

ASTRONOMY 100, Section 1, Fall 2001
Second Hour Exam, October 17 - FORM A

1. Stars emit blackbody radiation. The color of this radiation tells us a star's
(A) chemical composition. (B) brightness. (C) *temperature.*
(D) magnetic field. (E) age.
2. A star is usually surrounded by a thin layer of cool and low-density gas, called the stellar atmosphere. This atmosphere can
(A) emit its own blackbody radiation.
(B) amplify the stellar blackbody radiation.
(C) obscure the stellar blackbody radiation.
(D) produce emission lines over the stellar blackbody continuum.
(E) *produce absorption lines over the stellar blackbody continuum.*
3. We can determine the chemical compositions of a star by analyzing
(A) the rock sample collected from the star.
(B) the color and brightness of the star.
(C) *the spectral lines in its spectrum.*
(D) the continuous spectrum of the star.
(E) all of the above.
4. Which planet does *not* have a thick atmosphere?
(A) *Mercury* (B) Venus (C) Earth (D) Jupiter (E) Neptune
5. A planet with a thick atmosphere has nighttime temperatures ____ daytime temperatures.
(A) much cooler than (B) *slightly cooler than*
(C) slightly higher than (D) much higher than
6. Which planet has the highest temperature at night?
(A) Mercury (B) *Venus* (C) Earth (D) Jupiter (E) Neptune
7. This planet has a high temperature because
(A) it is the closest to the Sun. (B) it has a rapid rotation.
(C) it has many moons. (D) it has a strong magnetic field.
(E) *it has a runaway greenhouse effect.*
8. Which element in a planet's atmosphere is produced by life on that planet?
(A) hydrogen (B) helium (C) carbon (D) *oxygen* (E) nitrogen.
9. Jupiter's atmosphere is dominated by
(A) *hydrogen and helium.* (B) nitrogen and oxygen. (C) sodium and potassium.
(D) methane and nitrogen. (E) carbon monoxide and water.
10. These elements
(A) were brought by meteorites. (B) were released from surface rocks.
(C) were produced by ancient life. (D) *were there originally.*
(E) were product of radioactive decay.

11. The absence of a magnetic field on a planet suggests that the planet
 (A) has no atmosphere. (B) is liquid throughout. (C) has a solid core.
 (D) has no iron core. (E) is rotating rapidly.
12. Which of the following can be used to determine the surface temperature of Venus?
 (A) optical and infrared observations (B) infrared and radio observations
 (C) only optical observations (D) only infrared observations
 (E) only radio observations
13. Which of the following can be used to determine the surface temperature of Jupiter?
 (A) optical and infrared observations (B) infrared and radio observations
 (C) only optical observations (D) only infrared observations
 (E) only radio observations
14. Which of the following can be used to determine the rotational period of Jupiter?
 (A) optical and infrared observations (B) infrared and radio observations
 (C) only optical observations (D) only infrared observations
 (E) only radio observations
15. How long does Jupiter's Great Red Spot last?
 (A) 1 month (B) 1 year (C) 30 years
 (D) at least 300 years (E) 4.6 billion years
16. Saturn's rings are made of
 (A) dust and small rocks. (B) a solid sheet of ice. (C) a thin sheet of gas.
 (D) a solid sheet of silicates. (E) a sheet of fine dust.
17. Three types of volcanos are present on Earth: cinder-cone, shield, and composite. Which type of volcanos are seen on Venus?
 (A) cinder-cone volcano (B) shield volcano (C) composite volcano
 (D) all of the above (E) none of the above
18. Which type of volcanos are seen on Jupiter?
 (A) cinder-cone volcano (B) shield volcano (C) composite volcano
 (D) all of the above (E) none of the above
19. Which of the following planets does not have rings?
 (A) Pluto (B) Neptune (C) Uranus (D) Saturn (E) Jupiter
20. Which of the following moons has the highest volcanic activity?
 (A) Titan (B) Io (C) Charon (D) Phobos (E) Mimas
21. It has a high volcanic activity because of
 (A) its strong magnetic field. (B) frequent hits of meteorites.
 (C) rapid plate motions in its crust. (D) a high temperature in its atmosphere.
 (E) strong tidal forces from nearby planets or satellites.
22. Circular coronae are
 (A) optical illusions around the Moon. (B) hot ionized gas around the Sun.
 (C) old craters on Mars. (D) mild volcanic activities on Venus.
 (E) rotating cells in Jupiter's atmosphere.

