JP's Physics 101 Test Bank 3

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. The net charge of an atom is determined by the number of _____ it has.
A. neutrons
B. protons and electrons
C. protons
D. electrons and neutrons
E. neutrons and protons

____ 2. Protons have ___ charge, neutrons have ___ charge, and electrons have ___ charge.
A. positive; no; negative
B. no; negative; positive
C. negative; positive; no
D. negative; no; positive
E. positive; negative; no

____ 3. Neutrons have ___ charge, electrons have ___ charge, and protons have ___ charge.
A. no; negative; positive
B. negative; no; positive
C. negative; positive; no
D. positive; negative; no
E. positive; no; negative

____ 4. Electrons have ___ charge, protons have ___ charge, and neutrons have ___ charge.
A. no; negative; positive
B. negative; positive; no
C. positive; negative; no
D. negative; no; positive
E. positive; no; negative

____ 5. ___ have negative charge, ___ have positive charge, and ___ have no charge.
A. Electrons; protons; neutrons
B. Neutrons; electrons; protons
C. Protons; electrons; neutrons
D. Protons; neutrons; electrons
E. Electrons; neutrons; protons

____ 6. ___ have positive charge, ___ have no charge, and ___ have negative charge.
A. Electrons; neutrons; protons
B. Protons; electrons; neutrons
C. Electrons; protons; neutrons
D. Neutrons; electrons; protons
E. Protons; neutrons; electrons

____ 7. ___ have no charge, ___ have negative charge, and ___ have positive charge.
A. Electrons; neutrons; protons
B. Electrons; protons; neutrons
C. Protons; neutrons; electrons
D. Protons; electrons; neutrons
E. Neutrons; electrons; protons

____ 8. In a neutral atom, the number of electrons is equal to
A. the number of protons minus the number of neutrons.
B. the number of neutrons.
C. the total number of neutrons and protons.
D. the number of neutrons minus the number of protons.
E. the number of protons.

____ 9. If the number of electrons in an atom is equal to the number of protons, the atom is said to be ____ .
A. neutral
B. a molecule
C. carbon
D. a compound
E. a neutron

____ 10. 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.

____ 11. The number of ___ in an atom determines which element it is.
A. neutrons
B. shells
C. electrons
D. atomic mass units
E. protons

____ 12. Any two atoms of gold
A. have the same nuclei.
B. can have different numbers of protons.
C. have the same number of neutrons.
D. have the same atomic mass number.
E. have the same atomic number.

____ 13. The number of neutrons in an atom of a given element
A. is equal to the number of protons.
B. is equal to the number of electrons.
C. is equal to the atomic number.
D. is equal to the atomic mass number.
E. may vary from atom to atom.

____ 14. Within the atom the electron cloud is bound to the nucleus by
A. magnetic forces.
B. tiny springs.
C. gravitational forces.
D. very fine filments.
E. electrostatic forces.

____ 15. Within the atom an electron is
A. attracted by the protons in the nucleus and repelled by other electrons.
B. repelled by the neutrons in the nucleus and attracted by other electrons.
C. attracted by protons and repelled by neutrons.
D. attracted by the neutrons in the nucleus and repelled by other electrons.
E. repelled by the protons in the nucleus and attracted by other electrons.

____ 16. The mass of one hydrogen atom is approximately
A. one atomic mass unit.
B. 1/2 atomic mass unit.
C. two atomic mass units.
D. 16 atomic mass units.
E. 12 atomic mass units.

____ 17. The mass of one oxygen atom is approximately
A. two atomic mass units.
B. one atomic mass unit.
C. 1/2 atomic mass unit.
D. 16 atomic mass units.
E. 12 atomic mass units.

____ 18. The mass of one carbon atom is approximately
A. one atomic mass unit.
B. 1/2 atomic mass unit.
C. two atomic mass units.
D. 12 atomic mass units.
E. 16 atomic mass units.

____ 19. The mass of one hydrogen molecule is approximately
A. 1/2 atomic mass unit.
B. two atomic mass units.
C. one atomic mass unit.
D. 12 atomic mass units.
E. 16 atomic mass units.

____ 20. Almost all of the atom's mass is located in the atom's ____ .
A. electron cloud.
B. protons.
C. electrons.
D. nucleus.
E. neutrons.

