

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. When describing distances between objects that lie within our solar system, which convenient unit is commonly used?
 - a. An astrological unit
 - b. An astronomical unit
 - c. A light year
 - d. The Earth's radius

2. The Milky Way is an example of a:
 - a. Universe
 - b. Galaxy
 - c. Nebula
 - d. Solar system

3. Stars form by the gravitational contraction of clouds and dust within a: (Choose the most specific answer.)
 - a. Universe
 - b. Galaxy
 - c. Nebula
 - d. Solar system

4. The elements that make up nearly all of the material in interstellar space and our Sun are:
 - a. Hydrogen and carbon
 - b. Helium and silicon
 - c. Hydrogen and helium
 - d. Silicon and oxygen

5. 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

6. 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

7. 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

8. Which condition favors the condensation of interstellar gas into a liquid or a solid?
 - a. Higher temperatures
 - b. Lower temperatures

9. The accumulation of solids and dust due to gravitational attraction is called:
 - a. Accretion
 - b. Condensation
 - c. Bombardment
 - d. Differentiation

10. 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

11. 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

22. How old is the Sun?
- | | |
|------------------------|------------------------|
| a. ~ 13 billion years | b. ~ 4.5 billion years |
| c. ~ 4.5 million years | d. ~ 180 million years |
23. 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
24. What is the radius of the Earth?
- | | |
|--------------------|--------------------|
| a. ~ 6,500 km | b. ~ 65,000 km |
| c. ~ 65 million km | d. ~ 65 billion km |
25. Where do you find the oldest rocks on Earth?
- | | |
|------------------|--------------------|
| a. In continents | b. In the seafloor |
|------------------|--------------------|
26. 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
27. 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 | |
28. The compositional layer of the Earth that lies underneath the crust is called the:
- | | |
|---------------|------------------|
| a. Mantle | b. Outer core |
| c. Inner core | d. Asthenosphere |
29. How much of the asthenosphere is molten?
- | | |
|---------|---------|
| a. All | b. None |
| c. Part | d. Most |
30. 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 |
31. 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

32. Seafloor spreading takes place at:
- | | |
|--------------------|----------------------|
| a. Hawaii | b. East Pacific Rise |
| c. Aleutian trench | d. San Andreas Fault |
33. 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 | |
34. Which ocean is currently shrinking in size?
- | | |
|------------------|-------------------|
| a. Pacific Ocean | b. Atlantic Ocean |
|------------------|-------------------|
35. 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 |
36. 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 |
37. 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 |
38. 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 |
39. Does plate motion occur on the Moon?
- | | |
|--------|-------|
| a. Yes | b. No |
|--------|-------|
40. Which material has the greater density?
- | | |
|-------------|------------------|
| a. Basalt | b. Mantle |
| c. Andesite | d. Oceanic crust |
41. 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 |
42. 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 |

54. Is San Diego situated on the same plate as Las Vegas?
- Yes
 - No
55. 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
56. 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.
57. The thickness of a typical plate is:
- 5 km
 - 100 km
 - 6,00 km
 - 6,500 km
58. Water fills the oceans because:
- The rocks that make up the seafloor happen to be lower in elevation than continents
 - Oceanic crust releases water from midocean ridges
 - Oceanic crust attracts more water than continental crust because of its greater density
59. There is little subduction around:
- The Pacific
 - The Atlantic
60. Large areas of rock within the Earth typically begin to melt
- Below 10 m
 - Below 100 km
 - Below 700 km
 - Below 8,000 km
61. What kind of eruption flooded the lunar maria?
- Shield volcano
 - Fissure eruption
 - Composite volcano
 - Hotspot volcanism
62. 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.)
- Because iron is known to be a relatively common element in the solar system
 - Because the Earth has a magnetic field
 - Because the Earth's total mass is underestimated when you assume that its average density is similar to that of basalt
63. Compared with the Earth, the Moon has unusually:
- Low iron content
 - High iron content

64. How if the unseen deep interior of the Earth imaged?
- Electromagnetic radiation
 - Seismic (earthquake) waves
 - Sonar
 - Drilling
65. The velocity of both P- and S-waves drop as they pass through:
- Denser rock
 - Solid rock
 - Rocks at greater depth
 - Molten rock
66. Along subduction zones, strong earthquakes occur at unexpectedly:
- Deep depths
 - Shallow depths
67. Most earthquakes (on Earth) are generated:
- Within the lithosphere
 - Within the asthenosphere
 - Within the mantle
 - Within the core
68. Deep moonquakes may be caused by:
- Thermal expansion of rock
 - Stresses caused by the Earth's gravity
 - Meteorite impact
 - Movement of magma
69. P-waves can travel through the entire Earth.
- True
 - False
70. What triggered the Space Race?
- World War II
 - The war in Vietnam
 - Soviet Luna mission
 - Soviet launch of the Sputnik satellite
71. How long has it been since astronaut Neil Armstrong first set foot on the Moon?
- ~67 years
 - ~47 years
 - ~37 years
 - ~27 years
72. 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
73. 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
74. Which side of the moon has higher elevation and thicker crust?
- Near side
 - Far side

75. Which feature on the Moon's surface is the youngest?
- Tycho Crater
 - Mare Imbrium
 - Lunar highlands
 - Meteor Crater
76. 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
77. 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
78. 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
79. What is the second planet from the Sun?
- Venus
 - Mars
 - Mercury
 - Uranus
80. 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
81. 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
82. 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
83. 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
84. Which body has more volcanoes?

- a. Gravitational attraction exerted by the Moon on the Earth
 - b. Centrifugal force produced by revolution of the Earth-Moon system
 - c. Both
 - d. Neither
96. In San Diego, tidal forces result in:
- a. One high and low tide per day
 - b. Two high and low tides per day
97. The same tidal forces that are exerted on seawater are exerted on underlying rock.
- a. True
 - b. False
98. A spring tide occurs when tidal forces are at:
- a. An annual extreme
 - b. A monthly extreme
 - c. A daily extreme
 - d. A daily minimum
99. The term perihelion refers to:
- a. The point in an orbit farthest from the Sun
 - b. The point in an orbit closest to the Sun
100. Which does NOT occur at an impact site?
- a. Minerals that are high pressure forms of SiO_2
 - b. Rock that solidified from a molten state
 - c. A crater floor that is at a substantial elevation above surrounding ground
 - d. Rocks composed of angular chunks of broken rock - breccia

YOU ARE DONE!