

FINAL EXAM (practice)
ASTR 1101-001 Spring 2008
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Chapters 7, 8, 9, 10, 11, 13 (Galilean satellites only)

1. How many (real) planets are there in the solar system?
2. Which is the largest planet?
3. Which is the smallest planet?
4. Which planet is closest to the Sun?
5. Which planet would appear faintest from outside the solar system?
6. Which planet is most dense?
7. Which planet is less dense than water?
8. Which planet has the most moons?
9. Which planet has the highest mean surface temperature?
10. Which planet has the most carbon dioxide in its atmosphere?
11. Name the four inner terrestrial planets in order of increasing distance from the Sun.
12. Name the four outer Jovian planets in order of increasing distance from the Sun.
13. What are the names of Jupiter's four Galilean moons?
14. The Jovian planets have thinner atmospheres than the terrestrial planets (true or false?).
15. Which terrestrial planet has the largest natural satellite (moon)?
16. Which terrestrial planet or planets have not natural satellites (moons)?
17. All eight planets are composed primarily of the lightest two chemical elements, hydrogen and helium (true or false?)
18. The diameter of Earth's moon is significantly smaller than the diameter of all four of Jupiter's Galilean satellites (true or false?)

19. Which one of Jupiter's Galilean satellites displays an infrared spectrum that is almost identical to that of ice?
20. How many humans have walked on the surface of the Earth's moon?
21. How many humans have walked on the surface of the planet Mars?
22. According to radioactive dating techniques, approximately how old is the Solar System?
23. The chemical element hydrogen can be found in one of three isotopic forms: hydrogen, deuterium, and tritium.
 - The atomic nucleus of all three isotopes of hydrogen contains one proton (true or false?)
 - The atomic nucleus of all three isotopes of hydrogen contains one neutron (true or false?)
24. A ^{14}C nucleus contains six protons. How many neutrons are in a ^{14}C nucleus?
25. What is the half-life of the radioactive ^{14}C isotope?
26. What is the half-life of the radioactive ^{238}U isotope?
27. Which curve (red or blue?) in Figure 1 describes the rate of decay of a radioactive isotope?
28. Which curve (red or blue?) in Figure 1 describes the rate of production of final stable isotope to which a radioactive isotope decays?

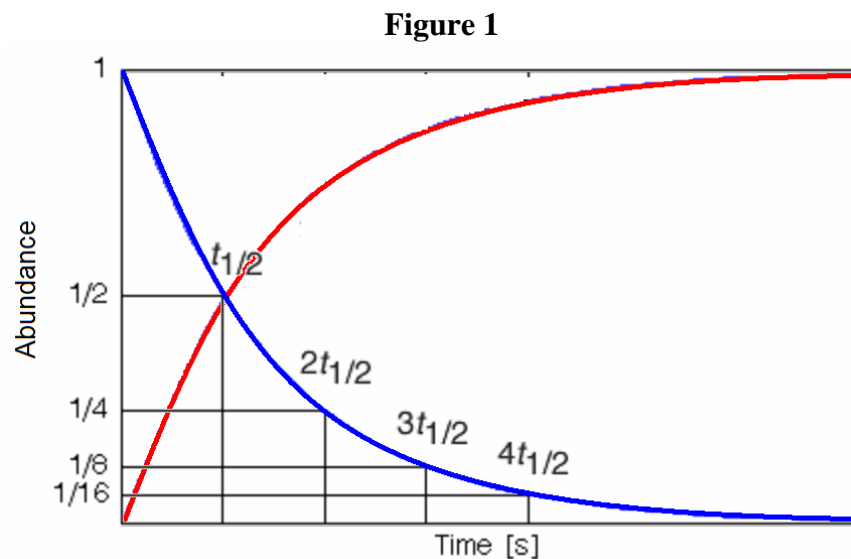


Table 1

Original Radioactive Isotope	Final Stable Isotope	Half-Life (Years)	Range of Ages that Can Be Determined (Years)
Rubidium (⁸⁷ Rb)	Strontium (⁸⁷ Sr)	47.0 billion	10 million–4.56 billion
Uranium (²³⁸ U)	Lead (²⁰⁶ Pb)	4.5 billion	10 million–4.56 billion
Potassium (⁴⁰ K)	Argon (⁴⁰ Ar)	1.3 billion	50,000–4.56 billion
Carbon (¹⁴ C)	Nitrogen (¹⁴ N)	5730	100–70,000

