

Physics 121

Astronomy of Stars & Galaxies

Sample Exam 2 Questions

April 2006

1. Summarize the life cycle of sun using a Hertzsprung-Russell diagram.
2. Describe the metaphor of “Herschel’s Garden”.
3. Describe the stellar thermostat.
4. Why was the young sun slightly fainter than it is now?
5. What will happen when sun exhausts the H in its core?
6. What is the helium flash?
7. Describe degenerate matter.
8. Describe a white dwarf star.
9. Describe a neutron star.
10. How do binary stars evolve?
11. Describe the life cycle of massive stars.
12. Distinguish a nova and a supernova.
13. Why are supernovae important?
14. Distinguish Type I & II supernovae.
15. What is the Chandrasekhar mass, and what does it have to do with supernovae?
16. From where do heavy elements come?
17. Describe the discovery of pulsars.
18. What is a pulsar?
19. Why is the Crab Nebula important?
20. Why is the binary pulsar important?
21. Describe the discovery of SN1987A.
22. Why was the supernova 1987A so important?
23. What important event occurred the day before the discovery of SN1987A?
24. What are black holes?
25. Why are black holes black?
26. What is curved spacetime?
27. How does a star or black hole deflect starlight?
28. Einstein’s special theory of special relativity resolves what conflict?
29. Describe how to test the invariance of light speed.
30. Describe the three key kinematical effects of special relativity.
31. Use a light-pulse clock to argue that moving clocks tick slowly.
32. What are the consequences of acceleration being a spacetime rotation?
33. What is the equivalence principle?
34. Illustrate Einstein’s theory of general relativity with the parable of two travelers.
35. Use special relativity and the equivalence principle to derive spacetime curvature.
36. Why is it so difficult to test the theory of relativity? Describe two tests of the theory.