Final exam for the course "Formation and evolution of galaxies"
June 20, 2017

Please write down your name and student ID on every page. When answering each question, please do so in at least 4 – 5 sentences.

1. If the Universe were baryon dominated, then the amplitude of the fluctuations in the CMB is expected to be ~ 10^{-3} - 10^{-4} on the basis of today's large scale structure. However what is measured is a factor 10 smaller. How is this problem solved in current cosmological models? *(1 pt)*
2. How do we determine the stellar and dynamical masses of galaxies of different morphological types? Why are different methods generally used for spiral and elliptical galaxies? *(1pt)*
3. Explain how the shape of the luminosity function of galaxies may be understood in the context of ΛCDM. *(1 pt)*
4. What does "stellar population synthesis" mean? How is it used to derive star formation histories of galaxies? What are its key ingredients and assumptions? *(1pt)*
5. Which halos are the most numerous in CDM? Which have most of the mass? *(1pt)*
6. What is a merger tree? Draw the merger tree of an elliptical and that of a disk galaxy and describe the main differences. *(1pt)*
7. What are the different processes that take place, affect and play a role in galaxy formation and evolution? Describe at least 4 of them in 4-5 lines each. *(2 pts)*
8. How can we study the IGM in the distant universe? *(1pt)*
9. What is the difference between galaxy clusters and galaxy clustering? *(1pt)*