

### Exam #3 ---- (atoms, solids, liquids, gases, etc.)

48. Protons have \_\_\_ charge, neutrons have \_\_\_ charge, and electrons have \_\_\_ charge.

- A. negative; positive; no
- B. positive; no; negative
- C. positive; negative; no
- D. negative; no; positive
- E. no; negative; positive

49. Which of the following is true?

- A. Some atoms do not belong to any particular element.
- B. Some atoms belong to more than one element.
- C. All atoms are identical.
- D. The number of protons in an atom determines which element it is.
- E. The number of neutrons in an atom determines which element it is.

50. The mass of one hydrogen atom is approximately

- A. one atomic mass unit.
- B. two atomic mass units.
- C. 12 atomic mass units.
- D. 16 atomic mass units.
- E. 1/2 atomic mass unit.

51. An element with an atomic number of 92 and an atomic mass number of 238 would have

- A. 92 protons, 146 neutrons, and 92 electrons.
- B. 92 protons, 146 neutrons, and 238 electrons.
- C. 92 protons, 238 neutrons, and 146 electrons.
- D. 146 protons, 92 neutrons, and 92 electrons.
- E. 146 protons, 92 neutrons, and 146 electrons.

52. Brownian motion is the

- A. random motion of microscopic particles being bombarded by even smaller atoms and molecules.
- B. random motion of atoms and molecules being bombarded by larger microscopic particles.
- C. vibration of atoms and molecules in a solid.
- D. movement of electrons circulating within the atom.
- E. very gradual flow of solid materials such as glass over long periods of time.

53. Chemical combinations of elements are called

- A. mixtures.

- B. groups.
- C. shells.
- D. nuclei.
- E. compounds.

54. Which of the following is a list of elements?

- A. hydrogen, nitrogen, air
- B. hydrogen, oxygen, water
- C. hydrogen, oxygen, nitrogen
- D. air, nitrogen, oxygen
- E. water, nitrogen, oxygen

55. Where on the periodic table would we find an element with one more proton and one more electron than silver?

- A. Just above silver.
- B. Just to the left of silver.
- C. Just below silver.
- D. Just to the right of silver.
- E. None of these -- there is no such element.

56. Density is

- A. mass times volume.
- B. mass divided by volume.
- C. mass plus volume.
- D. volume divided by mass.
- E. mass minus volume.

57. 1000 cubic centimeters of water should have a mass of approximately \_\_\_\_ .

- A. 100 grams
- B. 10 grams
- C. 1 gram
- D. 1 kilogram
- E. 1000 kilograms

58. A material is said to be \_\_\_\_ if it changes shape when a deforming force acts on it and returns to its original shape when the deforming force is removed.

- A. elastic
- B. inelastic
- C. plastic
- D. stretchy
- E. rigid

59. Hooke's Law relates the

- A. distance a spring stretches to the force applied to the spring.
- B. distance a spring stretches to the mass of the spring.
- C. distance a spring stretches to the density of the spring.
- D. density of a spring to the force applied to the spring.
- E. density of a spring to the mass of the spring.

60. When the length of each edge of a cube is doubled, the cube's surface area increases by a factor of \_\_\_ .

- A. 2
- B. 4
- C. 6
- D. 8
- E. 16

61. When the length of each edge of a cube is tripled, the cube's volume

- A. increases by a factor of 3.
- B. decreases by a factor of  $1/3$ .
- C. increases by a factor of 9.
- D. decreases by a factor of  $1/9$ .
- E. increases by a factor of 27.

62. The weight of a dome produces

- A. tension forces parallel to the curve of the dome.
- B. compression forces parallel to the curve of the dome.
- C. compression forces perpendicular to the curve of the dome.
- D. tension forces acting vertically.
- E. tension forces acting horizontally.

63. The buoyant force

- A. is the force of gravity acting on a submerged object.
- B. is the difference between a submerged object's weight and the weight of an equal mass of water.
- C. is the net upward force of the surrounding liquid acting on a submerged object.
- D. is the net downward force of a submerged object acting on the surrounding liquid.
- E. depends on the density of the submerged object.

64. The buoyant force on a block of wood floating in water

- A. is equal to the weight of a volume of water with the same volume as the wood.
- B. is equal to the weight of the wood.
- C. is greater than the weight of the wood.
- D. is less than the weight of the wood.

E. cannot be calculated because the block is not completely submerged.

65. An object with a mass of 1 kg displaces 700 ml of water. Which of the following is true?

- A. The weight of this object is 10 N.
- B. The weight of this object is 7 N.
- C. The weight of this object is 3 N.
- D. The buoyant force on this object is 3 N.
- E. The buoyant force on this object is 10 N.

66. An object with a mass of 1 kg displaces 0.6 kg of water. Which of the following is true?

- A. The buoyant force on this object is 10 N.
- B. The buoyant force on this object is 6 N.
- C. The buoyant force on this object is 4 N.
- D. The density of this object is less than that of water.
- E. This object will not sink in water.

67. The water pressure in a lake behind a dam depends on

- A. the volume of lake water behind the dam.
- B. the surface area of the lake.
- C. the distance from the dam at which the pressure is measured.
- D. the depth below the surface at which the pressure is measured.
- E. the number of fish in the lake.

68. When air is removed from a metal can by a vacuum pump, the can buckles inwards and is crushed. This occurs because

- A. the air pressure on the inside of the can is greater than the air pressure on the outside of the can.
- B. the air pressure on the outside of the can is greater than the air pressure on the inside of the can.
- C. the loss of air molecules from inside the can weakens the metal.
- D. the opposite sides of the empty can strongly attract each other.
- E. of Bernoulli's principle.

69. Bernoulli's principle explains why

- A. a hot air balloon rises.
- B. liquid rises in a drinking straw.
- C. airplanes fly.
- D. dead fish float.
- E. submarines can remain submerged.

70. In order to decrease the pressure in an automobile tire, one normally

- A. decreases the temperature of the tire.
- B. increases the volume of the tire.
- C. increases the density of air in the tire.
- D. decreases the number of air molecules in the tire.
- E. decreases the surface area of the tire.

71. According to Boyle's Law, if the volume occupied by a certain gas is doubled,

- A. the pressure of the gas will be doubled.
- B. the pressure of the gas will be quadrupled.
- C. the pressure of the gas will remain constant.
- D. the pressure of the gas will be halved.
- E. the number of atoms in the gas will be halved.

72. Archimedes' Principle states that an object surrounded by air is buoyed up by a force equal to the

- A. weight of the air it displaces.
- B. weight of the object.
- C. total pressure on the object.
- D. difference between the weight of the object and the weight of the air it displaces.
- E. weight of Archimedes.