A Table showing conversions between SI, cgs-esu and cgs-emu systems.

Issue 6

Basic Units		*Definitions*			*Current SI*	*Dimensions*	*Dimensions*	*x by k_s to get*	*cgs - esu*		*x by k_m to get*	*cgs - emu*		*k_s/k_m*
mass	**m**	base unit (gram)			kilogram	M	M	10^{3}	gram	M	10^{3}	gram	M	1
length	**l**	base unit (centimetre)			metre	L	L	10^{2}	centimetre	L	10^{2}	centimetre	L	1
time	**t**	base unit (second)			second	T	T	10^{0}	second	T	10^{0}	second	T	1
velocity	**v**	distance / time			metres / second	LT^{-1}	LT^{-1}	10^{2}	cm / second	LT^{-1}	10^{2}	cm / second	LT^{-1}	1
acceleration	**a**	rate of change of velocity (gal)				LT^{-2}	LT^{-2}	10^{2}	cm / sec^{2}	LT^{-2}	10^{2}	cm / sec^{2}	LT^{-2}	1
force	**f**	mass x acceleration (dyne)			newton	MLT^{-2}	MLT^{-2}	10^{5}	dyne	MLT^{-2}	10^{5}	dyne	MLT^{-2}	1
work or energy	**e**	force x distance (erg)			joule	$ML^{2}T^{-2}$	$ML^{2}T^{-2}$	10^{7}	erg	$ML^{2}T^{-2}$	10^{7}	erg	$ML^{2}T^{-2}$	1
power	**p**	rate of work			watt	$ML^{2}T^{-3}$	$ML^{2}T^{-3}$	10^{7}	erg/sec	$ML^{2}T^{-3}$	10^{7}	erg/sec	$ML^{2}T^{-3}$	1
pressure	**P**	force ÷ area (barge)			pascal	$ML^{-1}T^{-2}$	$ML^{-1}T^{-2}$	10	bar	$ML^{-1}T^{-2}$	10	bar	$ML^{-1}T^{-2}$	1
stiffness	**k**	force ÷ extension (F=kE)				MT^{-2}	MT^{-2}							
compliance	**c**	inverse of stiffness				$T^{2}M^{-1}$	$T^{2}M^{-1}$							
Conductance Field			**Mechanical Equivalents**											
electric current	**i**	base unit	velocity		ampere	I	QT^{-1}	$10^{-1} \times c_{cgs}$	statampere	$M^{\frac{1}{2}}L^{1\frac{1}{2}}T^{-2}$	10^{-1}	biot	$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-1}$	c_{cgs}
potential difference (emf)	**V**	energy / charge	force		volt	$ML^{2}I^{-1}T^{-3}$	$ML^{2}Q^{-1}T^{-2}$	$10^{8} \times c_{cgs}^{-1}$	statvolt	$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-1}$	10^{8}	abvolt	$M^{\frac{1}{2}}L^{1\frac{1}{2}}T^{-2}$	c_{cgs}^{-1}
field strength	**E**	emf / displacement	stiffness	$E = {}^{dV}/_{dx}$	volts/metre	$MLI^{-1}T^{-3}$	$MLQ^{-1}T^{-2}$	$10^{6} \times c_{cgs}^{-1}$	statvolt/cm	$M^{\frac{1}{2}}T^{-1}L^{-\frac{1}{2}}$	10^{6}	abvolt/cm	$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-2}$	c_{cgs}^{-1}
conductance	**G**	current / potential difference		$G = {}^{I}/_{V}$	siemens (mhos)	$I^{2}T^{3}M^{-1}L^{-2}$	$Q^{2}TM^{-1}L^{-2}$	$10^{-9} \times c_{cgs}^{2}$	statsiemens	LT^{-1}	10^{-9}	absiemens	TL^{-1}	c_{cgs}^{2}
resistance (conductance $^{-1}$)	**R**	potential difference / current	momentum	$R = {}^{V}/_{I}$	ohm	$ML^{2}I^{-2}T^{-3}$	$ML^{2}Q^{-2}T^{-1}$	$10^{9} \times c_{cgs}^{-2}$	statohm	TL^{-1}	10^{9}	abohm	LT^{-1}	c_{cgs}^{-2}
current density	**J**			$J = {}^{di}/_{da}$	amps/$metre^{2}$	IL^{-2}	$QT^{-1}L^{-2}$							
conductivity	σ			$\sigma = {}^{J}/_{E}$	mhos/metre	$I^{2}T^{3}M^{-1}L^{-3}$	$Q^{2}TM^{-1}L^{-3}$							
resistivity (conductivity $^{-1}$)	ρ			$\rho = {}^{E}/_{J}$	ohm-metres	$ML^{3}I^{-2}T^{-3}$	$ML^{3}Q^{-2}T^{-1}$							
Electric Field (each dimensional analysis adds T)														
electric flux	**Q**	charge	length	$Q = it$	coulomb	IT	Q	$10^{-1} \times c_{cgs}$	franklin	$M^{\frac{1}{2}}L^{1\frac{1}{2}}T^{-1}$	10^{-1}	abcoulomb	$M^{\frac{1}{2}}L^{\frac{1}{2}}$	c_{cgs}
charge density (displacement)	**D**	charge / area	$length^{-1}$	$D = {}^{dQ}/_{da}$	coulombs/$metre^{2}$	ITL^{-2}	QL^{-2}	$4\pi 10^{-5} \times c_{cgs}$	franklin/cm^{2}	$M^{\frac{1}{2}}T^{-1}L^{-\frac{1}{2}}$	$4\pi 10^{-5}$	abcoulomb/cm^{2}	$M^{\frac{1}{2}}L^{-1\frac{1}{2}}$	c_{cgs}
