ASTRO 120 -- FALL 2013

EXAM 2 - November -2, 2013

Name: _____ Section:_____

This examination is closed book. Please keep your answer sheet covered during the exam. Use a soft pencil when completing the computer answer sheet.

When you are finished, hand in your computer answer sheet AND this exam. Be sure to put your name on both

* In the NAME portion , enter your *last* name, a space, then your first name.

* Enter your ID number in the IDENTIFICATION NUMBER boxes of the answer sheet.

* Write your Section Number in spaces K and L of the SPECIAL CODE

Friday	8:00AM	Section 01	(B. Hoo)
	9:00AM	Section 02	(F. N. Stein)
	10:00AM	Section 03	(F. N. Stein)
	11:00AM	Section 04	(H. Hyde)
	12:10PM	Section 05	(H. Hyde)
	1:10PM	Section 06	(H. Hyde)
Monday	8:00AM	Section 09	(F. N. Stein)
	9:00AM	Section 10	(I.C.A. Ghost)
	10:00AM	Section 11	(I.C.A. Ghost)
	11:00AM	Section 12	(H. Hyde)
	12:10PM	Section 13	(B. Hoo)
	1:10PM	Section 14	(G. W. Glinda)
	2:10PM	Section 15	(G. W. Glinda)

* Fill in all circles corresponding to the letters/numbers of your name, ID number, and section.

GOOD LUCK --- and RTFQ

USEFUL FORMULAE

$$\frac{d^3}{P^2} = m_1 + m_2$$

density = mass/volume $D_{Roche} = 2.5\ R_{planet}$

Multiple Choice: Select the *best* answer to each of the questions below. Place your answer on the computer answer sheet provided.

1. The order of the planets in increasing mean distance from the Sun (on average) is:
   a) Mercury, Venus, Mars, Earth, Saturn, Jupiter, Uranus, Neptune, Pluto
   b) Mars, Venus, Earth, Mercury, Jupiter, Saturn, Uranus, Neptune, Pluto.
   c) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto.
   d) Mercury, Mars, Venus, Earth, Jupiter, Uranus, Neptune, Pluto.
   e) Mercury, Venus, Mars, Earth, Jupiter, Saturn, Neptune, Pluto.

2. The "planet" Pluto has been the center of a small controversy ever since the discovery of what objects?
   a) comets
   b) large asteroids between Mars and Jupiter
   c) Kuiper belt objects - large balls of ice - that are outside of Pluto's orbit
   d) the rings of Uranus
   e) large, Earth-crossing asteroids

3. If a planet has a reasonably strong magnetic field, we know that
   a) it is made entirely of iron.
   b) there is liquid nitrogen below the surface.
   c) it can harbor life.
   d) it has a core of conducting material, probably in liquid form.
   e) all of the above

4. According to the giant impact model of the formation of the Moon, the collision between what two objects led to the formation of the Moon?
   a) the Sun and Jupiter
   b) the Earth and a comet
   c) Mars and Venus
   d) the Earth and a Mars-size body
   e) the Chicago Cubs and the Boston Red Sox

5. Which of the following places has a crater density that is similar to that of Mercury?
   a) the Ames High junior class
   b) Venus
   c) lunar maria
   d) lunar highlands
   e) Earth

6. Consider the following hypothetical situation: A spacecraft lands on a moon of one of the planets. The moon has a smooth surface resembling that of the lunar Mare. The rocks on the surface are found to be 4.2 billion years old. Why would such a finding be highly unusual?
   a) Such rocks are far older than any found on the Earth's moon.
   b) The Mare rocks on the Earth's moon are much older than 4.2 billion years.
   c) If the surface is that old, it should be heavily cratered
   d) There should not be rocks on Mare
   e) The rocks cannot be that old, since the Solar System itself is younger than that.

7. Compared to the lunar highlands (the terrae), the lunar maria are
   a) smoother and older.
   b) hotter and damper.
   c) more cratered and older.
   d) smoother and younger.
   e) more cratered and younger.

8. One of the most important results of the Apollo missions to the Moon was the determination
   a) that the lunar surface is covered with soft dust miles deep
   b) of the relationship between age and crater density.
   c) of the heights of lunar mountains.
   d) of the existence of lunar craters.
   e) that the Moon has a large magnetic field

9. Five planets have densities of 5.3 g/cc, 2.1 g/cc, 1.1 g/cc, 0.9 g/cc, 4.5 g/cc. A good guess of their respective type could be
   a) Rocky, icy, gasball, gasball, rocky
   b) Gasball, icy, icy, rocky, gasball
   c) Rocky, icy, gasball, rocky, rocky
   d) Icy, gasball, gasball, rocky, icy
   e) Rocky, Rocky, gasball, gasball, icy