____ 21. The diameter of a typical atom is about ____ times the diameter of its nucleus.
A. 100
B. 100,000
C. 1000
D. 10
E. 2

____ 22. 100 million atoms lined up next to each other would form a line extending for about
A. 1 million kilometers.
B. 1 meter.
C. 1000 kilometers.
D. 1 kilometer.
E. 1 centimeter.

____ 23. The diameter of a typical atom is about ____ times the diameter of its nucleus.
A. 1000
B. 1/100,000
C. 1/1000
D. 10
E. 100,000

____ 24. The diameter of a typical atomic nucleus is about ____ times the diameter of the atom.
A. 1/100,000
B. 100,000
C. 1/1000
D. 10
E. 1000

____ 25. The atom consists of a nucleus of _____ surrounded by a cloud of _____ .
A. neutrons and electrons; protons
B. protons and neutrons; electrons
C. electrons and protons; neutrons
D. neutrons and electrons; positrons
E. positrons and neutrons; electrons

____ 26. The atom consists of a ____ nucleus surrounded by a ____ electron cloud.
A. positively charged; positively charged
B. positively charged; negatively charged
C. negatively charged; negatively charged
D. negatively charged; positively charged
E. neutral; neutral

____ 27. Your body contains approximately ____ atoms.
A. 10^{12}
B. 10^{18}
C. 10^{27}
D. 1000
E. 1 million

____ 28. The atomic number of an atom identifies which ____ it is.
A. mixture
B. element
C. molecule
D. phase
E. compound

____ 29. The atomic number is the number of ____ in the nucleus.
A. electrons
B. molecules
C. protons
D. neutrons
E. elements

____ 30. The number of protons in an atom is given by the atom's ____ .
A. atomic mass number
B. atomic mass unit
C. atomic number
D. atomic weight
E. isotopic number

____ 31. An element with an atomic number of 6 and an atomic mass number of 13 would have
A. 6 protons, 7 neutrons, and 6 electrons.
B. 7 protons, 6 neutrons, and 6 electrons.
C. 6 protons, 13 neutrons, and 7 electrons.
D. 6 protons, 7 neutrons, and 13 electrons.
E. 7 protons, 6 neutrons, and 7 electrons.

____ 32. An element with an atomic number of 3 and an atomic mass number of 7 would have
A. 3 protons, 4 neutrons, and 3 electrons.
B. 4 protons, 3 neutrons, and 4 electrons.
C. 3 protons, 4 neutrons, and 7 electrons.
D. 4 protons, 3 neutrons, and 3 electrons.
E. 3 protons, 7 neutrons, and 4 electrons.

____ 33. An element with an atomic number of 92 and an atomic mass number of 238 would have
A. 146 protons, 92 neutrons, and 92 electrons.
B. 92 protons, 146 neutrons, and 92 electrons.
C. 92 protons, 146 neutrons, and 238 electrons.
D. 146 protons, 92 neutrons, and 146 electrons.
E. 92 protons, 238 neutrons, and 146 electrons.

____ 34. An element with an atomic number of 7 and an atomic mass number of 13 would have
A. 6 protons, 7 neutrons, and 7 electrons.
B. 7 protons, 6 neutrons, and 13 electrons.
C. 6 protons, 13 neutrons, and 7 electrons.
D. 7 protons, 6 neutrons, and 7 electrons.
E. 6 protons, 7 neutrons, and 6 electrons.

____ 35. Brownian motion is explained as being caused by the bombardment of visible particles by
A. gusts of wind.
B. atoms and molecules.
C. sound waves.
D. antimatter.
E. light waves.

____ 36. ____ explained as being caused by the bombardment of visible particles by atoms and molecules.
A. Northern lights are
B. Electrons are
C. Lightning is
D. Brownian motion is
E. Water waves are

____ 37. Brownian motion is the
A. random motion of microscopic particles being bombarded by even smaller atoms and molecules.
B. vibration of atoms and molecules in a solid.
C. movement of electrons circulating within the atom.
D. very gradual flow of solid materials such as glass over long periods of time.
E. random motion of atoms and molecules being bombarded by larger microscopic particles.

