

Answer all questions in the space provided. If you have any questions, raise your hand. 100 points possible. No calculators or electronic devices of any type.

1 (2 pts) A world that is composed of only rock would have a density of about

- (a) 3 atm
- (b) 3 km
- (c) 3 %
- (d) 3 g/cm³

2 (2 pts) A billion is _____ than a million.

- (a) a 100 times smaller
- (b) a 100 times larger
- (c) a 1,000 times smaller
- (d) a 1,000 times larger

3 (2 pts) A typical size for a world in the inner solar system is

- (a) 10's of meters
- (b) 1,000's of km
- (c) 1,000's of g/cm³
- (d) 10's of atm

4 (2 pts) The Albedo of basalt is about

- (a) 3 g/cm³
- (b) 0.10
- (c) 1 atm
- (d) 0.40

5 (2 pts) As you move up from the surface of the Earth, the atmospheric pressure

- (a) increases
- (b) decreases
- (c) remains unchanged

6 (2 pts) The atmospheric pressure on the surface of the Moon is

- (a) 1 atm
- (b) 0 atm
- (c) 90 atm
- (d) 0.006 atm

7 (2 pts) The mare surfaces of the Moon, Mars, and Mercury have an age of about

- (a) 3.5 Myrs
- (b) 3.5 g/cm³
- (c) 3.5 atm
- (d) 3.5 Byrs

8 (2 pts) A world that is *undifferentiated* would have a Moment-of-Inertia of about

- (a) 3 g/cm³
- (b) 4.5 Byrs
- (c) 1 AU
- (d) 0.4



9 (4 pts) What is the evidence that Mercury was geologically active in the past.

10 (4 pts) Currently, the planet Mercury has no atmosphere. However, when it was geologically active, it released gasses. What gasses would have been released?

11 (6 pts) Explain why Mercury did not hold onto its atmosphere even though its escape velocity is nearly the same as Mars'.

12 (4 pts) Explain why Mars has no oxygen (O_2) in its atmosphere.



13 (8 pts) Explain why we think the Earth and Moon formed from the same collection of highly heated materials.

14 (8 pts) Explain why you would **not** use a radioactive element with a half-life of 1,000 years to determine the age of a lunar rock.



15 (8 pts) Explain why a world twice as large as the Moon could have the same gravity as the Moon.

16 (8 pts) Explain why a world twice as large as the Moon would have more ghost craters than the Moon.



17 (4 pts) Describe the *Crater Population* on the surface of the Moon.

18 (4 pts) Describe the *Crater Population* on the surface of Venus.

19 (8 pts) The Earth has only a few impact craters visible on its surface. Yet we believe that in the past the Earth was covered by impact craters. Explain why we believe the Earth was **heavily** bombarded in the past?



20 (8 pts) Explain how both human and robot missions to the planets sampled materials from deep under a surface without having to waste time digging.

21 (8 pts) If you know an asteroid is going to hit the Earth, explain why you do **not** want to break it into many pieces (blow it up).

