

普通天文學 二〇〇七年秋 期中考

2007.04.23 下午 3 : 00~4 : 50

一、問答題，每題 10 分

1. (a) Sirius, the brightest star in the night sky, has an apparent magnitude of -1.5 mag. Sirius actually has a companion, called Sirius B, with a brightness of 1/10,000 of that of Sirius A. What is the apparent magnitude of Sirius B? (b) Sirius has an annual parallax of 0.38". What is the distance of Sirius? What is the absolute magnitude of Sirius A?
2. Stars are classified into classes according to their spectra, namely O, B, A, F, G, K, M, and L. What is the main physical quantity that decides the sequence of the spectral type? Qualitatively describe the differences between an O star's spectrum and an M star's spectrum.
3. In a photograph of stars and interstellar nebulosity, we often see reddish, bluish, and dark patches. These are the interstellar clouds. Describe the differences between these clouds of various colors.
4. The sun has a main-sequence lifetime of about 10 billion years. Estimate the main-sequence lifetime of a star with 25 times the mass of the sun.
5. Plot the Hertzsprung-Russell diagram (赫羅圖). Clearly label the two axes, i.e., the physical quantity and unit. Mark on the HR diagram where main sequence stars, giants, supergiants and white dwarfs are located. Mark the position of the sun.
6. All the following terms are related to stellar evolution: 紅巨星分支 (red giant branch), 漸進巨星分支 (asymptotic giant branch), 中子星 (neutron star), 白矮星 (white dwarf), 主序 (main sequence), 超巨星 (supergiant), 水平分支 (horizontal branch), 氦閃 (helium flash). Write a short essay that links those terms that are relevant to the evolution of the sun.

二、將下列名詞翻譯並簡單解釋 (每小題 4 分)

- (1) spectroscopic binary; (2) Population I star; (3) interstellar reddening; (4) Type Ia supernova; (5) H II region; (6) proton-proton reaction; (7) Chandrasekhar limit; (8) brown dwarf; (9) Cepheid variable; (10) photodisintegration