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OBJECTIVE: FAMILIARIZATION WITH COMPONENTS & INSTRUMENTS

1. Perform the following exercise and write the observations on a sheet for this purpose. Show your result to the TA/instructor and get the observations signed. Submit it in the next lab session along with the answers to the questions given at the end.

2. **MATERIALS REQUIRED:** Resistance: 47 Ω , 100 Ω , 220 Ω, 470 Ω, 1KΩ , 10KΩ - (One Each)

Select a sine function of frequency 1.5 MHz in Arbitrary Function Generator (AFG). Connect the following mentioned load resistors to AFG and set its value in AFG. Set the amplitude of the signal to be delivered to the load, R_L as 3Vpp. Also connect the Digital Storage Oscilloscope (DSO) to the load to observe the signal waveform delivered to the load. Fill the following table.

	C_0	C_1	C_2	C_3	C_4
Sl. No.	Load Resistor, R_L (ohm)	Displayed Load Voltage when AFG is set for 50 ohm	Displayed Load Voltage for when AFG is set High Z	Displayed Load Voltage Actual R_L	Load Voltage from the DSO
1	47				
2	100				
3	220				
4	470				
5	1000				
6	10,000				
7	Open (i.e. no load)				

Steps for filling the above table for every R_L mentioned in it:

1. In AFG, set frequency = 1.5 MHz
2. Set the R_L into AFG & connect the AFG to R_L
3. In AFG, set Amplitude = 3Vpp
4. Fill column C_3 form AFG & C_4 form DSO

5. Change load value in AFG from R_L to 50Ω
6. Fill column C_1 from AFG Display
7. Change load value in AFG from 50 to High Z
8. Fill Column C_2 form AFG Display

3. Set the AFG to output a Ramp (triangular) waveform of 250 kHz and 2.0Vpp for a High Z load. Set the symmetry to 80% and offset to 500mV. Connect the output of the function generator to Channel 2 of the DSO. Adjust appropriate knobs of the DSO to get a stable display of the triangular wave. With the help of the cursor, measure the period of the waveform by counting the number of divisions per cycle on the time axis (x-axis) of the display and calculate the frequency of the waveform. Write the observations below from the DSO.

Time (X-axis) scale =

Number of divisions =

Period =

Frequency =

Symmetry =

Amplitude (Y-axis) scale =

Number of divisions =

V_low =

V_high =

Offset (along Y-axis) =

Amplitude (pp) =

(V_low and V_high respectively denote the trough and the crest of the wave) =

4. With the DSO connected, press the suitable button of the AFG to obtain a square wave of frequency 5 kHz and amplitude 5Vpp (in High Z load mode) by doing measurement on the oscilloscope screen (ignore the indicator on the function generator). Write the following parameters you have set on the oscilloscope.

Time (X-axis) scale   =

Number of divisions   =

Period   =

Frequency   =

Amplitude (Y-axis) scale   =

V_low   =

V_high   =

Amplitude (pp)   =

Offset (along Y-axis)   =

5. For the given resistances, fill the following table (in Ω, KΩ, or MΩ):

Sl. No.	Resistor Value	
	From Color Code	**From Multimeter**
1		
2		
3		
4		
5		
6		
7		

Answer the following questions on a separate sheet and attach it to this sheet.

Q1. What is the value of a capacitor on which 103 is written?

Q2. Write the colour code used to specify the value of a resistance.

Q3. How cathode and anode are generally indicated on a diode?

Q4. What does the notch on a transistor indicate?

Q5. Draw a circuit diagram to generate a variable voltage from 0 to 5 V using a potentiometer and a fixed power supply of 5 V.