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

(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. You will probably use most of the equations **and** $v = f\lambda$ will probably be used more than once. Note that there is a mistake on the Achievement standard and you are likely to be given $v = f\lambda$ and $f = 1/T$. Any constants you need e.g. $c = 3 \times 10^8$ m s^{-1} 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. 700 nm = 700×10^{-9} m) 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. $f= v/\lambda$ so frequency, f has units of m s^{-1}(from v) ÷ m (from λ) i.e. s^{-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. The Doppler Effect is best explained by Sheldon "Neeeeaaaaooo!"
6. The Doppler effect is not symmetrical and is only observed when there is relative motion between the observer and the source
7. Doppler effect equation:

$$f' = f\frac{v_w}{v_w \pm v_s}$$

   W = wave speed, s = speed of source, + for going away, - for coming toward

8. $n\lambda = dx/L$ only works for small angles
9. Diffraction grating $d = 1/N$ (make sure N = number of lines in **m**)
10. Diffraction splits white light into a spectrum because it's a mixture of λ's EXCEPT for the central maxima. Red is diffracted most of visible light.
11. It's all about the path difference – 1 or 2 or 3 (etc.) wavelengths difference between two "rays" is constructive interference, ½ or 1½ or 2½ (etc.) wavelengths difference between two "rays" is destructive interference
12. Draw standing waves travelling in one direction in blue and waves travelling in the other in black to make it clear
13. **N**o**D**e is **N**o **D**isplacement (AN is maximum displacement)
14. The fundamental is the simplest standing wave pattern (least number of A or AN)
15. The **second** harmonic is **2 x** fundamental, the **third** harmonic is **3 x** fundamental, etc… Avoid overtones unless the question requires them
16. Strings with transverse waves (fixed at both ends) count the antinodes
17. Open pipes with longitudinal waves count the nodes
18. Closed pipes – hmmmmm (you can't get even harmonics e.g. 2nd, 4th) because there is a N and an AN
19. Visualising a closed pipe? Your socks have a hole at one end to put your foot in – but they are "closed"

20. Write down the Beat formula $f_B = I f_1 – f_2 I$ as soon as you are allowed to (because you might not ne given it)