

Name _____

Do not forget to write your name and fill in the bubbles with your student number, and fill in test form A on the answer sheet. Write your name above as well. You have 50 minutes. For each question, mark the best answer. There are no formulas for this test. **The final five questions are based on images projected at the front of the room.**

1. The gas that is increasing due to man's activities, and is probably most responsible for the current increase in Earth's temperature is
 - A) Ozone
 - B) Carbon monoxide
 - C) Carbon dioxide
 - D) Water vapor
 - E) Acid rain
2. Which of the following layers of the Earth is believed to be liquid?
 - A) The mantle (only)
 - B) The outer core (only)
 - C) The inner core (only)
 - D) The mantle and outer core
 - E) The inner core and outer core
3. The name of a particularly large member of the asteroid belt is
 - A) Halley
 - B) Charon
 - C) Eris
 - D) Ceres
 - E) Triton
4. The largest storm in the Solar System is on
 - A) Earth
 - B) Jupiter
 - C) Mars
 - D) Neptune
 - E) Saturn
5. What two factors contribute to cause Mercury to have extreme (hot and cold) temperatures?
 - A) Slow rotation and no atmosphere
 - B) Slow rotation and eccentric orbit
 - C) No atmosphere and eccentric orbit
 - D) No atmosphere and weak magnetic field
 - E) Slow rotation and weak magnetic field
6. Which of the following moons has a pretty thick atmosphere?
 - A) Moon
 - B) Europa
 - C) Io
 - D) Titan
 - E) Enceladus
7. Which planets, besides Saturn, has rings?
 - A) Jupiter (only)
 - B) Neptune (only)
 - C) Uranus (only)
 - D) All of the above
 - E) None of the above
8. Why do visible pictures give us relatively few clues about what is on the surface of Venus?

- A) Venus always points one side towards the Sun, so we can't see the other side
 - B) No spacecraft have sufficient resolution to see the fine details on the surface
 - C) The amount of light on Venus is too dim to take pictures
 - D) Venus is close enough to the Sun that any pictures would get washed out from too much light
 - E) The whole planet is shrouded in clouds
9. Why do we think the inner planets of the solar system contain little water, while the outer planets contain a lot?
- A) The inner planets were inside the "frost line", where ice is not cold enough to stick together
 - B) The outer planets had a lot of gravity, which let them pull in ice
 - C) The early solar system had none of the water close to the Sun, while the outer solar system had lots of water
 - D) Water was made after the planets formed from hydrogen, and the inner planets have no hydrogen
 - E) Water was made after the planets formed from oxygen, and the inner planets have no oxygen
10. Which of the following is true about all eight planets in the Solar System?
- A) They are all pretty close to round (only)
 - B) They all go around the Sun (only)
 - C) They all have substantially more mass than anything else near them (only)
 - D) All of the above
 - E) None of the above
11. Which type of meteor probably represents pristine material, left over from the formation of the Solar System?
- A) Iron
 - B) Stony
 - C) Stony-Iron
 - D) Primitive, but lacking carbon compounds
 - E) Primitive, and including carbon compounds
12. The most volcanically active object in the solar system is
- A) Io B) Mars C) Ganymede D) Titan E) Pluto
13. Which of the following is not in orbit around Jupiter?
- A) Callisto B) Europa C) Ganymede D) Io E) Titan
14. The Doppler method detects planets around other stars by
- A) Measuring the Doppler effect from radar signals bounced off the planet
 - B) Measuring the infrared and other light generated by the heat of the planet
 - C) Measuring the Doppler effect from light from the star bounced off the planet
 - D) Measuring the side-to side motion of stars caused by the gravitational influence of the planet
 - E) Measuring the towards and away motion of stars caused by the gravitational influence of the planet
15. The ultimate source of energy that keeps the inside of the Earth hot and drives volcanoes is

