

ANSWER SHEET

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1. The chemical composition of Jupiter indicates that the two most abundant elements (by percentage) are
 - A silicon and carbon.
 - B silicon and oxygen.
 - C hydrogen and helium.
 - D hydrogen and oxygen.
 - E helium and oxygen.

2. The rotation periods of Jupiter and Saturn are
 - A very short, of the order of 1 hour
 - B long, of the order of several days
 - C very long, several weeks, because of their great size and mass
 - D relatively short, of the order of 10 hours

3. Which body in the solar system is known to have active volcanos?
 - A Titan.
 - B Callisto.
 - C Io.
 - D Triton.

4. Which chemical or chemicals appear to play a prominent role in the "volcanoes" of Io?
 - A Sulfur
 - B H₂O
 - C Methane and Ammonia
 - D Molten lava

5. Which solar system body is believed to have deep oceans of liquid water under a surface of solid ice
 - A Io
 - B Titan
 - C Triton
 - D Europa

6. As we move further from Jupiter, the Galilean moons have _____ densities and a _____ proportion of water.
 - A lower, greater
 - B greater, greater
 - C lower, lower
 - D greater, lower
 - E there is no such pattern of density and proportion of water.

7. The rings of Saturn are thought to have originated from
 - A a close moon which broke up
 - B material ejected from the surface of Saturn by its rapid rotation
 - C interplanetary ices captured by Saturn's strong gravity.
 - D unknown causes

8. Ring systems have been discovered around
 - A Saturn only.
 - B Jupiter and Saturn.
 - C Jupiter, Saturn, and Uranus.
 - D all of the Jovian planets

9. Mercury looks like what other object in the inner solar system?
 - A Venus
 - B Earth
 - C Earth's moon
 - D Mars

10. Io appears more active than the other Galilean satellites of Jupiter. This activity may arise from
 - A stronger heating of Io due to internal friction caused by Jupiter's strong gravity.
 - B the radiation close to Jupiter.
 - C Io's smaller density.
 - D Jupiter's magnetic field.

11. How does the surface atmospheric pressure on Venus compare to that on the Earth?
 - A it is much less.
 - B it is about the same.
 - C it is much greater.
 - D it is negligible.

12. The oldest Moon rocks are older than the most ancient rocks found on the Earth because
 - A the moon was formed long before the Earth
 - B the radioactive elements used for dating are rare on Earth
 - C the oldest Earth rocks were destroyed (recycled) by erosion and continental drift
 - D the moon formed from older material than the Earth did

13. Which of the following describes the formation of the lunar maria?
 - A melting and solidification followed by impact
 - B volcanism
 - C impact followed by volcanism
 - D volcanism followed by impact

14. The Galilean satellite with the highest average density is
 - A Io
 - B Europa
 - C Ganymede
 - D Callisto

15. The main constituent of the Martian atmosphere is
 - A carbon dioxide
 - B oxygen
 - C methane
 - D argon

16. Where is the Olympus Mons located?
 - A Mars
 - B Venus
 - C The Moon
 - D Mercury

17. The probable reason why Mars has no continental drift is that
 - A Mars has no large moon
 - B it spins more slowly and is smaller than Earth
 - C its interior is not differentiated
 - D its interior is a rigid solid

18. Jupiter's large "red spot" is
- A a Taylor column, caused by a mountain or depression on the surface
 - B a magnetic disturbance similar to a sunspot
 - C a storm like a hurricane, but on a huge scale (much larger than the whole Earth)
 - D a storm of similar cause and size to terrestrial hurricanes
19. One of the reasons that Jupiter has hydrogen in its atmosphere while the Earth does not is that
- A Jupiter has a stronger gravitational field at its surface
 - B Jupiter has a weaker gravitational field at its surface
 - C the weaker magnetic field of Jupiter did not push the hydrogen away
 - D there was no hydrogen where the Earth formed
20. Distinct evidence of the flow of water at an earlier time from photographs of the planetary surface is seen upon which planetary body?
- A Venus
 - B Mars
 - C The Earth's moon
 - D Titan
21. Compared to Earth, the expected seasonal changes on Uranus because of its orbital and spin-axis alignments will be
- A much less
 - B very much exaggerated
 - C absent, because of the alignment of the spin axis
 - D the same
22. Which two Jovian planets are most similar in sizes, masses, composition, and structure?
- A Jupiter and Saturn.
 - B Saturn and Uranus.
 - C Neptune and Jupiter.
 - D Jupiter and Uranus.
 - E Neptune and Uranus.
23. Mercury is difficult to see from Earth primarily because
- A it is such a small planet
 - B it is very faint
 - C it always appears near the sun
 - D the orbit is highly elliptical
24. The major constituents of the Earth's atmosphere are
- A 77% Oxygen, 21% Nitrogen
 - B 77% Nitrogen, 21% Oxygen.
 - C 95% Carbon Dioxide, some water and vapor.
 - D 77% Nitrogen, 11% Oxygen, 10% Carbon Dioxide.
25. In order for the terrestrial planets to form, the planetesimals had to
- A accrete to make the proto planets.
 - B move in from the asteroid belt.
 - C collide and fragment each other into smaller pieces.
 - D melt from radioactive decay and then reform.

