DATA SHEET FOR EXP. 1A

Your Name: _____ Date: _____Station #: _____

Names of other Team members:

_____

_____

IIIB: Measurement of common ground voltages (not all blanks have to be filled):

Location of positive probe	Location of negative probe	Observed Voltage	Your choice for location positive probe	Your choice for location negative probe	Observed Voltage
Power Supply	SCM				
Power Supply	Log Amp				
Power Supply	OA-1				

IVB: 1. Offset voltage using the following switch settings:

NORM _____V INV _____V

IVB: 2. Voltage source loading (show calculations)

Output voltage (E_O) without 100 Ω load = _____V

Source Voltage (E_S) = _____V

Output voltage (E_O) with 100 Ω load = _____V

R_A/R_B = _____

R_A = _____Ω

R_B = _____Ω

Show calculation of R_A/R_B

Show calculation of R_A

Show calculation of R_B

IVC: DMM Multimeter use (include units)

E (measured) = _____

i (measured) = _____

DMM current range used: _____

R (measured) = _____

% error in R (expected value is the nominal value) _____

Show calculation of the % error in R

i (calculated from E and R measured) = _____

Show calculation of the current i:

% difference between i calculated from E and R measured and i measured _____

Show calculation of the % difference in i:

VB: Attach a copy of the output from the DVM program and the Excel file proving that the STDDev and the Averages reported by the program are correct.

VC: Attach Excel chart, labeled with date, your name, a title, label voltage axis (+0.5 to -0.5 V) and the time axis with labels and units. Use proper significant figures.

VIA: Voltage Balance

Teammate's name:	Did Teammate performed voltage balance operation?
_____	_____
_____	_____

VIB: Voltage follower

measured E_{in} = _____ measured E_o = _____ expected E_o = _____

% error = _____

VIC: Voltage amplifier (include units)

measured E_{in} = _____ measured E_o = _____ expected E_o = _____

% error = _____

Show formula and calculation of expected E_o:

VID: 1. Response time (for nominal 10-s time constant)

Mark on your Excel chart E_0, E_f and the halfway point $(E_0 + E_f)/2$, label axes, and attach a copy of the chart.

How many seconds does it take to reach 50% of the final voltage ? _____s

What is the expected RC (calculated from R & C)? _____s

What is the experimental value of RC (calculated from time to reach 50%)? _____s

% error in RC = _____

What is the response time (not time constant) based on experimental value for RC?

_____s

2. Response time (for nominal 1-s time constant)

Mark on your Excel chart E_0, E_f and the halfway point $(E_0 + E_f)/2$, label axes, and attach a copy of the chart.

The response time estimated from the chart is _____s.

From your experimental results, by what factor does the response time decrease when RC is decreased by a factor of 10? (just give one significant figure) _____

VIE: Integrator

Measured E_{in} = _____ mV

Open the file in Excel and produce a labeled chart; attach a hardcopy of the chart

Determine slope up and slope down using trendlines = 1._____ 2._____ mV/s

Average of absolute value of slopes for 2 runs = _____ mV/s

Theoretical slope of OA output
(calculated from equation 6) . . . . . = _____ mV/s

Show calculation

Experimental % error in slope . . . . . = _____
(based on values above)

Estimated % error in slope . . . . . = _____

Below show the calculation of the estimated % error in the slope (uncertainty). It is based on propagation of error or uncertainty mathematics and estimates of the uncertainty due to the R and C component tolerances (Table I) and the uncertainty due to the DMM used to measure E_{in} (Table II). (See lecture notes or Harris for propagation of *systematic* error.)

Is your experimental error within your estimated error? _____

Based on this calculation, what is the main source of the experimental error?

_____