____ 38. Brownian motion is explained as being caused by the bombardment of _____ by atoms and molecules.
A. atomic nuclei
B. baseballs
C. brownies
D. individual electrons
E. small, but visible, particles

____ 39. Brownian motion is evidence of the existence of ____ .
A. inertia
B. friction
C. kinetic energy
D. atoms
E. gravity

____ 40. Chemical combinations of elements are called
A. nuclei.
B. shells.
C. groups.
D. mixtures.
E. compounds.

____ 41. Atoms combine to form
A. atomic numbers.
B. electron clouds.
C. molecules.
D. quarks.
E. antimatter.

____ 42. Sodium chloride (table salt) is an example of
A. a molecule.
B. an element.
C. an atom.
D. a mixture.
E. a compound.

____ 43. Air is an example of
A. an atom.
B. a compound.
C. an element.
D. a molecule.
E. a mixture.

____ 44. The mercury in a thermometer is an example of
A. antimatter.
B. a compound.
C. an element.
D. a molecule.
E. a mixture.

____ 45. H_20 is an example of ____ .
A. a mixture.
B. an atom.
C. a molecule.
D. an element.
E. an isotope.

____ 46. The constituent elements of water are
A. ice and steam.
B. hydrogen and oxygen.
C. helium and nitrogen.
D. hydrogen and helium.
E. nitrogen and oxygen.

____ 47. A chemical substance made of atoms of two or more different elements combined in a fixed proportion is called
A. a mixture.
B. a nucleus.
C. an isotope.
D. a crystal.
E. a compound.

____ 48. Each molecule of air contains
A. two atoms of nitrogen and two atoms of oxygen.
B. two atoms of nitrogen and one atom of oxygen.
C. one atom of nitrogen and two atoms of oxygen.
D. one atom of nitrogen and one atom of oxygen.
E. none of these – air is not a compound.

____ 49. The principal constituents of air are
A. oxygen molecules and water molecules.
B. hydrogen molecules and oxygen molecules.
C. oxygen molecules and nitrogen molecules.
D. hydrogen molecules and water molecules.
E. hydrogen molecules and nitrogen molecules.

____ 50. Which of the following is a list of *elements*?
A. hydrogen, oxygen, nitrogen
B. air, nitrogen, oxygen
C. water, nitrogen, oxygen
D. hydrogen, oxygen, water
E. hydrogen, nitrogen, air

____ 51. The human body is composed primarily of the elements
A. helium, oxygen, carbon, and nitrogen.
B. hydrogen, oxygen, carbon, and nitrogen.
C. hydrogen, helium, oxygen, and carbon.
D. hydrogen, helium, nitrogen, and oxygen.
E. hydrogen, helium, carbon, and nitrogen.

____ 52. The element just to the right of iron on the periodic table has
A. one fewer proton and one more electron than iron.
B. one more proton and one more electron than iron.
C. the same numbers of protons and electrons as iron.
D. one more proton and one fewer electron than iron.
E. one fewer proton and one fewer electron than iron.

____ 53. The element just to the left of iron on the periodic table has
A. one fewer proton and one more electron than iron.
B. one more proton and one more electron than iron.
C. the same numbers of protons and electrons as iron.
D. one more proton and one fewer electron than iron.
E. one fewer proton and one fewer electron than iron.

____ 54. Where on the periodic table would we find an element with one more proton and one more electron than silver?
A. Just below silver.
B. Just to the left of silver.
C. Just to the right of silver.
D. Just above silver.
E. None of these – there is no such element.

____ 55. Where on the periodic table would we find an element with one fewer proton and one fewer electron than silver?
A. Just to the right of silver.
B. Just above silver.
C. Just to the left of silver.
D. Just below silver.
E. None of these – there is no such element.

____ 56. Where on the periodic table would we find an element with one fewer proton and one fewer electron than hydrogen?
A. Just to the right of hydrogen.
B. Just below hydrogen.
C. Just to the left of hydrogen.
D. Just above hydrogen.
E. None of these – there is no such element.

____ 57. The element just to the right of oxygen on the periodic table has
A. one more proton and one more electron than oxygen.
B. one more proton and one fewer electron than oxygen.
C. one fewer proton and one fewer electron than oxygen.
D. the same numbers of protons and electrons as oxygen.
E. one fewer proton and one more electron than oxygen.

____ 58. The element just to the left of oxygen on the periodic table has
A. one more proton and one fewer electron than oxygen.
B. one fewer proton and one fewer electron than oxygen.
C. one more proton and one more electron than oxygen.
D. the same numbers of protons and electrons as oxygen.
E. one fewer proton and one more electron than oxygen.

