Astronomy 103: Third Exam

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• Each question is worth 2 points.
• Write your name on this exam and on the scantron.

1 Short Answer
A. Which moon has the most substantial atmosphere?

2 Multiple Choice
1. Which of the following has the most substantial atmosphere?
   (a) Mercury
   (b) Venus
   (c) Earth
   (d) Mars

2. Which of the following has the least substantial atmosphere?
   (a) Mercury
   (b) Venus
   (c) Earth
   (d) Mars
3. Which of the following has the greatest greenhouse effect?
   (a) Mercury
   (b) Venus
   (c) Earth
   (d) Mars

4. In which of the following is the greatest change between day and night temperature?
   (a) Mercury
   (b) Venus
   (c) Earth
   (d) Mars

5. Earth’s atmosphere is primarily:
   (a) hydrogen
   (b) carbon dioxide
   (c) nitrogen
   (d) ozone
   (e) helium

6. Titan’s atmosphere is primarily:
   (a) hydrogen
   (b) carbon dioxide
   (c) nitrogen
   (d) ozone
   (e) helium
7. Mars’s atmosphere is primarily:
   (a) hydrogen
   (b) carbon dioxide
   (c) nitrogen
   (d) ozone
   (e) helium

8. Venus’s atmosphere is primarily:
   (a) hydrogen
   (b) carbon dioxide
   (c) nitrogen
   (d) ozone
   (e) helium

9. What is the stratosphere?
   (a) the lowest layer in the atmosphere
   (b) the part of the atmosphere that absorbs optical light
   (c) the part of the atmosphere that absorbs ultraviolet
   (d) the part of the atmosphere that absorbs X rays
   (e) the highest layer in the atmosphere

10. What is the troposphere?
    (a) the lowest layer in the atmosphere
    (b) the part of the atmosphere that absorbs optical light
    (c) the part of the atmosphere that absorbs ultraviolet
    (d) the part of the atmosphere that absorbs X rays
    (e) the highest layer in the atmosphere
11. Why is Jupiter denser than Saturn?
   (a) It is made of a different composition than Saturn, including a higher proportion of hydrogen compounds and rocks.
   (b) The extra mass of Jupiter compresses its interior to a greater extent than that of Saturn.
   (c) Its core is much larger than Saturn’s.
   (d) It has a greater proportion of helium to hydrogen compared to Saturn.
   (e) It is unknown why this is so.

12. Why is Uranus denser than Saturn?
   (a) It is made of a different composition than Saturn, including a higher proportion of hydrogen compounds and rocks.
   (b) The extra mass of Uranus compresses its interior to a greater extent than that of Saturn.
   (c) Its core is much larger than Saturn’s.
   (d) It has a greater proportion of helium to hydrogen compared to Saturn.
   (e) It is unknown why this is so.

13. Which of the following planets are blueish in color
   (a) Jupiter and Pluto
   (b) Saturn and Uranus
   (c) Neptune and Uranus
   (d) Neptune and Pluto
   (e) Saturn and Jupiter

14. Which of the following planets has the most volcanically active moons
   (a) Jupiter
   (b) Saturn
   (c) Neptune
   (d) Uranus
15. How do astronomers think Saturn generates its internal heat?

(a) radioactive decay
(b) internal friction due to its high rotation rate
(c) by raining dense helium droplets from higher to lower altitudes, resembling the process of differentiation
(d) by contracting, changing gravitational potential energy into thermal energy
(e) it is still unknown

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17. How much energy does Jupiter emit compared with how much it receives from the Sun?

(a) It emits 10 times as much.
(b) It emits twice as much.
(c) It emits half as much.
(d) It emits 10 percent as much.
(e) It emits 1 percent as much.

18. How much energy does Saturn emit compared with how much it receives from the Sun?

(a) It emits 10 times as much.
(b) It emits twice as much.
(c) It emits half as much.
(d) It emits 10 percent as much.
(e) It emits 1 percent as much.
19. Which of the following is not visible by the naked eye
   (a) Jupiter
   (b) Saturn
   (c) Uranus
   (d) Neptune
   (e) all of the above

20. Which of the following planets have rings
   (a) Jupiter
   (b) Saturn
   (c) Uranus
   (d) Neptune
   (e) all of the above

21. A rocky leftover planetesimals orbiting the Sun is
   (a) a comet.
   (b) a meteor.
   (c) an asteroid.
   (d) a meteorite.
   (e) possibly any of the above

22. An icy leftover planetesimals orbiting the Sun is
   (a) a comet.
   (b) a meteor.
   (c) an asteroid.
   (d) a meteorite.
   (e) possibly any of the above
23. A rocky leftover planetesimals that hits the Earth’s surface?
   (a) a comet.
   (b) a meteor.
   (c) an asteroid.
   (d) a meteorite.
   (e) possibly any of the above

24. Which of the following would you find rocky particles orbiting the sun
   (a) Asteroid Belt
   (b) Kuiper Belt
   (c) Oort Cloud
   (d) All of these
   (e) None of these

25. Which of the following has comet like objects that initially formed near Jupiter
   (a) Asteroid Belt
   (b) Kuiper Belt
   (c) Oort Cloud
   (d) All of these
   (e) None of these

26. Which of the following has comet like objects that formed outside of Neptune’s orbit?
   (a) Asteroid Belt
   (b) Kuiper Belt
   (c) Oort Cloud
   (d) All of these
   (e) None of these
27. Which of the following has the most volcanic activity in the solar system?

