Water/Chemistry Benchmark Review

Water

Chapter 1

1. Water can exist as a ___***solid***_____, _____***liquid***_____, and _____***gas***____ on Earth.
2. Freshwater makes up ___***3***____% of all the water on Earth. Saltwater makes up __***97***__% of all water on Earth.
3. ___***Impermeable***_____substances stop water from flowing through. EXAMPLES: cement, marble
4. 2/3 of all freshwater is found frozen (_***solid***__ state) in _***icebergs*** __ or ___***glaciers***_____.
5. ____***Evaporation_, _Condensation***_, and _***Precipitation***_are all parts of the water cycle.
6. When temperature _***increases***__,water changes from a liquid to a gas. This is called __***evaporation***____.
7. The top portion of an aquifer that is saturates with water is called a(n) ___***water table***_____.
8. Water molecules stick to other water molecules in ___***cohesions***_____.
9. When the temperature ___***decreases***_, water changes from a gas to a liquid. This is called _***condensation***__.
10. __***Permeable***_____ substances allow water to flow through. EXAMPLES: sand and gravel
11. Water is _***polar***_____, or has a negative end and a positive end.
12. Aquifers provide __***freshwater***_____ for humans.
13. Water with no dissolved salts is called ___***freshwater***_____; water with dissolved salt is __***saltwater***_____.
14. Water molecules stick to other types of molecules in ___***adhesion***_____.
15. __***Surface tension***___ is what makes water bead up into drops. It is an attraction between _***polar***__ molecules.
16. If an object is __***less***_____ dense than water it floats, if it is ___***more***_____ dense, it sinks.
17. Water has a ___***high***_____ specific heat, meaning it takes a lot of ___***energy***_____ to heat it up.
18. About __***29***__% of the Earth is covered with land and about _***71***__% of the Earth's surface is covered with water.
19. On Earth, water flows from divides into areas known as __***river basins or watersheds***___.
20. Water that collects and moves beneath Earth's surface is called __***groundwater***_____.
21. As water seeps into the ground, it is stopped by a layer of ___***impermeable rock***_____.
22. The process in which water falls from clouds is called ____***precipitation***_____.
23. A hole that is dug into the ground to extract water from an aquifer is called a(n) _____***well***_____.
24. An increase of nutrients in a lake or pond that causes algae to grow is called _____***eutrophication***_____.
25. On Earth, water that flows off the side of the land and into a drainage basin is known as ___***runoff***_____.
26. An area that determines the direction of water flow is called a(n) ____***divide***_____.
27. _***Buoyancy***_____ is the force that pushes up on an object in liquid (water).
28. __***Turbidity***_____ is how clear the water is.
29. The formula for density is ___***mass / volume***_____. The density of water is __***1 g/mL***___ (include units).
30. What 3 things are needed for an aquifer to form? ***1. A layer of permeable rock, 2. A source of water, 3. A layer of impermeable rock***

Chapter 2

1. _***Dams***_____ are built across rivers to help control the water, but interfere with __***migration of***____ fish.
2. Most people get their water from __***aquifers***_____. How long do they take to form? __***thousands of years***____.
3. Point-source pollution is _***easy***___ to locate. Many ____***laws***____ are put into place to prevent this pollution.
4. The type of pollution that causes most water pollution is __non-point source_____ pollution.
5. An example of __***point source***_____ pollution is an oil spill.
6. An example of __***non-point source***_____ pollution is runoff from nearby farms or yards.
7. We can conserve water in three ways: ___***reduce***____, ____***reuse***_____, and ___***recycle***_____.
8. Two additional sources of fresh water are ___***desalination***__ and __***icebergs***_____.
9. The __***EPA***_____ determines whether the levels of chemicals in the water are safe for human consumption.
10. _***Septic tanks***____ are used to treat wastewater in rural areas.
11. The process of removing salt from salt water is known as __***desalination***_____.
12. Long periods of time with unusually low amounts of precipitation are known as ___***drought***_____.
13. The business of raising and harvesting fish in a controlled setting is called __***aquaculture***____.What are some negative effects of this? ***pollution, expense, removal of water ecosystems to build the aquacultures***
14. The unit for concentration is _***parts per million***__or _***ppm***_____.
15. _***Sewage system***_____ are used to treat wastewater in urban areas.

