

1. Which of the following layers of the earth is unique among the terrestrial planets?
 - A) core
 - B) ionosphere
 - C) hydrosphere
 - D) mantle
 - E) crust
2. At what phase would you expect to find extremely high and low tides?
 - A) first and third quarter
 - B) new Moon
 - C) full Moon
 - D) both new and full Moons
 - E) Moon phases are not impacting the tides.
3. What is true of spring tides?
 - A) The difference between low and high tides would be greatest.
 - B) The difference between low and high tides would be smallest.
 - C) There would be one high and one low tide each day.
 - D) The Moon's phase will be first quarter.
 - E) The third quarter Moon would be high overhead at dawn.
4. At what phase would the tides be least noticeable?
 - A) full Moon
 - B) new Moon
 - C) third quarter
 - D) waning gibbous
 - E) waxing crescent
5. The Moon's near side always faces Earth due to
 - A) Earth's tidal force
 - B) the Sun's gravity
 - C) the solar wind
 - D) Earth's magnetic field
 - E) conservation of angular momentum in the solar nebula
6. The smallest high tides occur when the Moon phase is
 - A) full.
 - B) new.
 - C) waxing or waning gibbous.
 - D) first or third quarter.
 - E) waxing or waning crescent.
7. What is true of the Moon's orbital and rotational periods?
 - A) The orbital period is longer.
 - B) The rotational period varies with the Moon's phase.
 - C) They are equal.
 - D) The rotational period is longer.
 - E) The orbital period is greatest at full moon.
8. Almost all of the earth's atmospheric gases lie in the
 - A) troposphere.
 - B) ionosphere.
 - C) hydrosphere.
 - D) stratosphere.
 - E) mesosphere.
9. Which portion of our atmosphere blocks ultraviolet radiation best?
 - A) the stratosphere
 - B) the ozone layer
 - C) the ionosphere
 - D) the mesosphere
 - E) the troposphere
10. Life on Earth occurs in the
 - A) exosphere.
 - B) troposphere.
 - C) mesosphere.
 - D) ionosphere.
 - E) stratosphere.
11. Which of these gases is least abundant in our atmosphere?
 - A) oxygen
 - B) argon
 - C) nitrogen
 - D) carbon dioxide
 - E) hydrogen
12. Without the greenhouse effect gases in our atmosphere,
 - A) we would not have to worry about any ecological problems.
 - B) the ice in our poles would have melted long ago.
 - C) the earth's present oceans would be frozen.
 - D) the whole Earth would be completely submerged.
 - E) the amount of nitrogen and oxygen would be much less.
13. Which of these gases are outgassed from our volcanic eruptions?
 - A) helium, carbon dioxide, methane.
 - B) oxygen, methane, ammonia
 - C) carbon dioxide, water vapor, oxygen
 - D) ammonia, water vapor, oxygen.
 - E) water vapor, methane, carbon dioxide.
14. The major presence of water detected on the Moon is in
 - A) the puffs of steam seen coming from some still active lunar volcanoes.
 - B) the flows of mud seen on the walls of some craters.
 - C) the floors of deep craters in the polar regions, as ice deposits that never thaw.
 - D) faint clouds of ice in the thin lunar atmosphere.
 - E) the mare.

