

ASTR 1010 FALL 2006: PRACTICE PROBLEMS FOR QUIZ #4

1. Which of the following types of radiation are blocked by the Earth's atmosphere?

c) Ultraviolet, X-ray, Gamma-ray, parts of the infrared.

2. Which of the following moons are bigger than Mercury?

d) Ganymede, Titan.

3. Which of the following objects often do NOT orbit the Sun in or near the ecliptic?

c) The comets.

4. The sixth largest object in our solar system is (in terms of diameter) (counting the Sun as number 1):

c) The Earth

5. The SECOND largest moon in our solar system (in terms of diameter) is:

e) Triton.

6. The largest moon of Neptune is:

e) Triton.

7. The Earth has an average density of 5.5 g/cm^3 , while the average density of rocks on its surface is about 3 g/cm^3 and the density of water is 1 g/cm^3 . What conclusion can be reached about the Earth's interior based on these observations?

b) it contains a lot of material denser than rock, probably metals.

8. The main reason for combining many widely-separated telescopes together into an interferometer is:

b) To obtain much sharper images of sources.

9. Which of the following is least useful to astronomers?

b) a ground-based X-ray telescope.

10. Which of the following spacecraft is scheduled to send a probe into the atmosphere of Titan?

c) Cassini.

11. Which moon in our solar system is closest in diameter to its planet?

c) Charon.

12. What is the name of Jupiter's largest moon?

e) Ganymede.

13. An extrasolar planet is:

e) a planet orbiting a star other than the Sun.

14. Ranking the planets and moons in our solar system in order by size, from largest to smallest, Pluto is ranked:

d) Sixteenth.

15. Which of the following planets has only been visited by one spacecraft?

a) Mercury

b) Uranus

d) Neptune

e) Answers a, c, and d above.

16. Which of the following spacecraft is currently orbiting Mars?

c) The Global Surveyor spacecraft.

17. Planets have been discovered around a number of nearby stars. Which of the following is *NOT* true about these planets?

b) They are visible in Hubble Space Telescope images.

18. All of the extrasolar planets discovered so far have been found by:

d) periodic redshifting and blueshifting of the light from the planet's star.

19. What are the two main constituents of the Earth's atmosphere?

d) N₂ and O₂.

20. The very thin atmosphere on the Moon:

c) is due to bombardment of the surface by the solar wind.

21. Most of Saturn's atmosphere is probably:

c) left-over from the formation of the solar system.

22. The main constituent of the atmosphere of which two objects is CO₂?

d) Venus and Mars.

23. Which terrestrial planet or moon has the highest atmospheric pressure at its surface?

a) Venus.

24. The main constituent of the atmospheres of which of the following two objects is nitrogen?

d) The Earth and Titan.

25. The atmospheres of the Jovian planets were produced mainly by what process?

e) they are left-over from the formation of the solar system.

26. The moon with the thickest atmosphere is:

d) Titan.

27. Which of the following lists gives the correct order for the listed planets and moons, in terms of surface atmospheric pressure? (from biggest to smallest)

e) Venus, Titan, Earth, Mars, Mercury.

28. How long is a sidereal day on Mercury?

d) 58.7 days.

29. Which of the planets or moons listed below has an atmosphere with the same main component as that of Mars?

b) Venus.

30. How many moons in the solar system are bigger than Pluto?

d) seven.

31. How many moons does Mars have?

c) 2.

32. Which of the following moons is orbiting around its planet in the reverse direction from most of the motions the solar system?

e) Triton.

33. The extrasolar planets discovered to date are:

d) similar in mass to Jupiter, Saturn, Uranus, Neptune, or larger.

34. Which of the following is the correct order of the densities of the different types of planets?

c) **densest:** terrestrial; **next dense:** Pluto; **lowest density:** Jovian.

35. The Very Large Array is a collection of 27 radio telescopes, each with a diameter of 25 meters, spread out in a Y-shaped array with a diameter of 22 miles in New Mexico. This telescope:

b) Has a resolution equal to that of a single 22 mile diameter telescope.

36. How many spacecraft have visited Triton and its planet?

b) one.

