FINAL EXAM STUDY CONCEPTS – QUANTUM:

Find the minimum wavelength of light necessary to eject an electron from a metal (given the work function.)

Find the minimum wavelength of X-ray produced on bombarding a metal with an electron

Bohr model. Recognize n=1,2,3 cartoons. Given r, find p for a given n.

If two waves solve the full Schödinger equation, does their sum?

If two waves solve the time-independent Schödinger equation, does their sum?

Understand what “stationary state” means, and that these states have definite energy.

Understand what you get if you measure the momentum of a particle in a stationary state in an infinite well (it ain’t zero!)

Two-level wells:
Given the energy level, find the ratio of wavelengths in each side
Find the ratio of amplitudes in each side
Find the probability of being on one side or the other

Finite square well:
Qualitatively, what do waves look like?
Is there always a bound state?
Use Heisenberg to quantitatively estimate spreading of wave in a shallow well.

Atoms.
Write down the electronic configuration of a light element.

Understand that different quantum numbers do NOT mean non-overlapping electron waves.

Find the ionization energy of the first electron in an element such as sodium, assuming screening by the remaining electrons.

Memorize the rules for n, l, m, m_s

Find the “uncertainty” in L_x or L_y, given l, m_l

Nuclear physics.
Understand why there’s a limit to the number of neutrons.
Find the volume or radius of a nucleus, given A.

Learn what alpha and beta- particles are and how those decays change the nucleus.