16. The use of water to grow crops is called __***irrigation***_____.
17. ____***Reduce***_____ and ____***reuse***_____ are the two main solutions to water shortages.
18. The _____***concentrations***_____ of a solution is how much solute has been dissolved in the solvent.
19. _Pollution_ and population __***increase***___ decrease our limited freshwater supplies.
20. The pH of water should be close to __*7*_____.
21. List 2 water quality indicators and explain how they help us tell how safe the water is.
    1.pH (measures how acidic or basic the water is) 2.bioindicators (the more diverse the bioindicators are the healthier the water)
22. Dangerous chemicals are only allowed in low _***concentrations***___ because of the damage they cause.
23. What is the difference between economic water scarcity and physical water scarcity?
    Economic scarcity - people are unable to pay for the water they need or the means to obtain it.
    Physical scarcity - water is not physically available (drought or distance)

Chapter 3

1. The higher the salinity is in ocean water the higher the __***density***_____ will be.
2. The three layers of the ocean based on temperature: ***surface layer, _thermocline layer__, and the __deep layer_***.
3. We use _***sonar***_____ (sound waves) to map out the ocean floor.
4. As you travel further down into the ocean the temperature _***decreases***_____.
5. A ___***current***_____ is a mass of moving water.
6. There are two types of currents ___***surface***_____and_____***deep***_____.
7. _***Deep***_____currents move nutrients to the surface and mix oxygen within the ocean.
8. _***Wind***_____causes surface currents which move _warm___ water away from the equator and __cold___ water away from the poles.
9. _***Heavy***_____rainfall can cause ocean salinity to decrease.
10. Waves in the ocean transfer ____***energy***_____, while currents move __***water***_____.
11. The density of _***fresh***_____water is less than the density of ___***salt***_____water. *(fresh or salt)*
12. __***Gravity***_____ causes the tides in the ocean.
13. Currents distribute ___***heat***_____ and _____***nutrients***_____ around the world.
14. __***Spring***_____tides are extreme tides, __***neap***_____tides are minimal tides.
15. When the sun, the moon, and the earth are not in line you will have ___***neap***_____tide.
16. When the sun, the moon, and the earth are in line you will have ___***spring***_____tide.
17. The difference between high and low tide is called a _____***tidal range***_____.
18. The _***Gulf***___ _***Stream***_____ moves warm water towards Great Britain creating a mild climate.
19. _***Tidal dam***_____ creates electricity from the moving of water during high and low tides.

Chapter 4

1. Organisms that live in the __***intertidal***_____ __***zone***_____ must be able to live in and out of the water.
2. Crabs, shrimp, tubeworms, and bacteria can all call ____***deep***_____ _***ocean***_____ their home.
3. Tiny, plantlike organisms that undergo photosynthesis are called_____***phytoplankton***_____.
4. _***Salt marsh***_____ and____***mangrove fores***t_____ are two types of wetlands.
5. What are Marine Protected Areas and why are they good?

They are areas where fishermen are not allowed to fish. This good because it provides a safe haven for marine life to grow and repopulate.

6. This type of wetland is found in warm tropical regions and is home to many trees:__***mangrove forest***____.
7. Fresh water from ___***rivers***_____ meets salt water from the __***ocean***_____ in environments called__***estuaries***_____.
8. The open ocean is divided into two zones:__***surface zone***____and__***the deep zone***_____.
9. _***Desalination***___ is a nonliving resource that some countries use as their source for drinking water.
10. Coral rely on ___***algae***_____ for food.
11. _***Non-point source pollution***__ is the source of most pollution in the ocean waters.
12. _***Mercury***___is one of the harmful chemicals found in some fish that live in the ocean.
13. A species that has a greater-than-expected effect on an ecosystem is called a __***keystone***_ species. What happens if you remove them? Give an example.