10. A rock contains an amount of an isotope of potassium (^{40}K), which has decayed into argon (^{40}Ar) with a half life of 1.3 billion years. What do we have to measure about this rock to estimate the time elapsed since it was last molten?
   a) The amount of potassium 40
   b) The amount of argon 40
   c) The total amount of argon 40 plus potassium 40
   d) The relative amounts of argon 40 and potassium 40
   e) The number of ticks on a very reliable, very old clock

11. Why does Venus appear featureless when viewed through a telescope?
   a) It has a very thick cloud layer.
   b) It has permanent dust storms.
   c) Its atmosphere is so hot that shimmering distorts its image
   d) Its surface reflects sunlight so well that it seems featureless.
   e) It is shy and so never reveals its bare surface

12. What evidence do we have that liquid water once existed on the surface of Mars?
   a) dry river beds
   b) metamorphic rocks
   c) ancient beaches
   d) high atmospheric humidity at the present time
   e) huge fields of beach umbrellas

13. Where is Mars's water likely to be located?
   a) in canals
   b) in permafrost layers beneath the visible surface
   c) in the polar caps
   d) in underground lakes of liquid water
   e) we don't know for sure, but probably both b) and c)

14. What two chemical elements make up most of Jupiter's mass?
   a) hydrogen and helium
   b) oxygen and nitrogen
   c) iron and silicon
   d) potassium and argon
   e) carbon and argon

15. What is the source of the magnetic fields of Jupiter and Saturn
   a) large (compared to the planet) iron core
   b) highly compressed liquid hydrogen acting as a metal
   c) a very large bar magnet
   d) both (a) and (b)
   e) These planets have insignificant magnetic fields

16. The principal constituent of the atmosphere of Mars is _____.
   a) Hydrogen
   b) Nitrogen
   c) Oxygen
   d) Carbon dioxide
   e) Methane.

17. Secondary Atmospheres on planetary surfaces are though to have been produced primarily from _____, producing gases such as _____.
   a) Volcanism; hydrogen, helium, methane, water vapor, nitrous oxide.
   b) impacts of meteorites; oxygen, hydrogen and helium
   c) dust storms and chemical reactions with sunlight; Nitrogen, Methane and carbon dioxide.
   d) collection of gas onto the surface from emissions from the Sun; carbon dioxide, nitrogen and water vapor.
   e) Volcanism; carbon dioxide, nitrogen , sulfurous gases and water vapor.

18. Venus is the planet with the highest surface temperature. Why?
   a) It is close to the Sun
   b) The thick atmosphere is responsible for an important greenhouse effect
   c) Volcanism and tectonic are still very active on Venus
   d) The atmosphere of Venus absorbs most of the solar radiation
   e) none of the above - Venus isn' t so hot, as we learned from Magellan

19. Why do we strongly suspect that there is an ocean of liquid water beneath the icy surface of Europa?
   a) The surface is broken into many pieces that resemble arctic ice fields and ice floes.
   b) Geysers have been seen erupting on Europa
   c) The surface shows many deep impact craters.
   d) There are gaps in the icy surface through which liquid water has been seen.
   e) It has a deep blue color.

20. The oldest meteorites are _____ billion years old.
   a) 1.5
   b) 4.5
   c) 9.5
   d) 100
   e) 1 million years old.

21. What is particularly noteworthy about Titan?
    a) It has volcanoes.
    b) It has a very large magnetic field
    c) It has a thick atmosphere
    d) It is the only satellite with rings around it.
    e) It is the only large moon of Uranus.

22. Which of the following planets **do not** have rings or ring-arcs?
    a) Uranus
    b) Jupiter
    c) Pluto
    d) Neptune
    e) Saturn

23. What is the significance of the Roche distance?
    a) The satellites of all the planets are located within this distance from their planets.
    b) If an orbiting body comes within this distance to its planet, tidal forces may break it apart.
    c) It is the distance from the surface of a planet to the upper atmosphere.
    d) It is the radial measure of the size of a planet's core.
    e) The Earth's distance to the Sun is equal to the Roche Distance.

24. The main asteroid belt lies between the orbits of which of the following planets?
    a) Mars and Earth
    b) Mercury and Venus
    c) Neptune and Uranus
    d) Jupiter and Saturn
    e) Mars and Jupiter

25. Approximately how often is the Earth struck by an asteroid large enough to cause mass extinctions?
    a) every 1 to 10 thousand years
    b) every 10 to 100 thousand years
    c) every 10 to 100 million years
    d) every 1 to 5 billion years
    e) every Thursday

26. Iron meteorites were believed to be formed when :
    a) Iron is the most common element in the solar system, and formed tiny iron fragments when the solar nebula cooled to form planets
    b) carbon grains merged with aluminum, fusing to form iron clumps.
    c) iron from the interior of the Earth is expelled into space by explosive volcanic activity
    d) iron sinks to the core of small "planetesimals", some of which are fragmented by collisions which scatter debris into space.
    e) a planet exploded somewhere between the orbit of Mars and Jupiter, forming Iron-rich asteroids in the asteroid belt. Some of these eventually fall to Earth.