

普通天文學 二〇〇八年春 期末考

2008.06.16 下午 3 : 00 ~ 4 : 50

一、解釋下列名詞（每小題各 3 分；共 45 分）

- (1) 21-cm line of atomic hydrogen; (2) gravitational microlensing; (3) Local Group of galaxies; (4) Large Magellanic Cloud; (5) Water Hole; (6) Tully-Fisher relation; (7) dark energy; (8) quasar; (9) Eddington limit; (10) Big Bang; (11) inflation epoch; (12) cosmic microwave background radiation; (13) cosmological principle; (14) Planck time; (15) Miller-Urey experiment

二、問答題（共 55 分）

1. Describe the "spiral arms" of the Milky Way and other similar galaxies. What makes the spiral pattern visible? Elaborate on one theoretical explanation for the formation of the spiral pattern. How fast does the spiral pattern move (rotate) compared to the orbital motion of stars like the Sun about the center of the Galaxy? (15%)
2. Astronomers believe vast quantities of dark matter surround our Galaxy. Give some lines of observational evidence that support the existence of dark matter. (10%)
3. Compare between spiral galaxies and elliptical galaxies in terms of their appearance, sizes, stellar contents and amounts of interstellar matter. Which kind of galaxy does M31 belong to? (10%)
4. The K line of singly ionized calcium measured in a lab has $\lambda_0=393.3$ nm. But in the galaxy NGC 4889, this spectral line has $\lambda=401.8$ nm. Assuming this galaxy follows the Hubble law, find the distance to this galaxy. What does the Hubble law imply on the current status of the Universe? What factor determines the fate of the Universe? (20%)