

# Quantum Physics

Physics

Nudger

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## Particle Theory

1. Specify the particle in specific charge.
2. Pair production is NOT annihilation.
3. Mesons are NOT muons. [Although a mu meson is an archaic name for a muon - gah!]
4. Decay is NOT interaction.
5. 'State' means use words, NOT just symbols.
6. 'Baryons consist of three quarks, while antibaryons consist of three antiquarks' NOT 'Baryons consist of three quarks or antiquarks' [or similar].
7. Electron antineutrino NOT antielectron neutrino.
8. What is 'quark confinement'? [p38]
9. What are the lepton number subscripts and what do they mean?

## Photoelectric Effect

10. Photoelectric emission is NOT (just) ionisation.
11. Photoelectric emission is NOT excitation/relaxation.
12. Number of incident photons or emitted photoelectrons per second NOT just 'number'. [Alternatively use 'rate of . . .']
13. Keeping intensity the same while increasing frequency will increase energy of each incident photon and hence decrease the rate of incident photons (and subsequent rate of photoelectron emission).
14. Each incident photon above the threshold frequency can liberate one, and only one, photoelectron (i.e. one-to-one relationship between incident photons and liberated photoelectrons).
15. Do not miswrite 'photons' and 'photoelectrons' (and vice versa).

## Energy Levels

16. Discrete!
17. Quanta/Quantised!
18. States relate to atoms NOT electrons (e.g. atoms excite/relax NOT electrons).
19. Ground state is NOT a specific energy level.
20. What is black-body radiation?
21. Remember absorption spectra and Fraunhofer lines.
22. What is an absorption spectrum and how is it produced? [98]

## Duality

23. Read the question properly and answer it; do not just waffle on about wave-particle duality *generally* when asked *specifically* to describe electrons (for example) behaving as waves.
24. Planck's equation shows a wave exhibiting particle-like properties (because frequency is a wave characteristic but the energy is quantised). De Broglie's equation shows a particle exhibiting wave-like properties (because momentum is a particle characteristic but wavelength is associated with waves). DO NOT CONFUSE THESE TWO EQUATIONS.
25. Bohr's model of the atom only worked for (most) levels in hydrogen. Schrödinger's model (which treats electrons as waves ['electron probability cloud']) works for all elements.
26. The probability of an atomic electron being in a particular location is directly proportional to its energy in that region (which is directly proportional to the amplitude of its waveform squared).