FUNDAMENTAL CONCEPTS

1. (1 Point) General introduction explain what an oscilloscope is and what can it be used for.
2. (1 Point) Specific introduction explain vertical gain.
3. (1 Point) Specific introduction explain time base.

TIME BASE APPLICATION

1. (1 Point) I hijacked and superimposed on top of an existing AM radio station's radio broadcast frequency, by also broadcasting on that same AM radio frequency. (NOTE: AM stands for Amplitude Modulation) Did I accomplish this by ADDING an audio signal to a radio frequency, or by MULTIPLYING the radio signal by the audio signal?
2. (1 Point) Draw a very vague/rough drawing of the components involved
3. (1 Point) Draw a rough representation of high frequency radio signal as seen on the oscilloscope.

TIME BASE CALCULATIONS for the radio frequency

1. (1 Point) Show the math to determine this AM radio frequency. (Possible range 540-1600 kHz).
2. (1 Point extra to remove one lost point) Determine the Buffalo station's AM call letters for this station's radio frequency. W***? You will have to look this up somehow or if you are Buffalo try to tune into that station and listen for the call letters..

pg. 1

TIME BASE CALCULATIONS for the audio signal

1. (1 Point) Draw the oscilloscope's screen showing the audio envelope for the audio tone that was amplitude modulating the amplitude of the radio frequency.
2. (1 Point) Show the math to determine this audio tone. (Possible range 20-20,000 Hz)

SIGNAL AMPLITUDE APPLICATION

1. (1 Point) Explain the procedure I USED to measure AC peak voltage from my household electrical outlet
2. (1 Point) Draw basic arrangements of physical equipment used to perform this
3. (1 Point) Draw oscilloscope screen

AMPLITUDE BASED CALCULATIONS

1. (1 Point) Calculate voltage peak for my electrical outlet, show math
2. (1 Point) Calculate AC RMS from this voltage peak, show math
3. (1 Point) What ideally should this RMS AC voltage be, that is found in every household? You may need to look this up.

pg. 2

SOLVING AN AMPLITUDE BASED APPLICATION PROBLEM VIA A SIMPLE CALCULATION

1. (1 Point) Could a 9 volt ac RMS electrical source be used to charge a 12 volt dc battery (assuming we placed a rectifying diode in series with the battery?) N/Y? Show the math.

BASIC UNDERSTANDING OF VOLTAGE USED FOR A SIGNAL VERSUS POWER

1. (1 Point) Explain one or more of the differences between an AC voltage that is used as an AC signal versus an AC voltage that is used to power something that does work.

USING AN OSCILLOSCOPE TO DETERMINE SPEED OF SOMETHING

1. (1 Point) Describe the procedure I used to determine the speed of sound.
2. (1 Point) Draw the basic physical arrangement.
3. (1 Point) Draw the oscilloscope screen.

pg. 3

CALCULATIONS FOR SPEED

1. (1 Point) Show data.
2. (1 Point) Perform calculations to determine the speed of sound and show the math.
3. (1 Point) Is this speed of sound experiment above flawed? Could sound reflections from nearby objects cause errors in our determination of the speed of sound? If yes, then how? (Use your scientific intuition here).

FUN

1. (1 Point) CONCLUSION: After viewing my fun stuff oscilloscope video I want you to use your imagination. I want you in this conclusion to present your original idea of something we SHOULD TRY TO OBSERVE in a household or anywhere, somehow by using an oscilloscope, and explain why your idea is a good idea. If your idea is doable I might try it and post the results online.