

科目：天文學(3004)

校系所組：中大天文研究所

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Attempt as many questions as you can. You can answer in Chinese or in English.

- (1) (10 points)
What is the size of the following astrophysical objects?
 - (a) (2 points) the Earth
 - (b) (2 points) the Sun
 - (c) (2 points) the globular cluster Messier 15
 - (d) (2 points) the disk of the Milky Way
 - (e) (2 points) the Coma Cluster of galaxies
- (2) (20 points)
 - (a) (10 points) Describe the principle of a reflecting telescope. (A simple diagram of the telescope optics will be useful.)
 - (b) (10 points) What is active optics and what is adaptive optics? Why are modern telescopes often equipped with active optics and adaptive optics?
- (3) (20 points)
 - (a) (4 points) List the eight planets in our Solar system.
 - (b) (16 points) Each of the eight planets has its own unique features. Describe one characteristic feature of each planet.
- (4) (10 points)
 - (a) (2 points) What is the definition of main sequence stars?
 - (b) (2 points) What is the estimated life time of the Sun in the main sequence phase?
 - (c) (6 points) Estimate the fraction of mass being converted to radiation during the main sequence phase of the Sun.
- (5) (20 points)
Describe in detail the post main sequence evolution of a one solar mass star. Put the evolutionary history on a Hertzsprung-Russell diagram. (Don't forget to label the axes.) Mark the important events along the evolutionary history.
- (6) (10 points)
The stars in our Galaxy have three spatially distinct distributions. Describe the shape, size, stellar populations of these distributions.
- (7) (10 points)
 - (a) (2 points) Some scientists claim that the Andromeda galaxy and the Milk Way are approaching each other. What kind of evidence(s) do they have?
 - (b) (8 points) What do you think will happen to both galaxies and our Solar system when and after the two galaxies collide?