

## **ERTH 01: The Planets**

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

12. Which feature on the Moon's surface is the youngest?
- Tycho Crater
  - Mare Imbrium
  - Lunar highlands
  - Meteor Crater
13. 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
14. 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
15. 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
16. What is the second planet from the Sun?
- Venus
  - Mars
  - Mercury
  - Uranus
17. 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
18. 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
19. 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
20. 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



32. 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
33. In San Diego, tidal forces result in:
- One high and low tide per day
  - Two high and low tides per day
34. The same tidal forces that are exerted on seawater are exerted on underlying rock.
- True
  - False
35. A spring tide occurs when tidal forces are at:
- An annual extreme
  - A monthly extreme
  - A daily extreme
  - A daily minimum
36. The term perihelion refers to:
- The point in an orbit farthest from the Sun
  - The point in an orbit closest to the Sun
37. Which does NOT occur at an impact site?
- Minerals that are high pressure forms of  $\text{SiO}_2$
  - 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
38. 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
39. The Milky Way is an example of a:
- Universe
  - Galaxy
  - Nebula
  - Solar system
40. Stars form by the gravitational contraction of clouds and dust within a:  
(Choose the most specific answer.)
- Universe
  - Galaxy
  - Nebula
  - Solar system
41. 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

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

53. The Earth moves faster around the Sun when:  
 a. It passes closer to the Sun      b. When it passes farther away from the Sun
54. What did Kepler do?  
 a. He gave clear evidence that the Earth must be orbiting the Sun  
 b. He described how the planets orbit the Sun - describing their orbital speeds, orbital paths and the time it takes for one orbit  
 c. He explained the physics behind why the Earth orbits the Sun in the way that it does
55. Density is defined as:  
 a. Mass per unit of distance      b. Weight per unit of volume  
 c. Mass per unit of volume      d. Weight per unit of pressure
56. Which object has the lower average density?  
 a. Earth      b. Moon
57. 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)  
 a. 10:1      b. 50:1  
 c. 100:1      d. 1000:1
58. Under ideal circumstances, when a scientist expresses a scientific idea or opinion (their thinking) regarding a question of interest, their answer is expected to be:  
 a. Based on logical conclusions drawn from documented evidence  
 b. Based on synthesis and consideration of existing knowledge  
 c. The best idea that an individual has at that time  
 d. 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  
 e. All of the above
59. How old is the Sun?  
 a. ~ 13 billion years      b. ~ 4.5 billion years  
 c. ~ 4.5 million years      d. ~ 180 million years
60. How do we know that the materials in our solar system have undergone expulsion by previous supernovas?  
 a. The existence of elements larger than iron on Earth  
 b. The existence of meteorites and asteroids in the solar system  
 c. The dominance of hydrogen and iron in our Sun
61. What is the radius of the Earth?  
 a. ~ 6,500 km      b. ~ 65,000 km  
 c. ~ 65 million km      d. ~ 65 billion km
62. Where do you find the oldest rocks on Earth?  
 a. In continents      b. In the seafloor

63. What happened to the interior of the Earth as a result of planetary differentiation?
- Materials separated into layers of different mechanical properties
  - Materials separated into layers of different composition based on density
64. For differentiation to take place, what did the Earth need to undergo?
- Earthquakes
  - Impact with a Moon-sized object
  - Melting of the interior
65. The compositional layer of the Earth that lies underneath the crust is called the:
- Mantle
  - Outer core
  - Inner core
  - Asthenosphere
66. How much of the asthenosphere is molten?
- All
  - None
  - Part
  - Most
67. The layer of the Earth that makes up its outer mobile plates is called the:
- Continental crust
  - Oceanic crust
  - Lithosphere
  - Asthenosphere
68. Which features can be found at a subduction zone on Earth?
- Trench, hotspot volcanic chain, earthquakes
  - Trench, volcanic arc, earthquakes
  - Midocean ridge, hotspot volcanic chain
  - Transform fault, trench, volcanic chain
69. Seafloor spreading takes place at:
- Hawaii
  - East Pacific Rise
  - Aleutian trench
  - San Andreas Fault
70. New seafloor is currently being produced at:
- Aleutian Trench
  - East Pacific Rise
  - Mid-Atlantic Ridge
  - East Pacific Rise and the Mid-Atlantic Ridge
  - None of the above
71. Which ocean is currently shrinking in size?
- Pacific Ocean
  - Atlantic Ocean
72. As you move away perpendicular to the crests of midocean ridges, the age of the seafloor:
- Stays the same
  - Is younger
  - Is older
  - Is more complex
73. Excluding areas within a few hundred miles of coasts, the shallowest areas of the seafloor are located:
- Nearest the coast
  - At midocean ridges
  - In the centers of oceans
  - Along trenches



85. How often does the Earth's magnetic field reverse?
- Regularly every hundreds of years
  - Regularly every millions of years
  - Irregularly every millions of years
86. Reversals of the Earth's magnetic field are recorded in its:
- Outer core
  - Mantle
  - Oceanic crust
  - Continental crust
87. The pattern of magnetization on the seafloor occurs in thick and thin stripes:
- Parallel to the midocean ridge
  - Perpendicular to the midocean ridge
88. A wide normal paleomagnetic stripe could be formed by:
- Long duration of normal polarity
  - Short duration of normal polarity
  - Slower rate of formation of seafloor during normal polarity
89. Does the Moon has a strong magnetic field?
- Yes
  - No
90. The extent of the North American plate is:
- The area of North America plus the adjacent continental shelf areas
  - The area of North America and its adjacent continental shelves, plus the North Atlantic Ocean on the west side of the Mid-Atlantic Ridge
91. Is San Diego situated on the same plate as Las Vegas?
- Yes
  - No
92. Where new oceans open by the initiation of seafloor spreading, this helps the planet to:
- Maintain its rotation
  - Release interior heat
  - Heat its interior
  - Deflect the solar wind
93. Cascadia is a tectonically active region. What happens there?
- It is an active spreading center and a location of flood basalts through fissures.
  - It is an active transform boundary and a location of volcanism and possible tsunamis.
  - It is an active subduction zone and a location of volcanism and possible tsunamis.
  - It is an active hotspot and a location of large shield volcanoes.
  - It is a dead subduction zone and therefore a location with no potential for tsunamis.
94. The thickness of a typical plate is:
- 5 km
  - 100 km
  - 6,00 km
  - 6,500 km

95. Water fills the oceans because:
- a. The rocks that make up the seafloor happen to be lower in elevation than continents
  - b. Oceanic crust releases water from midocean ridges
  - c. Oceanic crust attracts more water than continental crust because of its greater density
96. There is little subduction around:
- a. The Pacific
  - b. The Atlantic
97. Large areas of rock within the Earth typically begin to melt
- a. Below 10 m
  - b. Below 100 km
  - c. Below 700 km
  - d. Below 8,000 km
98. What kind of eruption flooded the lunar maria?
- a. Shield volcano
  - b. Fissure eruption
  - c. Composite volcano
  - d. Hotspot volcanism
99. Which line of evidence does not support this deduction - that the core of the Earth is made of iron? (Assume that all of the given statements are true.)
- a. Because iron is known to be a relatively common element in the solar system
  - b. Because the Earth has a magnetic field
  - c. Because the Earth's total mass is underestimated when you assume that its average density is similar to that of basalt
100. Compared with the Earth, the Moon has unusually:
- a. Low iron content
  - b. High iron content

YOU ARE DONE!