____ 59. Where does water appear on the periodic table of the elements?
A. Just to the right of hydrogen.
B. Just to the right of oxygen.
C. In the box marked 'W'.
D. Nowhere; water is not an element.
E. Between hydrogen and oxygen.

____ 60. Where does air appear on the periodic table of the elements?
A. Nowhere – air is not an element.
B. Between nitrogen and oxygen.
C. In the box marked 'Ar'.
D. Just to the right of oxygen.
E. Just to the right of nitrogen.

____ 61. Atoms bond to each other in solids through their
A. protons.
B. neutrons.
C. electrons.
D. nuclei.
E. none of these – the atoms in a solid are not bonded to each other.

____ 62. Density is
A. mass times volume.
B. the same as atomic number.
C. mass divided by volume.
D. mass times velocity.
E. mass divided by velocity.

____ 63. Density is
A. mass times volume.
B. mass minus volume.
C. mass divided by volume.
D. mass plus volume.
E. volume divided by mass.

____ 64. The element with the highest density is
A. osmium.
B. water.
C. aluminum.
D. gold.
E. mercury.

____ 65. The density of water is approximately one
A. gram per liter.
B. gram per cubic centimeter.
C. kilogram per cubic centimeter.
D. gram per cubic meter.
E. kilogram per cubic meter.

____ 66. The density of water is approximately 1000
A. grams per cubic meter.
B. kilograms per cubic meter.
C. grams per cubic centimeter.
D. kilograms per cubic centimeter.
E. kilograms per liter.

____ 67. The density of water is approximately ____ per cubic centimeter.
A. 1000 kilograms
B. 100 grams
C. 1 kilogram
D. 10 grams
E. 1 gram

____ 68. The density of ____ is approximately one gram per cubic centimeter.
A. water
B. air
C. aluminum
D. lead
E. mercury

____ 69. 100 cubic centimeters of water should have a mass of approximately ____ .
A. 10 grams
B. 100 grams
C. 1 gram
D. 1 kilogram
E. 100 kilograms

____ 70. 1000 cubic centimeters of water should have a mass of approximately ____ .
A. 10 grams
B. 100 grams
C. 1000 kilograms
D. 1 gram
E. 1 kilogram

____ 71. 10 cubic centimeters of water should have a mass of approximately ____ .
A. 100 grams
B. 1 kilogram
C. 10 grams
D. 1000 kilograms
E. 1 gram

____ 72. 100 grams of water should occupy a volume of about ____ .
A. 10 liters
B. 100 cubic meters
C. 100 cubic centimeters
D. 100 liters
E. one liter

____ 73. 1000 grams of water should occupy a volume of about ____ .
A. 100 cubic centimeters
B. 1000 cubic meters
C. 10 liters
D. one liter
E. 1000 liters

____ 74. 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. rigid
B. elastic
C. stretchy
D. plastic
E. inelastic

____ 75. A material is said to be ____ if it changes shape when a deforming force acts on it and then does not return to its original shape when the deforming force is removed.
A. elastic
B. rigid
C. stretchy
D. inelastic
E. plastic

____ 76. Of these, the most elastic material is
A. clay.
B. rubber.
C. dough.
D. lead.
E. putty.

____ 77. An example of an inelastic material is
A. a spring.
B. a golf ball.
C. rubber.
D. clay.
E. a baseball.

____ 78. If a spring is stretched beyond its elastic limit,
A. it will break.
B. it will snap back into its original shape.
C. it will remain deformed.
D. its density will be forever changed.
E. it will still obey Hooke's Law.

____ 79. Hooke's Law relates the
A. distance a spring stretches to the density of the spring.
B. distance a spring stretches to the mass of the spring.
C. density of a spring to the force applied to the spring.
D. distance a spring stretches to the force applied to the spring.
E. density of a spring to the mass of the spring.