37. Which of the following planets has the slowest spin rate?

c) Venus.

38. Which of the following planets has never been visited by a spacecraft?

e) Pluto.

39. As an interstellar gas cloud gravitationally contracts in the process of forming into a star and planets:

d) its spin rate increases, and it flattens to a disk.

40. At present, the diameter of only one extrasolar planet is known. This extrasolar planet is:

c) the only extrasolar planet found so far that eclipses its star.

41. Asteroids are probably:

b) left-over planetesimals from the formation of the early solar system.

42. Which of the following is a characteristic of terrestrial planets?

e) Mainly made of materials with high evaporation temperatures.

43. Which of the following planets is most likely to retain a thick atmosphere?

e) a planet with a cold atmosphere, a mass of 10 Earth masses, and a radius of 1 Earth radii.

44. Which of the following best describes the rotation of Venus, compared to the rotation of Earth?

a) Much slower, and in a backwards direction.

45. What is the sidereal day of Venus?

a) 243 days.

46. The density of water is 1 g/cm^3 , while the density of rock is $2\text{-}3 \text{ g/cm}^3$. What is the average density of the Earth?

e) 5.5 g/cm^3 .

47. Which type of light can travel through the Earth's atmosphere without being absorbed very much?

d) visible and radio.

48. The primary target of the Messenger spacecraft, launched in 2004, is:

a) Mercury.

49. Io is a moon of which planet?

b) Jupiter.

50. Which of the following does NOT happen when an interstellar cloud becomes a solar system?

c) the spin rate of the cloud slows down as the cloud contracts.

51. An interferometer telescope is:

e) a collection of several telescopes working together.

52. How many moons in the solar system are larger than Mercury?

c) 2.

53. When a planet or moon is completely enshrouded by clouds which visible light cannot penetrate, which of the following method or methods can be used to study the surface?

b) use radar.

d) send a spacecraft to land on its surface.

e) both b) and d) above.

54. Our best images of Neptune and its moons came from:

c) Voyager 2.

55. Which of the following is true about asteroids?

c) they are probably left-over planetesimals from the formation of the solar system.

56. Which of the following spacecraft is currently orbiting Saturn?

e) Cassini.

57. The spacecraft that landed successfully on Venus:

b) survived for only short amounts of time before failing, but sent back pictures.

58. Which of the following moons orbits its planet in a backwards direction, compared to most of the motions in the solar system?

e) Triton.

59. The resolution of a 1 meter space telescope is:

b) half that of a 0.5 meter space telescope.

60. The ETSU radio telescope has a diameter of about 3 meters, similar in diameter to the Infrared Telescope Facility (IRTF) on Mauna Kea, in Hawaii, a telescope used for short-wavelength infrared observations, and the 3 meter optical telescope on the Canary Islands. The relative resolutions of these three telescopes are:

a) best: Canary Islands; next: IRTF; worst: ETSU radio telescope.

61. The resolution of a telescope:

a) increases (gets worse) with increasing wavelength of light.

d) increases with decreasing diameter of primary mirror or lens.

e) both a) and d) above.

62. Audible sound has wavelengths of approximately 1 meter, while visible light has wavelengths of about 5×10^{-7} meters. Therefore:

b) With a door about a meter in size, diffraction is much more significant for audible waves than visible waves.

63. The reason that you can hear but not see a person standing outside the classroom door is:

b) Sound waves are longer than visible light waves, and so bend more when they go through a doorway.

Answers: 1c, 2d, 3c, 4c, 5d, 6e, 7b, 8b, 9b, 10c, 11c, 12e, 13e, 14d, 15e, 16c, 17b, 18d, 19d, 20c, 21c, 22d, 23a, 24d, 25e, 26d, 27e, 28d, 29b, 30d, 31c, 32e, 33d, 34c, 35b, 36b, 37c, 38e, 39d, 40c, 41b, 42e,

43e, 44a, 45a, 46e, 47d, 48a, 49b, 50c, 51e, 52c, 53e, 54c, 55c, 56e, 57b, 58e, 59b, 60a, 61e, 62b, 63b.