- A) Heat of formation
 - B) Radioactivity
 - C) Chemical reaction
 - D) Light from the Sun
 - E) Tidal heating
16. What is the distribution of craters like on the Moon?
- A) Very little, but relatively uniform
 - B) Very heavy, and relatively uniform
 - C) Heavy in the dark maria, light in the highlands
 - D) Light in the dark maria, heavy in the highlands
 - E) There is no systematic pattern to the density of cratering on the Moon
17. What do we currently believe about the sizes of planets around other stars?
- A) They are pretty much all very large, Jupiter size or larger
 - B) They are mostly very large, Jupiter size or larger, with a very small number of Earth-size planets
 - C) They come in a wide range of sizes, ranging from smaller than Earth-sized to larger than Jupiter
 - D) They are mostly Earth size or so, with a small number of Jupiter sized and up
 - E) They are pretty much all Earth size or smaller, with none as large as Jupiter
18. Why is it that most of the large moons are almost perfectly round?
- A) Their fast rotation pulls them into a round shape
 - B) Gravity pulls them towards a point, pressure pushes them out into a sphere
 - C) They usually are tidally locked, and the gravity from their planet makes them spherical
 - D) They are still small enough they are frozen solid, which makes them spheres
 - E) I have no idea; please mark this one wrong
19. Which of the following planets are considered terrestrial (Earth-like)?
- A) Mars, Mercury, and Uranus
 - B) Mars, Mercury, and Venus
 - C) Mars, Mercury, and Neptune
 - D) Mars, Neptune, and Venus
 - E) Mars, Mercury, and Neptune
20. What was the primary, or first atmosphere of all the planets believed to be like?
- A) They were all made of hydrogen (and helium)
 - B) The inner planets were hydrogen, the outer ones were mostly carbon dioxide
 - C) The outer planets were hydrogen, the inner ones were mostly carbon dioxide
 - D) They were all made of carbon dioxide (and nitrogen)
 - E) They were all mostly water vapor
21. Which of the following objects are generally made of more ice than anything else?
- A) Kuiper belt objects (only)
 - B) Oort cloud objects (only)
 - C) Asteroids (only)
 - D) Kuiper belt and Oort cloud objects, but not asteroids
 - E) Kuiper belt, Oort cloud, and asteroids
22. What is the way one can generally tell how old the surface of a planet or moon is

- A) Color – the brighter it is, the newer it is
 - B) Color – the brighter it is, the older it is
 - C) Craters – the more craters, the older it is
 - D) Craters – the more craters, the younger it is
 - E) Oxidation – the more oxidized, the older it is
23. The moon Triton orbits
- A) Neptune
 - B) Jupiter
 - C) Saturn
 - D) Mars
 - E) Uranus
24. Jupiter emits more energy than it gets from the Sun. The difference probably comes from
- A) Radioactivity
 - B) Friction from storms
 - C) Heat of formation left over from when the planet formed
 - D) Chemical reactions
 - E) Tidal heating
25. Suppose there was a NASA proposal to study storms on Mercury. Why should this proposal be rejected?
- A) It is impossible to see the storms without landing on Mercury, but it is too hot for a spacecraft to survive on the surface
 - B) A spacecraft to study the storms would have to go near the Sun to get there, where it would be destroyed
 - C) Mercury has no atmosphere, and hence can't have storms
 - D) Mercury has very little rotation, and hence can't have storms
 - E) Mercury has very little magnetic field, and hence can't have storms
26. Besides Earth, which planets have liquid water on their surface?
- A) Mars (only)
 - B) Venus (only)
 - C) Mercury (only)
 - D) Mars and Venus, but not Mercury
 - E) None of the above
27. If you made a list of the planets from shortest period to longest, the one that would come after Saturn would be
- A) Earth
 - B) Jupiter
 - C) Mercury
 - D) Mars
 - E) Uranus
28. Sometimes rings are very narrow. It is believed they are so narrow because typically
- A) Their self- gravity pulls them into a very tight region
 - B) The particles are touching each other, which keeps them together
 - C) There are a pair of shepherd moons that keep them narrow
 - D) They are actually solid, a single ring that is therefore narrow
 - E) Magnetic fields from the planet cause them to stick together

For each of the following, please look at the pictures on the screen to identify the object.

29. What are these pictures of?

- A) Io B) Mercury C) Europa D) Venus E) Mars

30. What is this a picture of?

- A) Neptune B) Saturn C) Earth D) Venus E) Uranus

31. What is this a picture of?

- A) Mars B) Ganymede C) Titan D) Mercury E) Moon

32. What is this a picture of?

- A) Moon B) Triton C) Miranda D) Jupiter E) Ganymede

33. What is this a picture of?

- A) Uranus B) Neptune C) Io D) Saturn E) Jupiter