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26. What is the half-life of the radioactive ²³⁸U isotope?
27. Which curve (red or blue?) in Figure 1 describes the rate of decay of a radioactive isotope?
28. Which curve (red or blue?) in Figure 1 describes the rate of production of final stable isotope to which a radioactive isotope decays?
29. Suppose an archeologist digs up a primitive weapon made partly of wood and determines that the wood contains an isotopic abundance ratio ¹⁴N/¹⁴C = 3. How old is the weapon if we assume that, originally, the wood contained no ¹⁴N?
30. Suppose an astronomer discovers a meteorite and determines that the meteorite contains an isotopic abundance ratio ²⁰⁶Pb/²³⁸U = 1. How old is the meteorite if we assume that, when it originally formed, the meteorite contained no ²⁰⁶Pb?
31. The principal explosive ingredient inside the atomic bombs that were built during World War II was radioactive isotopes of _____ (fill in the blank).
32. The fuel that is used to generate electricity at St. Francisville's River Bend nuclear power plant is radioactive isotopes of heavy elements (true or false?).
33. What key structural properties of the solar system does the "solar nebula" model of solar system formation explain?
34. Name two planets that, themselves, resemble miniature solar systems.
35. Besides hydrogen and helium, name three of the top ten most abundant chemical elements found in the Sun's atmosphere and the local interstellar medium.
36. 'Planetesimals,' which are thought to be the building blocks from which all the planets formed, contain mostly hydrogen and helium (true or false?).

37. Large gaseous atmospheres did not form around the terrestrial planets primarily because the inner regions of the primitive solar nebula were hotter/colder than the outer regions of the solar nebula (circle 'hotter' or 'colder').
38. What is the principal observational technique that has been used successfully to discover extrasolar planets?
39. The vast majority of extrasolar planets that have been discovered, to date, have masses comparable to or larger than Jupiter's mass (true or false?).
40. Virtually all of the extrasolar planets that have been discovered, to date, orbit their parent star at distances greater than 1 AU (true or false?).
41. What is the relationship between the general idea of "continental drift" and the direct measurements of "seafloor spreading"?
42. The Earth is the only terrestrial planet whose atmosphere is oxygen rich primarily because _____.
43. The atmosphere of Venus is much hotter than the atmosphere of Earth primarily because Venus is much closer to the sun than the Earth is (true or false?).
44. Certain molecules in a planetary atmosphere, such as carbon dioxide (CO₂), allow visible sunlight to pass through the atmosphere and heat the planet's surface but they tend to prevent the planet's own infrared radiation from escaping back into space to cool the planet's surface. This is referred to as the _____ effect.
45. The burning of fossil fuels (for example, oil, natural gas, coal) increases the concentration of carbon dioxide in the Earth's atmosphere (true or false?).
46. Dark colored 'maria' on the surface of the Moon are generally thought to be large dried up lake beds (true or false?).
47. Name one feature of the Earth's atmosphere that distinguishes it from the atmospheres of the other three terrestrial planets.
48. Rocky debris that formed along with planetesimals in the early history of the solar system continues to exist in the present-day solar system (true or false?).
49. When rocky debris left over from the early history of the solar system collides with a planet or moon, it creates _____.
50. Which of the four terrestrial planets has a surface that most closely resembles the Moon?

51. Which of the four terrestrial planets has an atmosphere that can be described as dense, hot, and corrosive?
52. The planet Mars does not now have, nor has it ever had, liquid water on its surface (true or false?).
53. There are two robotic 'rovers' presently exploring the surface of Mars. How many astronauts are presently living on Mars and controlling the daily activities of these robotic rovers?