Detectors

1. How would you compare ATLAS and CMS electron and muon resolutions (qualitatively)?
2. What are the ALICE particle ID systems?
3. What are the main arguments to use gas or silicon detectors for a tracker system?
4. Why would you use a fiber detector?
5. Why is amplification needed for gas detectors and not for silicon?
6. Is bremsstrahlung an issue for muons at LHC?
7. Why are the LHC upgrades using more PIXEL detectors?
8. What are the main differences between linear collider detectors and LHC detectors and why are they different?
9. For a future hadron collider at higher energies (FCC type), how do you need to change the calorimeters compared to LHC?

Accelerator physics

1. With luminosity given as ,rewrite it as a function of emittance and beta, and explain what these two concepts mean ?
2. What are the main limitations for proton and electron machines and what can be done to overcome them (R&D, design changes, technology)?
3. Why is synchrotron radiation particularly important for electrons, and does it matter for hadrons?
4. How do we bend and focus particles?
5. How do we accelerate particles and what are the technologies available?
6. What is a typical power efficiency of an accelerator and does it represent a challenge?

LHC physics:

1. Why is it important to do measurements, and not only searches for new physics at the LHC?
2. Why is interaction of theory and experiment so important. The LHC detectors are the most expensive ever built and not surprisingly they have the best performance of any general-purpose detector ever built, even for e+e- machines. Why is LHC physics so important?
3. Why is it important to have simulation of both physics processes at the collision point and within the detector itself.
4. Why is triggering important? Why is it important to stay being unbiased as experimentalists by whatever theorists tell us?