

There is more to practice on **ElectroMath in module 3**

AC THEORY Answers are below!

- 1) What is the phase difference in a circuit with 100v, drawing 0.5 amps, consuming 50Watts
a) 45 dgr b) 60 dgr c) 90 dgr

- 2) A sine wave has 5 amps RMS value. What is the peak value?
a) 7.07 amps b) 6.37 amps c) 10 amps

- 3) A 10 ohm resistor has a 14.14 V peak drop across it. What power is dissipated?
a) 1.414 W b) 19.99 W c) 10 W

- 4) A circuit has 115 V RMS, 2.5A at 60 degrees, what is the power dissipated?
a) 300 VA b) 143 W c) 79 W

- 5) How many amperes will a 28-volt generator be required to supply to a circuit containing five lamps in parallel, three of which have a resistance of 6 ohms each and two of which have a resistance of 5 ohms each?
a) 1 ampere b) 1.11 amperes c) 25.23 amperes

- 6) A sine wave of RMS value 7.07 volts has a peak to peak value of
a) 20.0 volts b) 10.0 volts c) 0.707 volts

- 7) The average value of 100 volts peak AC is
a) 141.4 volts b) 63.7 volts c) 70.7 volts

- 8) The RMS value of 200 volts peak to peak is
a) 70.7 volts b) 141.4 volts c) 127.4 volts

- 9) If an AC sine wave has an RMS value of 5V its peak value is
a) 14.14 V b) 7.07 V c) 6.37 V

- 10) A sine wave has a periodic time of 0.5 milliseconds, what is its frequency?
a) 2Khz b) 20Khz c) 200 Hz

- 11) A circuit has 115 V RMS, 2.5A at 60 degrees, what is the power dissipated?
a) 300 VA b) 143 W c) 79 W

ANSWERS:

1c 2a 3c 4b 5c 6a 7b 8a 9b 10c

1) What is the phase difference in a circuit with 100v, drawing 0.5 amps, consuming 50Watts

- a) 45 dgr b) 60 dgr c) 90 dgr

$100V \times 0.5A = 50W$, as there is no additional power consumed, they are at 90 degrees

2) A sine wave has 5 amps RMS value. What is the peak value?

- a) 7.07 amps b) 6.37 amps c) 10 amps

Effective value = RMS value = $0.707 \times \text{peak value}$ Peak value = $\frac{RMS\ value}{0.707}$

3) A 10 ohm resistor has a 14.14 V peak drop across it. What power is dissipated?

- a) 1.414 W b) 19.99 W c) 10 W

Peak $\times 0.707 = \text{effective Volts}$ $14.14V \times 0.707 = 10V$ $P = \frac{Volts^2}{Resistance} = \frac{10V^2}{10\Omega} = \mathbf{10W}$

4) A circuit has 115 V RMS, 2.5A at 60 degrees, what is the power dissipated?

- a) 300 VA b) 143 W c) 79 W

$P = E \times I \times \cos \Theta$ as **cos Θ of 60 dgr is = 0.5**, the solution is $115V \times 2.5A \times 0.5 = \mathbf{143W}$

5) How many amperes will a 28-volt generator be required to supply to a circuit containing five lamps in parallel, three of which have a resistance of 6 ohms each and two of which have a resistance of 5 ohms each?

- a) 1 ampere b) 1.11 amperes c) 25.23 amperes

First you must find out the total Resistance in a parallel circuit! The formula is $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5}$

$$\frac{1}{6\Omega} + \frac{1}{6\Omega} + \frac{1}{6\Omega} = \frac{3}{6\Omega} = \frac{1}{2\Omega} \quad \text{and} \quad \frac{1}{5\Omega} + \frac{1}{5\Omega} = \frac{2}{5\Omega} \quad \frac{1}{2\Omega} + \frac{2}{5\Omega} = \frac{5}{10\Omega} + \frac{4}{10\Omega} = \frac{9}{10\Omega}$$

$$\frac{1}{R_T} = \frac{9}{10\Omega} \quad \text{thus} \quad R_T = \frac{10}{9}\Omega$$

$$I = \frac{E}{R} = \frac{28V}{\frac{10}{9}\Omega} = \frac{28V \times 9}{10\Omega} = \mathbf{25.2A}$$

6) A sine wave of RMS value 7.07 volts has a peak to peak value of

- a) 20.0 volts b) 10.0 volts c) 0.707 volts

Effective value = RMS value = $0.707 \times \text{peak value}$ Peak value = $\frac{RMS\ value}{0.707} = \mathbf{10\ Volts}$

7) The average value of 100 volts peak AC is

- a) 141.4 volts b) 63.7 volts c) 70.7 volts

Average value = $0.637 \times \text{peak value}$ $0.637 \times 100V = \mathbf{63.7V}$

8) The RMS value of 200 volts peak to peak is

- a) 70.7 volts b) 141.4 volts c) 127.4 volts

Effective value = RMS value = $0.707 \times \text{peak value}$ $0.707 \times 200V = 141.4V$

9) If an AC sine wave has an RMS value of 5V its peak value is

- a) 14.14 V b) 7.07 V c) 6.37 V

Peak value = $\frac{RMS\ value}{0.707} = \frac{5V}{0.707} = \mathbf{7.07V}$

10) A sine wave has a periodic time of 0.5 milliseconds, what is its frequency?

- a) 2Khz b) 20Khz c) 200 Hz

$0.5 \text{ milliseconds} = 0.005s = \frac{5}{1000}s = 200\text{cps} = 200\text{Hz}$

Learn by heart: **cos Θ of 60 dgr is = 0.5** **sin Θ of 30 dgr is = 0.5**

cos Θ of 90 dgr is = 0 and of 0 degrees is 1 - sinus is just the opposite!