**Sample Science Questions (2015 – 2016)**

**Earth and Space Science**

1. What evidence would NOT support the giant impact hypothesis for the formation of the moon?
2. The Moon’s composition is similar to Earth’s crust and mantle.
3. The Moon has a small percentage of iron compared with Earth.
4. Percentages of isotopes in lunar rock are indistinguishable from those in Earth’s rock.
5. Asteroids show evidence of impact melting 100 million years after solar system formation.
6. Carbon-14 has a half-life of 5730 years. If the initial sample had 10 g of material, how many grams of carbon-14 will remain after 17,190 years?
7. 1.7
8. 5.0
9. 1.25
10. None.
11. True or False: Increased water vapor in the atmosphere due to increased temperatures is a positive climate feedback.
12. True or False: The average temperature of Earth is the highest it’s been in a million years.
13. True or False: The present *rate* of warming is the highest observed or estimated in Earth’s history.
14. What statement best describes ocean pH and how it is changing?
15. Ocean pH is almost neutral but becoming more acidic.
16. Ocean pH is basic (> 7.0) but is getting lower (more neutral).
17. Ocean pH is acidic (< 7.0) and getting lower (more acidic).
18. Ocean pH is almost neutral but becoming more basic.
19. None of the above.
20. True or False: Ocean pH has changed by at least 10% in the last century due to increased CO2 in the atmosphere.
21. True or False: A large amount of carbon has been removed from Earth’s surface and atmosphere over geologic time scales by burying it in Earth’s mantle.
22. True or False: Melting of glaciers and floating sea ice is the main cause of sea-level rise over the last century.
23. True or False: Based on current rates of sea-level rise, oceans are expected to rise a meter or more by 2100.
24. At current atmospheric densities, the strongest greenhouse gas is
25. carbon dioxide
26. nitrogen
27. water vapor
28. methane
29. sulfur dioxide

**Physics**

1. A puck is gliding across an ice rink at a constant speed. What is the best description of what happens to the kinetic (KE), potential (PE), and total mechanical energy (E)?
2. KE decreases, PE stays the same, E decreases
3. KE stays the same, PE decreases, E stays the same
4. All three stay the same.
5. KE increases, PE decreases, E stays the same
6. KE stays the same, PE increases, E increases
7. A rock falls by gravity from the top of a cliff to the bottom of a valley. During the fall, what is the best description of what happens to the kinetic (KE), potential (PE), and total mechanical energy (E)?
8. KE decreases, PE stays the same, E decreases
9. KE stays the same, PE decreases, E stays the same
10. All three stay the same.
11. KE increases, PE decreases, E stays the same
12. KE stays the same, PE increases, E increases
13. True or False: When a child bounces on a trampoline (i.e., during the contact time), the child’s total mechanical energy is constant.
14. A flower pot is hanging from a chain attached to the ceiling. List all the forces acting *on* the chain.
15. A janitor exerts a forward force on a push-broom as it moves across the floor at a constant speed. What description best represents what is happening?
16. A force exerted on an object always causes it to move at a constant speed.
17. There must be another force opposing the first one to make the net force on the broom equal to zero.
18. The janitor must be slowly reducing the strength of the forward force.
19. The janitor is nor really exerting a force on the broom; the two are simply moving together.
20. 100 grams of water at room temperature (T = 20 degrees Celsius) are added to an insulated container with 20 grams of boiling water (T = 100 degrees Celsius). What is the final temperature once the two liquids reach equilibrium?
21. 25 C
22. 33.3 C
23. 60 C
24. 66.7 C
25. 80 C