electric potential (emf)	**V**	energy / charge	force		volt	$ML^{2}I^{-1}T^{-3}$	$ML^{2}Q^{-1}T^{-2}$	$10^{8} \times c_{cgs}^{-1}$	statvolt	$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-1}$	10^{8}	abvolt	$M^{\frac{1}{2}}L^{1\frac{1}{2}}T^{-2}$	c_{cgs}^{-1}
potential gradient	**E**	emf / displacement	stiffness	$E = {}^{dV}/_{dx}$	volts/metre	$MLI^{-1}T^{-3}$	$MLQ^{-1}T^{-2}$	$10^{6} \times c_{cgs}^{-1}$	statvolt/cm	$M^{\frac{1}{2}}T^{-1}L^{-\frac{1}{2}}$	10^{6}	abvolt/cm	$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-2}$	c_{cgs}^{-1}
capacitance	**C**	$i = C\ {}^{dv}/_{dt}$ (coulombs/volt)	compliance	$C = {}^{Q}/_{V}$	farad	$I^{2}T^{4}M^{-1}L^{-2}$	$Q^{2}T^{2}M^{-1}L^{-2}$	$10^{-9} \times c_{cgs}^{2}$	statfarad = cr	L	10^{-9}	abfarad	$T^{2}L^{-1}$	c_{cgs}^{2}
permittivity	ε	charge density / field strength	$force^{-1}$	$\varepsilon = {}^{D}/_{E}$	farad/metre	$I^{2}T^{4}M^{-1}L^{-3}$	$Q^{2}T^{2}M^{-1}L^{-3}$	$4\pi 10^{-11} \times c_{cgs}^{2}$	statfarad/cm	dimensionless	$4\pi 10^{-11}$	abfarad/cm	$T^{2}L^{-2}$	c_{cgs}^{2}
elastance (capacitance^{-1})	δ			$\delta = {}^{V}/_{Q}$	daraf	$ML^{2}I^{-2}T^{-4}$	$ML^{2}Q^{-2}T^{-2}$							
elastivity (permittivity^{-1})				$? = {}^{E}/_{D}$		$ML^{3}I^{-2}T^{-4}$	$ML^{3}Q^{-2}T^{-2}$	a franklin is a statcoulomb						
Magnetics (exchange i and v in the equations)														
magnetic charge = flux	Φ				weber	$ML^{2}I^{-1}T^{-2}$	$ML^{2}Q^{-1}T^{-1}$	$10^{8} \div c_{cgs}$	statweber	$M^{\frac{1}{2}}L^{\frac{1}{2}}$	10^{8}	maxwell	$M^{\frac{1}{2}}L^{1\frac{1}{2}}T^{-1}$	c_{cgs}^{-1}
flux density (induction)	**B**	magnetic flux / area		$B = {}^{d\Phi}/_{da}$	tesla (weber/m^{2})	$MI^{-1}T^{-2}$	$MQ^{-1}T^{-1}$	$10^{4} \div c_{cgs}$		$M^{\frac{1}{2}}L^{-1\frac{1}{2}}$	10^{4}	gauss	$M^{\frac{1}{2}}T^{-1}L^{-\frac{1}{2}}$	c_{cgs}^{-1}
magnetic potential (mmf)	**F**	energy / magnetic flux			joules / weber	I (ampere-tu	I (ampere-tu	$4\pi 10^{-1} c_{cgs}$		$M^{\frac{1}{2}}L^{1\frac{1}{2}}T^{-2}$	$4\pi 10^{-1}$	gilbert	$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-1}$	c_{cgs}
field strength (intensity)	**H**	mmf / displacement	angular velocity	$H = {}^{dF}/_{dx}$	newtons / weber	IL^{-1}(ampturr	IL^{-1}(ampturn	$4\pi 10^{-3} c_{cgs}$		$M^{\frac{1}{2}}L^{\frac{1}{2}}T^{-2}$	$4\pi 10^{-3}$	oersted	$M^{\frac{1}{2}}T^{-1}L^{-\frac{1}{2}}$	c_{cgs}
inductance	**L**	$E = -L\ {}^{dI}/_{dt}$	mass	$\Lambda = {}^{\Phi}/_{F}$	henry	$ML^{2}I^{-2}T^{-2}$	$ML^{2}Q^{-2}$	$10^{9} \div c_{cgs}^{2}$	stathenry	$T^{2}L^{-1}$	10^{9}	abhenry = cm	L	c_{cgs}^{-2}
permeability	μ	flux density/field strength		$\mu = {}^{B}/_{H}$	henry/metre	$MLI^{-2}T^{-2}$	MLQ^{-2}	$10^{7} \div (4\pi c_{cgs}^{2})$	stathenry/cm	$T^{2}L^{-2}$	$10^{7} \div 4\pi$	gauss/oersted	dimensionless	c_{cgs}^{-2}
reluctance (inductance^{-1})	**S**	mmf / flux			sturgeon	$I^{2}T^{2}M^{-1}L^{-2}$	$Q^{2}M^{-1}L^{-2}$	$c_{cgs}^{2} \div 10^{9}$	statsturgeon	LT^{-2}	10^{-9}	absturgeon	L^{-1}	c_{cgs}^{2}
permeance	Λ	inductance of one turn			weber/ampereturns	$ML^{2}I^{-2}T^{-2}$	$ML^{2}Q^{-2}$							
reluctivity (permeability^{-1})	γ			$\gamma = {}^{H}/_{B}$	AT metre/weber	$I^{2}T^{2}M^{-1}L^{-1}$	$Q^{2}M^{-1}L^{-1}$				Robert Goodhand			*rg*