

brain block...



QUESTION 1 *(Courtesy: Glyn Craig of Techlyn)*

In a practical examination a student is presented with an unknown voltage source and an oscilloscope. The student is asked to estimate the RMS (Root Mean Square) voltage and the frequency. A sine wave of 30 Volts peak-to-peak and a period of 16,6 milliseconds is measured.

What are the correct conclusions?

Answer

The peak-to-peak voltage of an ac (alternative current) signal is twice the peak value. (Half the sine wave is positive and the other half is negative).

The RMS value for a sine wave is the peak voltage divided by the square root of 2. (1,414)

The answer is therefore:

$$\begin{aligned}V_{\text{rms}} &= V_{\text{pk}} / 2 \times 1,414 \\ &= 30 / (2 \times 1,414) \\ &= 10,6 \text{ V (approximately a third of } V_{\text{pk-pk}} \text{)}\end{aligned}$$

The frequency is:

$$\begin{aligned}f &= 1/t \quad \text{Where } f \text{ is in Hertz (Hz)} \\ &\quad t \text{ is in seconds} \\ f &= 1/16,6 \times 10^{-3} \\ &= 60,2 \text{ Hz}\end{aligned}$$