____ 80. The distance a spring stretches is related to the force applied to the spring by ____ Law.
A. Newton's
B. Hooke's
C. Galileo's
D. Aristotle's
E. Pierce's

____ 81. A mass of 1 kg is hung from a spring 50 cm long, causing the spring to increase its length to 60 cm. If the 1-kg mass is replaced by a 2-kg mass, how long will the spring then be (assuming the elastic limit is not reached)?
A. 120 cm
B. 70 cm
C. 100 cm
D. 85 cm
E. 110 cm

____ 82. A mass of 1 kg is hung from a spring 50 cm long, causing the spring to increase its length to 60 cm. If the 1-kg mass is replaced by a 3-kg mass, how long will the spring then be (assuming the elastic limit is not reached)?
A. 180 cm
B. 80 cm
C. 150 cm
D. 70 cm
E. 110 cm

____ 83. A mass of 1 kg is hung from a spring 50 cm long, causing the spring to increase its length to 70 cm. If the 1-kg mass is replaced by a 2-kg mass, how long will the spring then be (assuming the elastic limit is not reached)?
A. 90 cm
B. 80 cm
C. 140 cm
D. 100 cm
E. 120 cm

____ 84. A mass of 2 kg is hung from a spring 50 cm long, causing the spring to increase its length to 70 cm. If the 2-kg mass is replaced by a 1-kg mass, how long will the spring then be (assuming the elastic limit is not reached)?
A. 120 cm
B. 35 cm
C. 90 cm
D. 60 cm
E. 20 cm

____ 85. A mass of 2 kg is hung from a spring 50 cm long, causing the spring to increase its length to 60 cm. If the 2-kg mass is replaced by a 1-kg mass, how long will the spring then be (assuming the elastic limit is not reached)?
A. 110 cm
B. 30 cm
C. 25 cm
D. 70 cm
E. 55 cm

____ 86. Which should cool most rapidly -- a large bowl of porridge, a small bowl of porridge, or a medium-sized bowl of porridge? (Assume all three bowls were filled at the same time with equally hot porridge.)
A. The small bowl, because it has the greatest surface-to-volume ratio.
B. The large bowl, because it has the greatest surface area.
C. They should all cool at the same rate because the porridge is the same in each one.
D. The large bowl, because it has the greatest volume.
E. The medium-sized bowl, because in the story it was the coldest.

____ 87. Elephants need large ears because
A. small ears would look silly on a body that large.
B. they provide shade for the rest of the elephant's body.
C. they use them as sails to help move their bodies around.
D. they need more surface area to cool their large bodies.
E. otherwise their hearing would not be very good.

____ 88. When the length of each edge of a cube is doubled, the cube's surface area increases by a factor of __ .
A. 6
B. 8
C. 2
D. 4
E. 16

____ 89. When the length of each edge of a cube is doubled, the cube's volume increases by a factor of __ .
A. 16
B. 8
C. 2
D. 6
E. 4

____ 90. When the length of each edge of a cube is doubled, the cube's surface area
A. increases by a factor of 2.
B. decreases by a factor of 1/2.
C. decreases by a factor of 1/4.
D. increases by a factor of 4.
E. increases by a factor of 8.

____ 91. When the length of each edge of a cube is doubled, the cube's volume
A. increases by a factor of 4.
B. decreases by a factor of 1/2.
C. increases by a factor of 8.
D. decreases by a factor of 1/4.
E. increases by a factor of 2.

____ 92. When the length of each edge of a cube is tripled, the cube's surface area increases by a factor of __ .
A. 27
B. 3
C. 6
D. 18
E. 9

____ 93. When the length of each edge of a cube is tripled, the cube's volume increases by a factor of __ .
A. 18
B. 3
C. 6
D. 9
E. 27

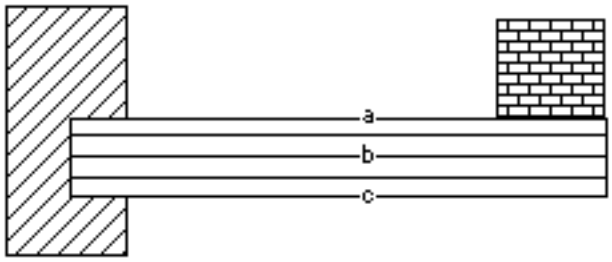
____ 94. When the length of each edge of a cube is tripled, the cube's surface area
A. decreases by a factor of 1/9.
B. decreases by a factor of 1/3.
C. increases by a factor of 27.
D. increases by a factor of 3.
E. increases by a factor of 9.

____ 95. When the length of each edge of a cube is tripled, the cube's volume
A. increases by a factor of 9.
B. decreases by a factor of 1/3.
C. decreases by a factor of 1/9.
D. increases by a factor of 3.
E. increases by a factor of 27.

