Useful Formulae

The E12 resistor series:

1.0	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7	5.6	6.8	8.2

BJT (Small Signal Model Common Emitter):

Parameter	**Formulae**
Emitter current, I_E	$I_E = I_C + I_B$
DC gain of BJT Transistor, β_{DC}	$\beta_{DC} = \frac{I_C}{I_B}$
The internal emitter resistance, r_e	$r_e \cong \frac{25\ \text{mV}}{I_E}$
The ac input resistance into the base, R_{in}	$R_{in} \cong \beta_{ac} r_e$
The total input resistance into the transistor, $R_{in}(tot)$	$R_{in}(tot) = R_1 \parallel R_2 \parallel R_{in}$
The total output resistance at the collector, R_{out}	$R_{out} \cong R_C \parallel R_L$
Voltage gain of amplifier, A_v (without emitter bypass capacitor)	$A_v = \frac{R_{out}}{r_e + R_E}$
Voltage gain of amplifier, A_v (with emitter bypass capacitor)	$A_v = \frac{R_{out}}{r_e}$
Power gain of amplifier, A_p	$A_p = A_v A_i$
First order RC circuit for cut-off frequency	$f_C = \frac{1}{2\pi RC}$
Miller capacitance at the input of BJT	$C_{in(Miller)} = C_{bc}(A_v - 1)$
Miller capacitance at the output of BJT	$C_{out(Miller)} = C_{bc}\left(\frac{A_v + 1}{A_v}\right)$