Instrument Accuracy

Dimension	Instrument	Instrument Precision	Instrument Accuracy (max. relative error)	Common Error Limiting Factor
Length	meter stick[1]	0.5 mm	$< 0.5\%$	visual
Length	Vernier calipers [2]	0.05 mm	0.1%	misreading scale
Mass	electronic balance [3]	0.1 g	0.1% to 1%	calibration
Time	digital stopwatch [4]	0.01 s	$\sim$0.001%	reaction time ($\sim$ 0.2 s)
Time	photogate[5]	5 ms	0.50%	data processing
Time	Smart Timer[6]	0.1 ms	0.01% of full scale	calibration
Frequency	signal generator [7]	0.1 Hz	1%	calibration
Freefall Time	Tape Timer[8]		0.1%	obstruction
Time/dist	generator meter [9]		0.1%	wrinkled paper, spin on inelastic
Angle	Digital Level[10]	0.05°	0.05°	unstable level

Table 1: Instrument Accuracy - Mechanics

Dimension	**Instrument**	**Instrument Precision**	**Instrument Accuracy (max. relative error)**	**Common Error Limiting Factor**
V, I, R	multimeter[11]	4.5 digits	DCV: 1% ACV: 1.5% DCA (< 30 mA): 1% DCA (0.3 to 10 A): 2% R (< 300 kΩ): 1% R (0.3 to 3 MΩ): 2%	extra resistance, calibration
V, I, R	multimeter[12]	4.5 digits	0.3% for 1 mV to 320 V 1.5% for 0.1 mA to 10 A 0.5% for 1Ω to 3.2 MΩ	calibration
V, I, R	multimeter[13]		(see bottom of meter)	extra resistance, calibration
Capacitance	capacitance meter [14]	3.5 digits	0.5% for 200 pF to 0.2 mF 2% for 0.2 mF to 20 mF	calibration, stray capac.
Inductance	LCR meter[15]	3.5 digits	3% for C < 0.2 mF 3% for L < 20 H	calibration
V, freq.	oscilloscope[16]	2 digits	3% for both gain and sweep	visual resol., calibration
Resistance	Decade resistor [17]		10%	calibration
Resistance	Resistance subst. box [18]	7 Ohms	10%	calibration
Inductance	Decade inductor [19]	1 mH	10%	calibration
Mag. Field	Hall Probe[20]	0.01 mT	±2% DC, ±3.5% AC	probe alignment

Table 2: Instrument Accuracy - Electricity and Magnetism

