

ERTH 01: The Planets

Midterm Exam – Friday, April 27th, 2007

- **This exam is all multiple choice, 100 questions**
- **Each question is worth 1 point**
- **Use the Scantron sheet provided**
- **Use a #2 pencil (Do not use ink pens)**
- **Be sure to write and bubble in your name and ID number on the Scantron**

- **READ ALL QUESTIONS CAREFULLY!**

When you are done, turn in the following:

- 1. Your Exam (write your name on it)**
- 2. Your Scantron (write your name on it)**
- 3. Your handwritten cheat sheet (write your name on it)**
- 4. A photo ID will be required**

1. Seafloor spreading takes place at:
 - a. Hawaii
 - b. East Pacific Rise
 - c. Aleutian trench
 - d. San Andreas Fault

2. New seafloor is currently being produced at:
 - a. Aleutian Trench
 - b. East Pacific Rise
 - c. Mid-Atlantic Ridge
 - d. East Pacific Rise and the Mid-Atlantic Ridge
 - e. None of the above

3. Which ocean is currently shrinking in size?
 - a. Pacific Ocean
 - b. Atlantic Ocean

4. As you move away perpendicular to the crests of midocean ridges, the age of the seafloor:
 - a. Stays the same
 - b. Is younger
 - c. Is older
 - d. Is more complex

5. Excluding areas within a few hundred miles of coasts, the shallowest areas of the seafloor are located:
 - a. Nearest the coast
 - b. At midocean ridges
 - c. In the centers of oceans
 - d. Along trenches

6. Where does the bottom of the oceanic crust sit?
 - a. Lower than the bottom of continental crust
 - b. Higher than the bottom of continental crust

7. In order for plate motion to continue, the Earth must:
 - a. Maintain its rotational rate
 - b. Undergo another significant impact within the next 1.5 billion years
 - c. Maintain its internal heat

8. Does plate motion occur on the Moon?
 - a. Yes
 - b. No

9. Which material has the greater density?
 - a. Basalt
 - b. Mantle
 - c. Andesite
 - d. Oceanic crust

10. Which of the Earth's plates has moved from a location near the South Pole to a location in the northern hemisphere within the last 180 million years?
 - a. North American Plate
 - b. Australian Plate
 - c. Pacific Plate
 - d. Indian Plate

11. Which is an example of a divergent plate boundary?
 - a. Mid-Atlantic Ridge
 - b. Hawaiian-Emperor seamounts
 - c. Andes
 - d. Eastern edge of North America

33. How if the unseen deep interior of the Earth imaged?
- Electromagnetic radiation
 - Seismic (earthquake) waves
 - Sonar
 - Drilling
34. The velocity of both P- and S-waves drop as they pass through:
- Denser rock
 - Solid rock
 - Rocks at greater depth
 - Molten rock
35. Along subduction zones, strong earthquakes occur at unexpectedly:
- Deep depths
 - Shallow depths
36. Most earthquakes (on Earth) are generated:
- Within the lithosphere
 - Within the asthenosphere
 - Within the mantle
 - Within the core
37. Deep moonquakes may be caused by:
- Thermal expansion of rock
 - Stresses caused by the Earth's gravity
 - Meteorite impact
 - Movement of magma
38. P-waves can travel through the entire Earth.
- True
 - False
39. What triggered the Space Race?
- World War II
 - The war in Vietnam
 - Soviet Luna mission
 - Soviet launch of the Sputnik satellite
40. How long has it been since astronaut Neil Armstrong first set foot on the Moon?
- ~67 years
 - ~47 years
 - ~37 years
 - ~27 years
41. Why do we always see the same side of the Moon from the Earth?
- Because the far side is always dark.
 - Because the Moon's orbit is an ellipse.
 - Because the Moon rotates on its own axis once for every time it orbits the Earth
 - All of the above
 - None of the above
42. Which statement best describes the Moon's orbit.
- The Moon orbits the Earth
 - The Moon and Earth both orbit around a common point
 - The Moon does not orbit the Earth
 - The Earth rotates making it appear that the Moon moves
43. Which side of the moon has higher elevation and thicker crust?
- Near side
 - Far side