15. The average rate of erosion on the Moon is far less than here because
- A) the Moon lacks wind, water and an atmosphere.
 - B) the Moon is much younger than the earth.
 - C) the Moon's mare long ago dried up, so there is no more wave erosion there.
 - D) the Moon's magnetic field protects it from the solar wind better than ours does.
 - E) the crust of the Moon is much denser than the earth's crust.
16. We determine the structure of the Earth's core using
- A) magnetic resonance imaging.
 - B) satellite imaging.
 - C) seismic wave data.
 - D) deep mine shafts.
 - E) radar and sonar.
17. The atmospheric gases primarily responsible for our greenhouse effect are
- A) hydrogen and helium.
 - B) oxygen and carbon dioxide.
 - C) argon and water vapor.
 - D) carbon monoxide and methane.
 - E) water vapor and carbon dioxide.
18. In noting that the earth is "differentiated," we mean that
- A) the density increases as you descend downward toward the core.
 - B) the earth's magnetic field varies at different locations on the globe.
 - C) the earth is very different than any other planet we study.
 - D) the radioactive heating in the core is increasing with time.
 - E) the density of oceanic basalt is less than that of granite on the mountain tops.
19. Seismic waves can most usefully map
- A) the ozone layer and the mesosphere.
 - B) the seafloor.
 - C) the surface of the Moon.
 - D) the interior mantle and core of the earth and other worlds.
 - E) the topography of the continents.
20. Which statement about seismic waves is true?
- A) Only S waves can travel through liquid.
 - B) P waves travel faster, and thus arrive sooner than do the S waves.
 - C) In the shadow zones, neither type is observed.
 - D) On the far side of the earth, only the S waves on the surface can be detected.
 - E) S waves can travel though the outer core, but P waves cannot.
21. Which of these is not a result of plate tectonics?
- A) the Andes
 - B) the Mid-Atlantic Rift
 - C) the San Andreas Fault
 - D) the Philippine Trench
 - E) the Grand Canyon
22. Today, an average lunar moonquake releases about as much energy as
- A) a major U.S. city uses in 1 year.
 - B) the most powerful earthquake ever recorded.
 - C) a firecracker.
 - D) the Mount St. Helens eruption.
 - E) an atomic bomb.
23. The far side of the Moon was first mapped
- A) by William Herschel with his large reflectors in the early 1800s.
 - B) by the Apollo astronauts on the first orbit of the Moon with Apollo 8.
 - C) by NASA with its Lunar Orbiters in the 1960s.
 - D) by early Russian spacecraft.
 - E) by Galileo in 1610 with his first telescope.
24. The lunar mare are found
- A) mainly on the near side.
 - B) only as layered rocks, since the original water was lost long ago.
 - C) uniformly all over the Moon.
 - D) only in the dark areas of the lunar poles, where water is not boiled away.
 - E) mainly on the far side.
25. Which of these age ranges best describes the lunar maria?
- A) 8.6 - 6.0 billion years
 - B) 3.9 - 3.2 billion years
 - C) 2.5 - 1.0 billion years
 - D) 100 - 65 million years
 - E) a few million years to present lava flows seen erupting
26. The rate of cratering in the lunar highlands shows us that
- A) most of the asteroids must have hit the Moon, not the earth.
 - B) they must be younger than the older, darker mare.
 - C) they range from 4.6 - 4.4 billion years old, on average.
 - D) the largest impacts are the youngest, such as Copernicus and Tycho.
 - E) the oldest rocks are at least as old as the mare, but some craters are much younger.

27. What is true of the lunar highlands ?
- A) They are less heavily cratered than the mare.
 - B) They are the darker regions of the Moon seen with the naked eye.
 - C) They are found on the Moon's northern hemisphere.
 - D) They are the oldest part of the lunar surface..
 - E) They are younger than the darker mare.
28. The presence of a magnetic field is a good indication that
- A) the earth's core is completely molten.
 - B) the dense Earth is made chiefly of iron and nickel.
 - C) the earth's core, like Mercury's, has had time to freeze out solid into a bar magnet.
 - D) the earth has a huge, nickel-iron meteorite buried under the Yucatan.
 - E) the earth has a large amount of swirling molten nickel and iron in its outer core.
29. When strong solar winds are displaced poleward by our magnetic fields, we get
- A) intense auroral displays.
 - B) sunspots.
 - C) the Van Allen radiation belts.
 - D) hurricanes in the tropics.
 - E) droughts and dust bowls in the American West.
30. The region in which charged particles are trapped by our magnetic fields is the
- A) Aurora.
 - B) ozone layers.
 - C) ionosphere.
 - D) Van Allen radiation belt.
 - E) exosphere.
31. Earth's magnetic field
- A) lines intersect the atmosphere at the equator.
 - B) is a remnant of the solar nebula's magnetic field.
 - C) prevents charged particles in the solar wind from reaching the surface.
 - D) is weakening the Van Allen radiation belts
 - E) is the force behind plate tectonics.
32. Which statement about our core is FALSE?
- A) The seismic data indicates the outer portion is liquid, the inner part solid.
 - B) Its magnetic field generates the protective Van Allen Radiation Belts.
 - C) It generated a stable and permanent magnetic field much as a regular bar magnet.
 - D) It must be rich in both iron and nickel.
 - E) It is almost as hot as the Sun's glow surface, the photosphere.
33. Which of these theories seems to best explain the Moon's origin?
- A) Fission Theory
 - B) Capture Theory
 - C) Impact Theory
 - D) Fusion Theory
 - E) Coformation Theory