   (a) Mercury
   (b) Mars
   (c) Io
   (d) Titan

28. Water arrived on Earth

   (a) from the initial accretion
   (b) it was accreted out of the gas
   (c) from comets during the heavy bombardment following the formation
   (d) from volcano’s
   (e) none of the above

29. The age of the solar system is approximately

   (a) 4 hundred years
   (b) 4 thousand years
   (c) 4 million years
   (d) 4 billion years
   (e) 4 trillion years

30. The largest asteroid is about how big?

   (a) 1 km
   (b) 10 km
   (c) 100 km
   (d) 1000 km
   (e) 10,000 km
31. The total mass of all the asteroids is about
   (a) less than a terrestrial planet
   (b) a small terrestrial planet
   (c) a large terrestrial planet
   (d) a small Jovian planet
   (e) a large Jovian planet

32. Asteroids in Jupiter’s orbit that lead or lag by 60 degrees are called what kind of asteroids?
   (a) Trojan
   (b) Jovian
   (c) Kuiper
   (d) near Earth

33. Rather than being a planet, Pluto is considered a member of
   (a) Kuiper Belt
   (b) Asteroid Belt
   (c) Oort Cloud
   (d) Moons of Neptune
   (e) Extrasolar Planets

34. The largest Kuiper Belt object is
   (a) Neptune
   (b) Uranus
   (c) Pluto
   (d) Earth
   (e) none of these
35. Which of the following describes the Doppler Method of detecting planets?
   (a) looking for reduced light as a planet passes between us and the star.
   (b) looking for the change in position of a star on the sky
   (c) looking at the change in velocity of a star from its spectra
   (d) looking at locations near stars for planets

36. Which of the following describes the Transit Method of detecting planets?
   (a) looking for reduced light as a planet passes between us and the star.
   (b) looking for the change in position of a star on the sky
   (c) looking at the change in velocity of a star from its spectra
   (d) looking at locations near stars for planets

37. Which of the following has been most successful at finding other planets?
   (a) looking for reduced light as a planet passes between us and the star.
   (b) looking for the change in position of a star on the sky
   (c) looking at the change in velocity of a star from its spectra
   (d) looking at locations near stars for planets

38. Most planets found around other stars
   (a) are more massive than Earth and close to the star.
   (b) are more massive than Earth and far from the star.
   (c) are less massive than Earth and close to the star.
   (d) are less massive than Earth and far from the star.
39. A planet is detected via the Doppler technique. The shape of the periodic velocity pattern tells us
   (a) the planet’s size.
   (b) the planet’s mass.
   (c) the planet’s density.
   (d) the orbital period of the planet.
   (e) the orbital eccentricity of the planet.

40. A planet is detected via the Doppler technique. The period of the repeating velocity pattern tells us
   (a) the planet’s size.
   (b) the planet’s mass.
   (c) the planet’s density.
   (d) the orbital period of the planet.
   (e) the orbital eccentricity of the planet.

41. The strength of the Coriolis effect depends on
   (a) a planet’s distance from the sun
   (b) the amount of greenhouse gases
   (c) the planet’s temperature
   (d) the planet’s size and rotation rate
   (e) the tilt of the planet’s axis

42. Which planet finding technique depends on the planets having edge on orbits
   (a) Astrometric
   (b) Doppler
   (c) Gravitational lensing
   (d) Transit
   (e) Direct imaging
43. Many of the detected exoplanets are "Hot Jupiters" because
   (a) these are the brightest planets
   (b) the long and detailed historical record
   (c) these planets are easiest to find
   (d) these are predicted by the solar nebular model
   (e) none of these

44. Ozone in the atmosphere absorbs ultraviolet.
   (a) true
   (b) false

45. The stratosphere is where most of the infrared is absorbed.
   (a) true
   (b) false

46. Jupiter’s inner moons are particularly active due to tidal heating.
   (a) true
   (b) false

47. The atmosphere of the Moon is very minimal.
   (a) true
   (b) false

48. Neptune is occasionally observed to transits the Sun.
   (a) true
   (b) false

49. Mercury is occasionally observed to transits the Sun.
   (a) true
   (b) false