23. Which of the following moons resembles “Death Star” from the Star Wars?
 (A) Titan (B) Io (C) Charon (D) Phobos (E) *Mimas*
24. The most distinct feature on this moon is
 (A) *a large crater.* (B) the presence of alien colonies.
 (C) a large ocean. (D) complicated canal system.
 (E) a totally featureless surface.
25. The Martian meteorite that suggested past microscopic life on Mars was
 (A) found by Carl Sagan.
 (B) a gift from the Russians.
 (C) *found at the South Pole of the Earth.*
 (D) brought back from space by the Space Shuttle.
 (E) brought back from Mars by the Viking spacecraft.
26. The physical conditions of the Earth’s interior can be studied via earthquakes. As S-waves cannot go through the center of the Earth, the Earth must have
 (A) *a liquid core.* (B) a solid core. (C) a magnetic field.
 (D) a lithosphere. (E) all of the above.
27. The average density of Jupiter is much lower than that of the Earth, implying that
 (A) *Jupiter is made of light elements such as H and He.*
 (B) Jupiter must have a much lower surface gravity.
 (C) Jupiter’s magnetic field must be weaker than the Earth’s.
 (D) the pressure in Jupiter’s interior is lower than that in the Earth’s interior.
 (E) all of the above.
28. The physical conditions of Jupiter’s interior are derived from
 (A) the analysis of radio observations of seismic P-waves and S-waves.
 (B) *theoretical models assuming a balance between pressure and gravity.*
 (C) measurements made by dropping probes into Jupiter from the Voyager spacecrafts.
 (D) the analysis of the blackbody radiation from Jupiter.
 (E) all of the above.
29. Which of the following provides constraints on the interior structures of Jovian planets?
 (A) surface gravity (B) *magnetic field* (C) rings and satellites.
 (D) atmospheric pressure. (E) rotational period
30. In the greenhouse effect, the surface of the Earth absorbs the the sunlight at ____ wavelengths and emits blackbody radiation at ____ wavelengths.
 (A) X-ray, visible (B) visible, radio (C) *visible, infrared*
 (D) visible, radio (E) infrared, visible
31. In the greenhouse effect, which of the following absorb the radiation emitted by the surface of the Earth and keep the heat in the Earth’s atmosphere?
 (A) nitrogen and oxygen. (B) argon and methane.
 (C) sulphuric acid and dust. (D) *carbon dioxide and water vapor.*
 (E) argon and radon.

32. The craters in the viewgraph, from left to right, belong to
 (A) Neptune, Earth, and Moon. (B) Mars, Earth, and Venus.
 (C) Earth, Venus, and Mercury. (D) *Venus, Earth, and Mercury.*
 (E) Venus, Earth, and Uranus.
33. The four terrestrial planets in the viewgraph, from left to right, are:
 (A) *Mars, Mercury, Earth, Venus.* (B) Mars, Venus, Earth, Mercury.
 (C) Venus, Mercury, Earth, Mars. (D) Mercury, Mars, Earth, Venus.
34. The four Jovian planets in the viewgraph, from left to right, are:
 (A) Saturn, Neptune, Jupiter, Uranus. (B) Saturn, Jupiter, Neptune, Uranus.
 (C) *Saturn, Jupiter, Uranus, Neptune.* (D) Jupiter, Uranus, Saturn, Neptune.
35. The Cassini spacecraft launched in 1997 will orbit around
 (A) Venus (B) the Earth. (C) Mars. (D) Jupiter. (E) *Saturn.*
36. The Moon has no atmosphere because of
 (A) *its low gravity.* (B) its low temperature. (C) the intense sunlight.
 (D) the Earth's tidal effect. (E) a lack of magnetic field.
37. The lunar maria are remnants of ancient oceans. *False.*
38. The Earth's rotation is being slowed down by tides, and this process will continue until the Earth becomes a synchronous rotator like the Moon. *True.*
39. Mars appears red because of oxidized iron (like rust) in the surface material. *True.*
40. The evidence of water on Mars is convincing, but the evidence of life is controversial. *True.*
41. The shield volcanos on the Earth draw lava flow from the liquid iron core. *False.*
42. On the surface of Jupiter, the optically brightest regions have the highest temperatures. *False.*
43. The Jovian planets have higher masses but lower densities than the terrestrial planets. *True.*
44. Mercury obtains its atmosphere by capturing sodium and potassium from the solar wind. *False.*
45. The collision of a comet with Jupiter in 1994 left a large crater on the surface of Jupiter. *False.*
46. The center of the Earth is solid because the pressure is high. *True.*
47. The age of the oldest lunar rock is adopted as the age of the solar system. *False.*
48. A full Moon or a new Moon produces stronger tides on the Earth than a quarter Moon. *True.*
49. An electron in an atom emits a photon to make a transition to a higher-energy state. *False.*
50. Water ice has been found on the Moon. *True.*
51. The Earth's Moon was formed together with the Earth, but Mars' moons were captured. *False.*
52. Pluto's orbit crosses Neptune's orbit, but they will not collide. *True.*