44. Which feature on the Moon's surface is the youngest?
- Tycho Crater
 - Mare Imbrium
 - Lunar highlands
 - Meteor Crater
45. Although there are several reasons the Big Island of Hawaii is sinking into the ocean, the most important process is:
- Erosion of the top
 - Sinking into the underlying mantle as erosion occurs
 - Sinking along with the aging and cooling seafloor on which it sits
46. In scientific usage, the term "theory" is used to describe concepts that are:
- Backed by substantial evidence and mostly without contradiction
 - Speculative and among several competing ideas
 - Highly speculative
47. The lunar terminator is:
- The line between night and day on the Moon
 - The event that marks the total solidification of the Moon's interior and the end of convection
 - The anticipated time when expansion of the Sun will reach the orbit of the Moon and destroy the Moon
48. What is the second planet from the Sun?
- Venus
 - Mars
 - Mercury
 - Uranus
49. The Earth's seasons are caused by
- The changing distance to the Sun along the Earth's orbit
 - The tilt of the Earth's axis of rotation relative to the ecliptic plane
50. Today, the Moon is thought to have formed:
- When the Earth captured a passing Mars-sized object
 - As the result of a large object that collided with the Earth
 - When the Earth ejected the mass of the Moon because of instabilities caused by fast rotation
 - As a sister planet to Earth
51. If it is true that the Moon has lower iron content than the Earth – that observation is best explained if the Moon forms by:
- Impact ejecta from the surface of the Earth after the Earth differentiates
 - Impact ejecta from the surface of the Earth before the Earth differentiates
52. If it is true that there are fewer craters on the surfaces of maria than the highlands – that observation is best explained by:
- A substantial increase in the rate of impacts over time
 - A substantial decrease in the rate of impacts over time
53. Which body has more volcanoes?

- The ocean tides on Earth are caused by:
- Gravitational attraction exerted by the Moon on the Earth
 - Centrifugal force produced by revolution of the Earth-Moon system
 - Both
 - Neither
65. In San Diego, tidal forces result in:
- One high and low tide per day
 - Two high and low tides per day
66. The same tidal forces that are exerted on seawater are exerted on underlying rock.
- True
 - False
67. A spring tide occurs when tidal forces are at:
- An annual extreme
 - A monthly extreme
 - A daily extreme
 - A daily minimum
68. The term perihelion refers to:
- The point in an orbit farthest from the Sun
 - The point in an orbit closest to the Sun
69. Which does NOT occur at an impact site?
- Minerals that are high pressure forms of SiO_2
 - Rock that solidified from a molten state
 - A crater floor that is at a substantial elevation above surrounding ground
 - Rocks composed of angular chunks of broken rock - breccia
70. When describing distances between objects that lie within our solar system, which convenient unit is commonly used?
- An astrological unit
 - An astronomical unit
 - A light year
 - The Earth's radius
71. The Milky Way is an example of a:
- Universe
 - Galaxy
 - Nebula
 - Solar system
72. Stars form by the gravitational contraction of clouds and dust within a:
(Choose the most specific answer.)
- Universe
 - Galaxy
 - Nebula
 - Solar system
73. The elements that make up nearly all of the material in interstellar space and our Sun are:
- Hydrogen and carbon
 - Helium and silicon
 - Hydrogen and helium
 - Silicon and oxygen
74. As nebula begin to undergo gravitational contraction and flatten into a disk, they:

