1. What property of an emitting region controls the power-law slope of the higher-energy-end of the synchrotron spectrum?

The energy distribution of $e^-$ is:
\[ n(E) dE = E^{-\delta} dE \]
ends up controlling it (power-law slope \( \propto E^{-\delta} \)).

2. Doodle the instantaneous power pattern of an accelerating relativistic electron. What is the beam opening angle over which most Larmor power is emitted? (Answer symbolically. I'll accept answers correct to within a factor of 2).

3. In “equipartition”, what two properties of an emitting region are balanced (describe in words not just symbols)?

Balancing energy density in relativistic particles ($U_e$) and in magnetic fields ($U_B$).

4. When determining Eddington Luminosity, what two forces do we start out by balancing (describe in words not symbols)?

- Radiation pressure going outward.
- Gravitational force going inward.