

普通天文學 二〇〇九年春 期末考

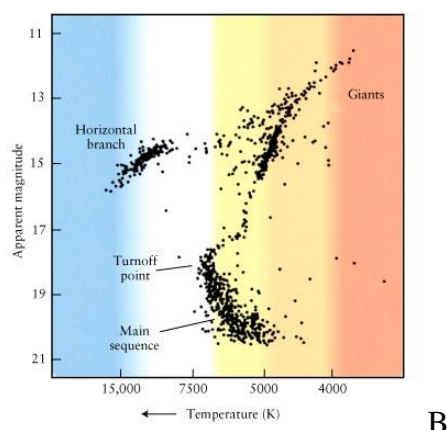
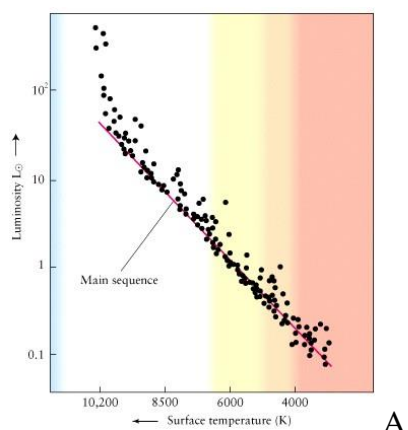
2009.06.22 下午 3 : 00 ~ 4 : 50

一、解釋下列名詞（每小題各 4 分；共 40 分）

- (1) Local Group of galaxies;
- (2) 21-cm line;
- (3) Water Hole;
- (4) dark energy;
- (5) quasar;
- (6) pulsar;
- (7) cosmic inflation;
- (8) cosmic microwave background radiation;
- (9) Planck time;
- (10) Chandrasekhar limit

二、問答題（共 60 分，每題 15 分）

1. Describe the "spiral arms" of the Milky Way and other similar galaxies. What makes the spiral pattern visible (5%)? Give one theoretical explanation for the formation of the spiral pattern (5%). How fast does the spiral pattern move (rotate) compared to the orbital motion of stars like the Sun about the center of the Galaxy (5%)?
2. Describe the life of our Sun from its birth out of a molecular cloud to the end of a stellar remnant. Draw an H-R diagram and label each axis (3%) Mark how the Sun behaves in each of the evolutionary stages: the main sequence, red giant branch, horizontal branch, asymptotic giant branch, a planetary nebula, and a white dwarf (5%). Describe how the stellar structure and energy source change in each of these stages (5%). How long does the Sun stay on the main sequence? (2%)



3. There are generally two kinds of star clusters, globular clusters and open clusters. The two figures above show the typical Hertzsprung-Russell diagram of each of these kinds. Which figure, A or B, is for an open cluster (5%)? Compare between open clusters and globular clusters, in terms of their shapes, numbers of stars, chemical composition and ages of members stars, and locations in the Galaxy (5%). Give one explanation why there are such two distinct types of star clusters (5%).
4. What is the Hubble's law (5%)? What does it imply on the current status of the Universe (5%)? What factor determines the fate of the Universe (5%)?