- a. Spin faster and heat up b. Spin more slowly and heat up
c. Spin faster and cool d. Spin more slowly and cool
75. Much of the Sun's energy is produced by:
a. The fusion of helium atoms to produce hydrogen
b. The fusion of hydrogen atoms to produce helium
76. Atoms of elements larger than iron are formed:
a. By ongoing processes within the interiors of rocky planets
b. By ongoing processes within the interior of our Sun
c. As a result of explosive forces that are only possible during supernovas
77. Which condition favors the condensation of interstellar gas into a liquid or a solid?
a. Higher temperatures b. Lower temperatures
78. The accumulation of solids and dust due to gravitational attraction is called:
a. Accretion b. Condensation
c. Bombardment d. Differentiation
79. Which of the following is NOT a substantial source of heat in the Earth's interior?
a. Radioactive decay b. Solar radiation
c. Infalling of denser materials
80. Which conditions favored early depletion of volatile gases from the inner planets?
a. Strong solar winds, more massive planetary size, lower temperatures far from the Sun
b. Strong solar winds, less massive planetary size, higher temperatures close to the Sun
81. In addition to outward expulsion by strong solar winds, most planets have swept their orbital paths clear of debris by accretion.
a. True b. False
82. The shape of planetary orbits around the Sun are:
a. Circles b. Ellipses
c. Parabolas d. Ovals
83. All the planets (excluding Pluto) orbit the Sun in the same direction and in nearly the same plane of orbit.
a. True b. False
84. The time that it takes for the Earth to orbit the Sun once is:
a. A day b. Approximately one month
c. A year d. 4 years and $\frac{1}{4}$ of a day
85. The Earth moves faster around the Sun when:
a. It passes closer to the Sun b. When it passes farther away from the Sun

86. What did Kepler do?
- He gave clear evidence that the Earth must be orbiting the Sun
 - He described how the planets orbit the Sun - describing their orbital speeds, orbital paths and the time it takes for one orbit
 - He explained the physics behind why the Earth orbits the Sun in the way that it does
87. Density is defined as:
- Mass per unit of distance
 - Weight per unit of volume
 - Mass per unit of volume
 - Weight per unit of pressure
88. Which object has the lower average density?
- Earth
 - Moon
89. The Moon's radius is roughly 1/4 the radius of the Earth. What is the ratio of the Earth's volume relative to that of the Moon? (Select the closest answer)
- 10:1
 - 50:1
 - 100:1
 - 1000:1
90. When a scientist expresses a scientific opinion regarding a question (their thinking), it is intended to be:
- Based on logical conclusions drawn from documented evidence
 - Based on synthesis and consideration of existing knowledge
 - The best idea that an individual has at that time
 - Given with the understanding that a good answer will stand up to challenges based on the scientific thinking of others, and that their ideas may be refined by those challenges
 - All of the above
91. How old is the Sun?
- ~ 13 billion years
 - ~ 4.5 billion years
 - ~ 4.5 million years
 - ~ 180 million years
92. How do we know that the materials in our solar system have undergone expulsion by previous supernovas?
- The existence of elements larger than iron on Earth
 - The existence of meteorites and asteroids in the solar system
 - The dominance of hydrogen and iron in our Sun
93. What is the radius of the Earth?
- ~ 6,500 km
 - ~ 65,000 km
 - ~ 65 million km
 - ~ 65 billion km
94. Where do you find the oldest rocks on Earth?
- In continents
 - In the seafloor

95. What happened to the interior of the Earth as a result of planetary differentiation?
- a. Materials separated into layers of different mechanical properties
 - b. Materials separated into layers of different composition based on density
96. For differentiation to take place, what did the Earth need to undergo?
- a. Earthquakes
 - b. Impact with a Moon-sized object
 - c. Melting of the interior
97. The compositional layer of the Earth that lies underneath the crust is called the:
- a. Mantle
 - b. Outer core
 - c. Inner core
 - d. Asthenosphere
98. How much of the asthenosphere is molten?
- a. All
 - b. None
 - c. Part
 - d. Most
99. The layer of the Earth that makes up its outer mobile plates is called the:
- a. Continental crust
 - b. Oceanic crust
 - c. Lithosphere
 - d. Asthenosphere
100. Which features can be found at a subduction zone on Earth?
- a. Trench, hotspot volcanic chain, earthquakes
 - b. Trench, volcanic arc, earthquakes
 - c. Midocean ridge, hotspot volcanic chain
 - d. Transform fault, trench, volcanic chain

YOU ARE DONE!