Things to remember in the last hour before the exam: Level 3 Electricity

(This is not a revision sheet – you've done that by now - it's a list of things you might want to memorise at the last minute…)

1. Most equations are only used once so highlight an equation once you have used it (but **V=IR** will probably be used more than once). Any constants you need e.g. e = -1.6 x 10^{-19} C will be given to you (probably on the separate equation sheet).
2. You must convert quantities into **SI** before using them in an equation (e.g. 5 mC = 5 x 10^{-3} C) Remember prefixes (n = 10^{-9}, μ=10^{-6}, m = 10^{-3}, c = 10^{-2}, k = 10^{3}, M = 10^{6}, G = 10^{9})
3. If you can't remember the units, use the units on the other side of the equation e.g. ε_0= Cd/A so absolute permittivity, ε_0 has units of F (from C) x m (from d) ÷ m^2 (from A) i.e. F m^{-1}
4. If you are asked to give the answer to the correct number of significant figures use the information in the question (the least number of significant figures) and write your rounded answer after your calculated answer (and not instead of) – have a guess if you can't remember and it isn't the same rule as Chemistry
5. Remember the basic electricity rules (in a series circuit I is the same but V splits; in a parallel circuit V is the same but I splits). You might need to use $R_T = R_1 + R_2$ is for adding resistors in series, $1/R_T = 1/R_1 + 1/R_2$ is for adding resistors in parallel (but probably not)
6. You may need to use $\mathcal{E} = V + Ir$ – memorise this and write it down as soon as you are allowed to in the exam
7. The terminal p.d. V = EMF $\mathcal{E}$ **only** when I = 0 because the load resistor R is very large/or the is an open switch
8. Ir is the lost volts (more lost volts the hotter the battery is and the more inadequate it becomes)
9. You might need to use $C_T = C_1 + C_2$ is for adding capacitors in **parallel**, $1/C_T = 1/C_1 + 1/C_2$ is for adding capacitors in **series** (they are insulators and therefore the opposite to resistors)
10. Kirchhoff's laws – sum of voltages in a loop are zero (law of conservation of energy), current entering a junction = current leaving a junction (law of conservation of charge)
11. If you need to solve a Kirchhoff's law question by simultaneous equations something has gone terribly wrong – back up and check if one of the currents was zero because the *current was going through a voltmeter (I ≈ 0 because R is soooo big)*
12. Memorise the equation and write it down when you are able to – and please remember R is resistance, X_c reactance of the capacitor and X_L reactance of the inductor

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

13. They might – or might not – give you V = IR (they have for the last two years). If not use V = IZ.
14. Capacitors block low frequency and inductors block high frequency
15. Z (Impedance) = R "at resonance" (when f = f_0) and then I is the maximum value
16. X_c and X_L are 180^0 out of phase
17. A phasor diagram is like a vector diagram – it doesn't have to be used in a reference circle
18. Reactance X_c and X_L have units of Ω
19. ELI the ICEman
20. ω = 2 π f where f is the frequency of the supply voltage (and not ω)
21. If it asks you to explain something (e.g. "Describe what happens to the current flowing through a 100 μF capacitor if the frequency of the supply is doubled.") Don't be afraid to put in numbers to the equation twice e.g. I = V/ X_c so I = V x 2 π f using two different values of f and then write a comparison of your answers
22. Leave $f_0 = \frac{1}{2\pi}\sqrt{\frac{1}{LC}}$ show that until the end of the exam if it turns up