Electronic Instrumentation Problem sheet: SI

2011/2012 module 2

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1) The relaxation time of an electronic circuit is given by the values of resistance and capacitance. Discuss, on basis of a units analysis, if the relation between these values and the relaxation time is $\tau = RC$ or $\tau = 1/RC$. The table below shows the standard S.I. units

quantity	unit	symbol
Length	meter	m
Mass	kilo	kg
Time	second	s
Electrical current	ampere	A
Thermodynamic temperature	kelvin	K
Quantity of matter	mole	mol
Luminous intensity	candela	cd

2) Which equation is correct?

a) Thermal voltage

$\qquad V_T = kT/q$

$\qquad V_T = q/kT$

b) Energy of a charged capacitor

$\qquad E = C^2 V/2$

$\qquad E = CV^2/2$

c) Power dissipation

$\qquad P = I^2/R$

$\qquad P = V^2/R$

$\qquad P = I^2 R$

$\qquad P = V^2 R$

3) What is the energy of a 10 µF capacitor charged to 1 V? Check the units of your equation.