The entire ecosystem could collapse. Example: The loss of algae will destroy coral reefs and thus the habitats and for other fish and other marine life.

14. What are dead zones? What causes them?
    A dead zone is where nothing grows or lives. Pollution.
15. Describe an ocean food web.
    Use example from notes.
16. What kind of water holds more gas? _____***cold ocean water***_____.
17. Why is carbon dioxide important in the ocean?
    Helps plants carry out photosynthesis.
18. Explain how the ocean affects climate. Give examples.
    It's currents carry warmer water and air towards cold climates and makes the climates mild.
19. What is overfishing and why is it a problem?
    When you fish an area too much. This causes the loss of fish populations and by-catch, which affects the ocean ecosystem in that area.
20. What is by-catch?
    The organisms caught in the nets that are not used for commercial use.
21. Why is pollution in one area of the ocean a problem for everyone?
    Because the ocean is connected and it eventually spreads .
22. Explain the process of drilling for oil in the ocean.

- ***First, an oil <u>well</u> must be found in the ocean. When a potential well is found, <u>government</u> permission must be granted for <u>exploratory</u> drilling to see if the oil is actually there and if we can get it out.***
- ***If oil or gas is found, a <u>production</u> well is drilled, and an oil <u>rig</u> is built.***
- ***Initially the <u>pressure</u> from the reservoir of oil is enough to pump it out, but over time, the pressure <u>decreases</u>, and other techniques must be used to help <u>pump</u> it.***
- ***Crude oil obtained from a well is <u>refined</u> at oil refineries onshore.***

23. What are some good things about tourism? Bad things? What about ecotourism?
Tourism helps to build the economy. Down side is it causes pollution and the destruction of ecosystems to build attractions, malls, homes, etc… Ecotourism has a low impact on the environment, which makes it the best type of tourism for the environment.

<u>Chemistry</u>

Section 1: Atomic Structure and the Periodic Table:

1. What are the three particles that make up the atom? What are their charges?
   a. __***protons***_____ = _***positive***_____ charge
   b. __***neutrons***_____ = _***neutral***_(no charge)____ charge
   c. __***electrons***_____ = _***negative***_____ charge
2. What is the difference between atomic number and atomic mass number?
   a. ***Atomic # = number of protons in an atom.***
   b. ***Atomic Mass # = number of protons + neutrons, (It is also the Atomic Mass rounded).***
3. Describe the structure of an atom. Be sure to tell where each particle is located. ***An atom is made up of protons and neutrons (located in the center/nucleus) surrounded by electrons (located in the electron cloud).***
4. Particles with the same charge ___***repel***___ each other, while particles with opposite charges ___***attract***___ each other.
5. What does it mean if an atom is neutral?
   It means that it has no charge because it has the same number of protons and electrons.
6. How do ions form? ***Ions form by losing or gaining electrons.***
7. A positive ion will have more __***protons***____ than ___***electrons***____, but a negative ion will have more ___***electrons***____ than ____***protons***___.

8. What is an isotope? ***An isotope is an atom that has different numbers of neutrons.***
9. Atoms of the same element all have the same number of ***__protons___***.
10. Who organized the elements into the first periodic table? ***Dimitri Mendeelev***
11. What are the 3 types of elements on the periodic table? ***Metals, non-metals, and metalloids***
12. Explain how the Periodic Table is arranged. ***It is arranged by the atomic # of atoms.***
13. The columns (↓) of the periodic table are called ***__groups/families_*** and the rows are called ***_periods__***.
14. Elements in the same group/family have similar ***____characteristics/properties____***.
15. Which group is **least** reactive? ***__Group 18_____***
16. Which groups are **most** reactive? ***__Group 1 and Group 17___***
17. Most elements on the periodic table are ***____metals_____***. At room temperature, most metals are ***_solids___*** and most nonmetals are ***___gases___***.

