Batu Arda Düzgün

21802633

i. What is ADC (analog to digital converter)? What is DAC (digital to analog converter)? Search the Internet and write a summary. Give some examples of applications for both. If I somehow measure the time interval between two successive digital outputs of ADC, how can I determine the sampling frequency (sample rate) of it?

Like the name imply an ADC convert an analog signal to a digital signal a good example to this is a microphone it converts the pressure of the sound waves to an analog voltage signal then an ADC converts it to a binary digital signal. This way we can modify the digital signal on a computer. A DAC does the opposite of an ADC and convert a digital signal to an analog signal. If we keep using the same example. To listen to the sound of the modified digital signal we run it trough a DAC and convert it to an analog signal then send it to a speaker. If we know the time interval between two successive digital outputs of ADC we know the period of its sample points then we can just divide 1 by that time to find its frequency.

ii. Explain the difference between a waveform point and a sample point.

Waveform point is the digital value of the voltage at a specific time. A sample point is a sample value taken from an analog signal to construct a waveform point.

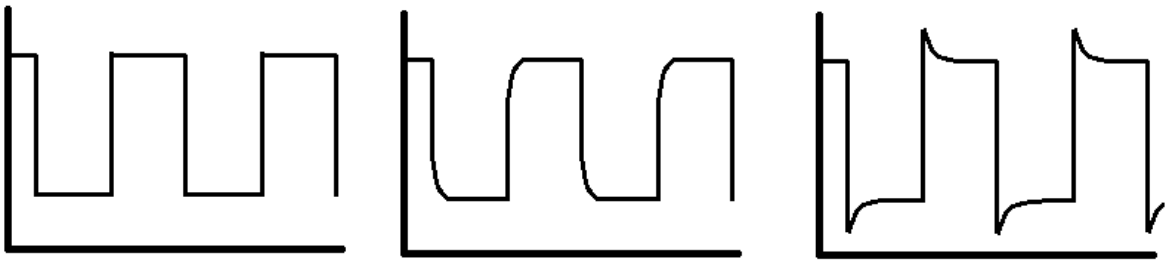
iii. Explain equivalent-time sampling mode of a digital oscilloscope. Why and when is it used?

It can only be used in signal which repeats itself. The oscilloscope takes sample points as fast as it could then uses those points to construct a clear picture of the wave which it could not take enough sample points in one pass. This is used in very fast repeating signals because the oscilloscope can't take sample points fast enough to create a clear picture of the wave in one pass of the wave.

iv. Explain the trigger mode to be used to capture and display an aperiodic signal of limited time duration as shown in the figure below.

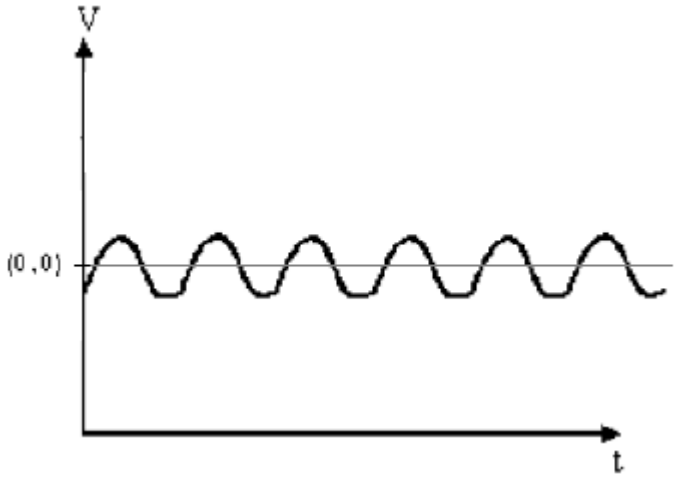
Single sequence trigger mode is used there. In this trigger made the display is empty until the trigger level is reached then the waveform that appears is frozen on display.

v. Explain and draw how a square wave is displayed on the screen if the probe is properly compensated, under-compensated or over-compensated.



Properly compensated under compensated over compensated

vi. Consider the following waveform: Draw what you would see on the oscilloscope screen with AC coupling.



vii. In digital scopes, portion of the signal during the time before trigger event is displayed. How do these scopes achieve this result?

In digital scopes it always takes sample points and sends them to memory then and after some time the memory deletes them so it doesn't get full. When the trigger event happens it just tells the memory to not delete a specific amount of sample points from the memory.

viii. Using the Edge-Triggering with a positive slope control and a level control of 4V (which means the trigger point is set to the 4V of rising edge of the signal) and set on Normal Mode, I am trying to observe a sinusoidal voltage signal (without any DC) on the oscilloscope. However, all I see is a blank screen. What do you think the problem might be? And with which one(s) of the following methods might I be able to see the voltage signal on the oscilloscope: a) decreasing voltage value of level control, b) using the negative slope control (falling edge), c) using Auto mode? Briefly explain

I think the signal might not be reaching 4V so it never triggers the level control. Decreasing voltage value of level control should solve this. Using the negative slope control should not solve this is a sinusoidal wave without and DC component so it can't have 4V negative slope without having a positive slope. Using auto mode should not fix our problem because our trigger value is too high so it will just show use an unfocused sweep.