**Final Exam Review Intro to Physical Science**

Terms: Define each of the following terms from your notes or homework readings.

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| Matter  Properties  Apparent Density  Density  Element  Compound  Valance Electrons  Atom  Bohr Diagram  Ion  Lewis Dot Model  Cation  Anion  Covalent Bonds  Ionic Bond  Reactant  Product  Reactive  Combustion  Combining capacity  Chemical Change  Physical Change  Buoyancy  Archimedes’ Principle | Instantaneous Position  Frame of Reference  Vector  Scalar  Deceleration  Distance  Acceleration  Average Speed  Position  Time Interval  Displacement  Force  Tension Force  Normal Force  Newton’s Laws –list all three  Force Diagram  Mass  Gravity  Weight  Static Friction  Dynamic Friction  Energy  Kinetic Energy  Potential Energy  Joule (J) |

**Part 2: Problems: CHECK TO MAKE SURE THE UNITS MATCH!** If they do not match use your Dimensional Analysis skills to convert the units to the necessary form.

1. The earthquake in Japan generated waves in the oceans that traveled at 500 miles/hour. If it is 5,000 miles from Japan to Washington, how long would it take for the waves to get to the Washington coast? EXTRA CREDIT: convert to m/s.
2. Rocket-powered sleds are used to test the responses of humans to acceleration. Starting from rest, one sled can reach a speed of 444m/s in 1.8 seconds. What is the uniform acceleration?
3. A driver slams on the breaks to avoid hitting a bunny on the road. The car was traveling at 60 m/s and stopped 10 seconds later? What is the uniform deceleration?
4. What is the uniform acceleration of a train from rest to 30m/s over 120 seconds?
5. Your family decides to go on vacation and you want to know which car to travel in because one is going to get their first and you want to be in that car. Your parents drive at 50 miles/hour for 750 miles. Your aunt and uncle travel at 60 miles/hour, but take the scenic route and travel for 1200 miles. Which one gets there first?
6. At 1:22PM a plane leaves the runway and at 1:44 the airplane has reached its cruising speed of 520m/s. What is the acceleration? (HINT: find the time in minutes and convert to seconds.)
7. If a car traveling has a mass of 3,200 kg and a µ of 1.9. What is the friction force? (hint: convert the mass to weight=FN)
8. The force of friction is 124 N and the normal force is 235 N. What is µ?
9. A 100 kg biker is traveling at 4m/s before she starts down a hill. By the time she has reached the bottom of the hill only 20 seconds later she is traveling at 8 m/s. What is her force?
10. A 25,000 kg train car is traveling along at the speed limit of 40m/s and slows down to 10m/s. It takes the train car a grand total of 5 minutes to do this. What is the force? (Hint: convert the minutes to seconds)
11. A 1.5 kg ball is dropped from the roof to the ground. When the ball reaches the ground it is traveling at 10m/s and it takes only 1 second to fall. What is the force of the ball?
12. You are waterskiing with your uncle and give him the signal to speed up and you go from 3m/s to 6m/s in 30 seconds. What is your net force?
13. A 10,000 kg train at rest leaves the station at noon and at 12:03 is traveling at 15 m/s. What is the force of the train? (Hint: find out how many minutes it takes and convert those to seconds.)
14. A hydropower plant uses 1 kilogram of water traveling at 10 m/s. What is the kinetic energy that can be generated?
15. The kinetic energy produced in question 12 is the energy produced every second. How much energy would be produced in 1 minute? 1 hour? 1 day?
16. Your idiot brother throws a 0.5 kg rock up into the air up to a height of 3 meters before trying to catch it with his head. What is the potential energy when the rock is at its highest point? What is the kinetic energy when the rock hits him in the face? If it takes energy of 200 J to knock a tooth out, will he loose his tooth?
17. How many seconds are there in a year?
18. How many millimeters are present in 20.0 inches?
19. Your car’s gas tank holds 18.6 gallons and is one quarter full. Your car gets 16 miles/gal. you see a sign saying, “Next gas 73 miles.” Your often-wrong brother, who is driving, is sure you’ll make it without running out of gas. You’re not so sure and do some quick figuring. Will you make it?
20. Draw a Lewis Dot diagram for the following elements: Pb, Bi, I, Ga, Rb, H, S
21. Draw a Bohr diagram for the following elements: Li, Be, P, Cl, Al, Na, He
22. List the name, atomic mass, number of protons, number of electrons, number of neutrons, valance electrons, ionic charge, family: Cs, Sr, At, Sb, P, Si, F, He
23. A wood block with a volume of 9 cm3 weighs just 13 grams. What is the density?
24. A new oil has been discovered and weighs 49 grams and has a volume of 42 cm3?
25. What is the density of water if it weighs 53 grams and has a volume of 53 cm3?
26. Will this new oil float or sink if placed in a container with water? Explain.
27. The classroom has a volume of 450,000 cm3 and the combined weight of the materials is 200,000 g. What is the density of the room? 7 students each weighing 50,000g walk into the classroom, what is the new density of that room?
28. A block of wood has a length of 2cm, a width of 3cm, and a height of 5cm. The scale reading is 45 grams. What is the density of the block of wood?
29. Keeping in mind that items with a lesser density will float on items with a greater density, put the following items in order from most dense to least dense.

|  |  |  |
| --- | --- | --- |
| Item | Density (g/cm3) | Order |
| Oil | 0.9 |  |
| Sucrose | 2.3 |  |
| Water | 1 |  |
| Vitamin Water | 1.1 |  |
| Soda | 2.9 |  |
| Orange Juice | 2.5 |  |
| Starch Water | 3.3 |  |

1. What is the mass of corn syrup in a 150mL container? The density of corn syrup is 1.986g/mL.
2. What is the volume of water that would be displaced when a 250g mass is lowered into the water? The density of this unknown object is 2.366g/mL.
3. A different mass weighting less at 200g has a density of 3.654 g/mL. How much water would be displaced? Which mass (question 10 or 11) has the greater volume of water displaced?

Circle the products and underline the reactants of the chemical reaction. Balance the chemical reaction.

\_\_\_\_\_ Pb(NO3)2 + \_\_\_\_\_K2CrO4 🡪 \_\_\_\_\_KNO3 + \_\_\_\_\_PbCrO4

\_\_\_\_\_Ca(OH)2 + \_\_\_\_\_HF 🡪 \_\_\_\_\_H2O + \_\_\_\_\_CaF2

Atomic Inventory

|  |  |  |
| --- | --- | --- |
| Formula | E or C | Atomic Inventory |
| O2 |  |  |
| 2K2SO4 |  |  |
| NaCN |  |  |
| 4(NH4)2CrO4 |  |  |
| Al2(SO4)3 |  |  |
| 2Au2O |  |  |
| I2 |  |  |

What does each symbol mean in a chemical reaction?

|  |  |
| --- | --- |
| Symbol | Meaning |
| (s) |  |
| (l) |  |
| (g) |  |
| (aq) |  |