

AST 301

Review questions for Exam #3

Exam date: Friday Dec. 5

1. Describe how a star (or protostar) changes if it generates more (or less) energy by nuclear fusion than it radiates from its surface.
2. Describe the changes that occur near the center of a star and in its envelope as it changes from a main-sequence star into a red giant.
3. Describe how a red giant becomes a planetary nebula and a white dwarf.
4. How does the pressure inside a white dwarf differ from normal gas pressure?
5. How do the processes that occur inside of massive stars lead to supernova explosions?
6. Describe neutron stars and pulsars.
7. Why do neutron stars rotate so quickly? Why couldn't other stars rotate as quickly?
8. Describe black holes.
9. What evidence do we have that there is a very massive black hole at the center of the Milky Way?
10. Describe the Milky Way Galaxy, or spiral galaxies in general.
11. Describe the Standard Candle method of determining distances and how Cepheid variable stars are used as standard candles.
12. Describe how astronomers measure the distribution of mass in the Milky Way and what they find.
13. Explain why we might expect the spiral arms in the Milky Way to become more tightly wrapped and how density wave theory solves this problem.
14. How does the big bang theory explain Hubble's law?
15. How does the big bang theory explain the microwave background radiation?
16. Describe some of the events that occurred in the first few minutes after the big bang.
17. Describe how supernovae are used to measure the rate of expansion of the Universe in the past.
18. How can we measure the amount of normal matter, dark matter, and dark energy in the Universe? What do we find?
19. What evidence do we have that planets exist orbiting around other stars?
20. Describe and compare briefly the compositions and orbits of the terrestrial and Jovian planets, asteroids, and comets.
21. Describe the nebular theory of the formation of the solar system.
22. How does the nebular theory explain the differences in composition among the planets? How does it fail to explain other planetary systems?
23. How can we use the concept of thermal equilibrium to calculate the temperature of the surface of a rock orbiting the Sun?
24. How and why does the result depend on the distance of the rock from the Sun?
25. How does the Earth's atmosphere affect the surface temperature of the Earth?
26. Why do Venus and Mars have such different surface temperatures?
27. How are we changing the Earth's atmosphere, and how do we think this will affect the surface temperature?