad \frac{}{831.36} = 12.03$ A

   $10,000 \times 3 = 30,000$ VA

   $30,000 / 480 \times 1.732 = 36$

TRANSFORMER STUDY QUESTIONS

1. The transformer winding that is connected to the source is called the _____ winding and the transformer winding connected to the load is called the _____.

   A. Secondary, Primary
   B. Primary, Secondary
   C. Delta, Wye
   D. Delta, Delta

2. If the primary phase voltage is 480V and the secondary phase voltage is 240V, the coil turns ratio is _____.

   A. 1:4 B. 1:2 C. 2:1 D. 4:1

3. Given the number of turns on the primary of a transformer is equal to 800 and the secondary has 3200 turns and a secondary current of 0.5 amps, find the primary current.

   A. 2 B. 4 C. 0.5 D. 800

4. A 112.5 kVA, three phase, 480-208/120 volt transformer will deliver how many amps of current on the secondary?

   A. 540
   B. 312
   C. 200
   D. 400

5. A 480-208/120v three-phase transformer is delta-wye connected. The secondary line voltage of the transformer is _____ in the secondary.

   A. less than the phase voltage
   B. equal to the phase voltage
   C. greater than the phase voltage
   D. none of these

6. A delta-wye 480/208/120 volt three phase transformer has a secondary line current of 150 amps. What is the primary line current?

   A. 37.5 amps
   B. 150 amps
   C. 3.75 amps
   D. 65 amps

7. What is the turn's ratio of a three-phase 480-208/120v transformer?

   A. 1:4 B. 2.3:1 C. 4:1 D. 480/208

8. Three 10 kVA single-phase transformers are connected delta-wye. The primary voltage is 480. What is the maximum primary line current?

   A. 72 amps
   B. 36 amps
   C. 18 amps
   D. 12 amps

TRANSFORMER STUDY QUESTIONS

1. The transformer winding that is connected to the source is called the _____ winding and the transformer winding connected to the load is called the _____.

   A. Secondary, Primary
   B. Primary, Secondary
   C. Delta, Wye
   D. Delta, Delta

2. If the primary phase voltage is 480V and the secondary phase voltage is 240V, the coil turns ratio is _____.

   A. 1:4 B. 1:2 C. 2:1 D. 4:1

3. Given the number of turns on the primary of a transformer is equal to 800 and the secondary has 3200 turns and a secondary current of 0.5 amps, find the primary current.

   A. 2 B. 4 C. 0.5 D. 800

4. A 112.5 kVA, three phase, 480-208/120 volt transformer will deliver how many amps of current on the secondary?

   A. 540
   B. 312
   C. 200
   D. 400

5. A 480-208/120v three-phase transformer is delta-wye connected. The secondary line voltage of the transformer is _____ in the secondary.

   A. less than the phase voltage
   B. equal to the phase voltage
   C. greater than the phase voltage
   D. none of these

6. A delta-wye 480/208/120 volt three phase transformer has a secondary line current of 150 amps. What is the primary line current?

   A. 37.5 amps
   B. 150 amps
   C. 3.75 amps
   D. 65 amps

7. What is the turn's ratio of a three-phase 480-208/120v transformer?

   A. 1:4 B. 2.3:1 C. 4:1 D. 480/208

8. Three 10 kVA single-phase transformers are connected delta-wye. The primary voltage is 480. What is the maximum primary line current?

   A. 72 amps
   B. 36 amps
   C. 18 amps
   D. 12 amps

USING THE STANDARD METHOD OF CALCULATION, ANSWER THE NEXT 6 QUESTIONS ON THE FOLLOWING DWELLING UNIT,

A Dwelling has a floor area of 3000 square feet of living area with a 120/240v, single phase 3-wire service and three small appliance circuits. The following equipment will be installed in this dwelling;

- Range (12kW)
- Water Heater (5kW)
- Dishwasher (1.2kW)
- Garbage Disposal (900va)
- Trash Compactor (1000va)
- Blower Motor (1700va)
- Central Heater (12kW)
- Clothes Dryer (4.5kW)
- A/C compressor (28A)

1. What is the total general lighting and small appliance demand load ? (choked down)

   A. 9,000 VA (B) 7,200 VA C. 3,000 VA D. 15,000 VA

2. How many 20 amp breakers do you need for the general lighting and small appliance demand load ?

   A. 8 (B) 9 C. 5 D. 6

   4 general ckts
   3 sm app ckts
   1 laundry ckt
   1 bath ckt

   120v x 20a = 2400va per ckt

   9000/2400 = 3.75 ckts
   go up to 4, can't overload ckt!

3. What is the total demand load for this dwelling unit ?

   (A) 39,975 VA B. 35,000 VA C. 47,775 VA D. 30,600 VA

4. What is the minimum standard over current device for the service entrance conductors ?

   (A) 175 B. 150 C. 125 D. 200

   go to 240.4(B)
   rollover rule find next biggest size
   list of 240.6(A) fuse & breaker sizes ↑

5. What size THHN CU service entrance conductors are needed for this dwelling unit ?

   310.15(B)(16) ↑ don't use for dwelling!

   A. #1 B. #3/0 (C) #1/0 D. #2/0

6. What is the grounding electrode conductor size ?

   A. #6 AL (B) #6 CU C. #4 CU D. #2 A

   310.15(B)(7)

   T 250.66

ANNEX D HAS EXAMPLES FOR TEST DAY