Section 2: Compounds and Mixtures:

18. Elements and compounds are both ***__pure substances___***.
19. How can the same elements form different compounds? ***By changing the number of elements and arranging them in different ways. Ex. H_2O, H_2O_2***
20. Chemical bonds between atoms involve ***__electrons_____***.
21. The freezing point of a solution is ***__lower_____*** than the freezing point of the pure solvent, and the boiling point is ***____higher_____*** than the boiling point of the pure solvent.
22. How do you increase the solubility of solids? ***By increasing the temperature of the solvent.***
23. How do you increase the solubility of gases? ***By increasing pressure.***
24. The octet rule says that elements will join chemically until they get ***___8___*** valence electrons.
25. A high solubility means a ***_large___*** amount of solute can dissolve in the solvent, while a low solubility means a ***_small__*** amount of solute can dissolve.
26. What is the chemical formula for water? ***_H_2O____***
27. What are the 4 ways to change the rate of a chemical reaction?
    1. Increase temperature
    2. Increase concentration
    3. Increase surface area
    4. Add a catalyst
28. What are the 4 types of evidence of a chemical reaction?
    1. Color change
    2. Temperature change
    3. Gas: bubbles
    4. Formation of a precipitate
29. As a substance goes from a solid, to a liquid, to a gas, density ***____decreases_____***.
30. When acids and bases combine, you get a(n) ***___neutral____*** solution.
31. In a chemical reaction, a new substance is formed when atoms are ***__chemically combined___.***
32. What does the law of conservation of mass say? It states that: ***Mass is neither created or destroyed. The mass you begin with is the mass you end with in a chemical reaction.***
33. When balancing a chemical equation, you can NEVER change the ***__subscript__***, you must change the ***___coefficient____***.

Write the chemical formula for the following compounds. Use the periodic table for help!

34. atom of barium, 2 atoms of oxygen: ***____BaO_2_____***
35. 3 atoms of copper, 2 atoms of chlorine: ***__Cu_3Cl_2_____***

36. 1 atom of sulfur, 4 atoms of oxygen: _____***SO_4***_____

37. 1 atom of potassium, 1 atom of iodine: ____***KI***_____

Element	Symbol	Atomic Mass	Atomic Mass #	Charge	Atomic #	# protons	# neutrons	# electrons
Titanium	Ti	***47.87***	48	(+2)	22	***22***	**26**	***20***
Silver	***Ag***	***107.87***	***108***	***(+2)***	***47***	***47***	***61***	***45***
Antimony	Sb	121.76	***122***	***(-3)***	51	***51***	***71***	***54***
Fluorine	***F***	***19.00***	***19***	***(-1)***	***9***	***9***	***10***	***10***
Carbon	C	***12.01***	***12***	***(+4,-4)***	6	***6***	***6***	***2,10***

Section 2: For each of the following statements, write if the change is physical (P) or chemical (C).

P	38. Slicing bread
C	39. Silver nitrate and potassium iodide forming a yellow precipitate (AgI)
C	40. Freezing an apple with liquid nitrogen
C	41. Burning wood
C	42. Baking Soda and Vinegar forming bubbles

Section 3: True/False: Circle your answer.

True ***False*** 44. All portions of a solution have identical properties.

True ***False*** 45. Solutions, solutes, and solvents can be liquids and solids only.

True **False** 46. A solution that has a pH of 6 is an acid.

True ***False*** 47. A solution that has a pH of 1 is a base.

True **False** 48. When you mix sugar and water together, you have created a solution.

True **False** 49. A solution that has a pH of 7 is neutral.

Section 4: Balancing Equations

50. _***5***__ C + _***2***__ SO_2 → ___ CS_2 + _***4***__ CO **start with Sulfur**

C=	C=
S=	S=
O=	O=

_***4***__ NH_3 + _***3***__ O_2 → _***2***__ N_2 + _***6***__ H_2O

N=	N=
H=	H=
O=	O=

51. _***2***__$AlBr_3$ + _***3***__K_2SO_4 → _***6***_KBr + __$Al_2S_3O_{12}$

Al=	Al=
Br=	Br=
K=	K=
S=	S=
O=	O=