

Astronomy 102: Assignment 5, the Milky Way, galaxies and AGN

1. Why are metals less abundant in older stars than younger stars? Describe the 2 main populations that astronomers divide stars into according to their age, chemical enrichment and where they are found in the Milky Way. [6]
2. Describe the following properties of a globular cluster: position in the Milky Way, number of stars, colour of stars, approximate ages. Give two differences between globular clusters and open clusters (look back at the chapters on young stars). [6]
3. What is a galactic rotation curve? Sketch an example of a rotation curve (either for the Milky Way or another galaxy), and label your axes appropriately. How do observations of galaxy rotation curves tell us about how much mass is in them (remember Kepler's laws!)? How do we infer the presence of dark matter from these observations? [6]
4. We observe that the H alpha line ($\lambda = 656.3\text{nm}$) in a faint galaxy is shifted to an observed wavelength of 667.8 nm. Using Hubble's law, calculate how far away this galaxy is (assume $H = 70 \text{ km/s/Mpc}$). [6]
5. Draw a diagram to show how the AGN unification model explains different objects as viewed simply different viewing angles of the same object. Explain why objects look different at different viewing angles. [6]

Total: 30.