

ASTR-3415-001: Astrophysics
Problem Set 2 (Due: 6 February 2003)

Attention Students! This problem set will take quite a bit of time. Get started on it immediately! Remember, no late homework is allowed.

1. (20 pts) Calculate the rate at which the Earth's orbital size changes as a result of the combined mass-loss from the solar wind and thermonuclear reactions. (*Hint:* $L_{\odot} = 3.83 \times 10^{33}$ erg/s.)
2. (20 pts) We observe the Ca II K line of a chromospherically active star and see that the K_1 features are separated by 2.1 \AA . If the star has a bolometric correction of -1.0 and a effective temperature of 3800 K , what is the luminosity of this star and what is its complete MK classification? If this star has a magnitude $V = 2.6$, how far away is it?
3. (10 pts) Problems 8.1 and 8.2, Page 251 in the Carroll and Ostlie textbook.
4. (20 pts) Problem 8.5, Page 251 in the Carroll and Ostlie textbook.
5. (20 pts) Problem 8.7, Page 251 in the Carroll and Ostlie textbook.
6. (30 pts) Problem 8.10, Page 252 in the Carroll and Ostlie textbook.
7. (20 pts) Problem 9.4, Page 307 in the Carroll and Ostlie textbook.
8. (20 pts) Problem 9.11, Page 308 in the Carroll and Ostlie textbook.
9. (20 pts) Problem 11.14, Page 432 in the Carroll and Ostlie textbook.
10. (20 pts) Problem 11.9, Page 434 in the Carroll and Ostlie textbook.