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26. The most probable process for the formation or acquisition of the planets of the sun is
- A the freezing of immense gas clouds by the cold temperature of space
 - B the break-up of one single large companion body to the sun, by tidal distortion
 - C capture from outer space by gravity
 - D relatively slow collection of smaller objects by mutual gravitational attraction and sticking, or accretion
27. Most of the asteroids orbit the sun in a belt between the orbits of
- A Venus and Mars
 - B Mars and Earth
 - C Jupiter and Saturn
 - D Mars and Jupiter
28. Periodic comets have lifetimes on the order of
- A billions of years
 - B millions of years
 - C hundreds to thousands of years
 - D no choice
29. Comet gas tails are the result of
- A melting and evaporation of ices from the comet core
 - B interplanetary material streaming into the comet
 - C sunlight glinting from the central comet core
 - D dust collected by the comet as it moves in its orbit
30. The solar system originated
- A about 500 million years ago
 - B about 5 billion years ago
 - C about 50 billion years ago
 - D about 500 billion years ago
31. Comparing the Jovian and terrestrial planets in terms of their group characteristics, which of these is (are) correct?
- A the Jovian planets have a lower density.
 - B the Jovian planets are more massive.
 - C the Jovian planets have many more satellites.
 - D all of the above.
32. A planetary system around a nearby star might be detected by
- A observing a planet with a very large telescope in space
 - B by measuring the size of the star
 - C by measuring the Doppler shift of the planet
 - D by measuring the Doppler shift of the star
33. The rings of Saturn are thought to be comprised of
- A solids
 - B gases
 - C millions of dust particles
 - D liquids

34. The terrestrial planets are _____ then the Jovian planets.
A larger, more massive and denser
B smaller, less massive and denser
C smaller, more massive and less dense
D larger, less massive and less dense
35. The highest tides occur near
A full moon
B new moon
C different lunar phases
D the Spring
36. The primary chemical constituent of comets is:
A CO₂.
B Nitrogen.
C H₂O.
D Methane.
37. A cometary nucleus has a diameter of roughly
A 10 km
B 1,000 km
C 10,000 km
D 100,000 km
38. Which of the following planets never transits the sun as seen from Mars
A Mercury
B Earth
C Jupiter
D no choice
39. Kepler's laws apply to the motion of
A the planets around the sun
B binary stars (2 stars orbiting around each other)
C Earth satellites
D all of these
40. Which of the following Jovian planets has the lowest density?
A Jupiter
B Saturn
C Uranus
D Neptune
41. The giant planets are composed primarily of
A hydrogen and helium
B carbon dioxide
C iron
D rocky materials
42. The surface pressure of the atmospheric carbon dioxide (CO₂) at the surface of Mars, compared to the atmospheric pressure at the Earth's surface, is
A less than 1/100

- B extremely small (less than 1 millionth)
C about the same
D about 90 times greater
43. The low average densities of the Jovian planets, which have high masses and hence high gravitational fields, is an indication of what fact about their interiors?
A their interiors are composed of H_2O , CH_4 (methane) and NH_3 (ammonia)
B they are composed mainly of very light elements, such as H and He
C their interiors have not been condensed to liquid or solid form
D they have hot, gaseous interiors, similar to cool stars
44. Mercury and Venus are always seen
A near the moon
B near each other
C near the sun
D none of the above
45. Which object in our solar system with the greatest orbital eccentricity (most elliptical orbit)?
A Pluto
B Mercury
C Mars
D Earth
46. The birthplace of the sun and planets (and of other stars and maybe their planets) is thought to have been
A at the centers of supernova explosions
B in black holes dotted about the universe
C in the centers of galaxies
D in cool gas and dust clouds
47. Venus is brightest at
A full phase
B new phase
C both (A) and (B)
D neither (A) nor (B)
48. Tides are caused by
A a bulge in the Earth's surface
B magnetic fields between the Earth and the moon
C gravitational attraction of the moon and the sun on the oceans
D no choice
49. The general shape of most asteroids is thought to be
A perfectly spherical
B irregular, odd shape
C loose collections of very small particles, held together by gravity
D double, two asteroids orbiting the sun together
50. Comets shine by
A reflected sun light
B florescence
C phosphorescence
D no choice

51. A bit of matter that enters the Earth's atmosphere and survives to reach the ground is called
- A a meteor.
 - B a meteoroid.
 - C a meteorite.
 - D a minor planet.
52. The only satellite of a planet in our solar system which is known to have an appreciable atmosphere is
- A Io, a moon of Jupiter
 - B Phobos, a moon of Mars
 - C The moon, of Earth
 - D Titan, a moon of Saturn
53. The particles in Saturn's rings
- A all move as if they are one solid disk
 - B revolve in different directions depending upon the distance from the plane
 - C move in circular orbits, with the outer particles moving fastest because they are furthest from the planet
 - D move in Keplerian (circular) orbits, inner particles faster
54. Which of the following planets does not have a ring around it?
- A Jupiter
 - B Uranus
 - C Neptune
 - D Venus
55. According to the new 2006 definition of a planet, Pluto is now a dwarf planet. What is the main characteristic of Pluto for which it is no longer considered a true planet?
- A. It has too eccentric of an orbit
 - B. It is too small to have a spherical shape
 - C. It has not cleared out its immediate neighborhood of smaller objects through gravity
 - D. It is smaller than some other Kuiper Belt Objects which are considered planets
56. What does the eccentricity of an orbit mean?
57. What is albedo?
58. What is the importance of the frost line?
59. Name 2 moons in our solar system that are thought to have water oceans beneath their surface ice layer?