____ 96. When the length of each edge of a cube is doubled, the cube's surface-to-volume ratio
A. increases by a factor of 8.
B. increases by a factor of 2.
C. decreases by a factor of 1/2.
D. increases by a factor of 4.
E. decreases by a factor of 1/4.

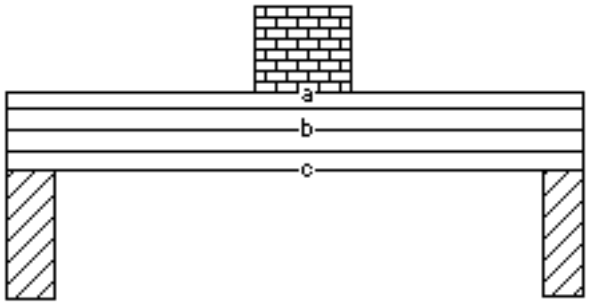
____ 97. When the length of each edge of a cube is tripled, the cube's surface-to-volume ratio
A. decreases by a factor of 1/9.
B. increases by a factor of 3.
C. decreases by a factor of 1/3.
D. increases by a factor of 27.
E. increases by a factor of 9.

____ 98. A horizontal steel beam is clamped at one end and a weight is placed on the other end, as shown. Describe the stresses on the beam at the three points indicated (a, b, and c)



A. tension at c, compression at a, neutral layer at b
B. tension at a, compression at b, neutral layer at c
C. tension at b, compression at a and c
D. tension at a, compression at c, neutral layer at b
E. tension at a and c, compression at b

____ 99. A horizontal steel beam is supported at each end as shown, and a weight is placed in the middle. Describe the stresses at the three points indicated in the beam (a, b, and c).



A. compression at a, b, and c
B. compression at a, tension at c, neutral layer at b
C. compression at b, tension at a and c
D. compression at c, tension at a, neutral layer at b
E. compression at a and b, tension at c

____100. An I-beam is relatively thin in the middle of its cross-section because
A. this is where most of the tension forces are concentrated.
B. relatively few forces are applied to this part of the beam.
C. this is where most of the compression forces are concentrated.
D. this is the part of the beam that needs to flex the most.
E. this is the part of the beam that needs to be the most rigid.

____101. The curve that gives maximum strength to an arch that supports only its own weight is called
A. a hyperbola.
B. a catenary.
C. a semicircle.
D. a parabola.
E. an ellipse.

____102. Stone doorways are often arched because
A. stones with the shapes used in arches are most easily found in nature.
B. stone masons do not know how to build any other kind.
C. stone breaks more easily under compression than tension.
D. stone breaks more easily under tension than compression.
E. stones with the shapes used in arches are easier to fabricate.

____103. Stone doorways are often arched because
A. stones with the shapes used in arches are easier to fabricate.
B. stone can withstand compression forces better than tension.
C. stone can withstand tension forces better than compression.
D. stone masons do not know how to build any other kind.
E. stones with the shapes used in arches are most easily found in nature.

____104. In a catenary curve such as is found in the St. Louis arch,
A. the compression forces produced by the weight of the material used act vertically.
B. the tension forces produced by the weight of the material used act horizontally.
C. the compression forces produced by the weight of the material used act parallel to the curve.
D. the tension forces produced by the weight of the material used act parallel to the curve.
E. the compression forces produced by the weight of the material used act horizontally.

____105. The weight of a dome produces
A. compression forces parallel to the curve of the dome.
B. tension forces acting vertically.
C. tension forces parallel to the curve of the dome.
D. compression forces perpendicular to the curve of the dome.
E. tension forces acting horizontally.

____106. A completely submerged object in a container of liquid always
A. sinks to the bottom of the container.
B. remains at the same level in the container.
C. displaces a mass of liquid equal to its own mass.
D. floats to the top of the container.
E. displaces a volume of liquid equal to its own volume.

____107. If the weight of a submerged object is less than the buoyant force on the object,
A. the object will be crushed by the liquid.
B. the object will rise to the surface and float.
C. the object will remain at its present level.
D. the object will sink.
E. the object will expand.

____108. If the weight of a submerged object is greater than the buoyant force on the object,
A. the object will sink.
B. the object will be crushed by the liquid.
C. the object will remain at its present level.
D. the object will expand.
E. the object will rise to the surface and float.

____109. The buoyant force
A. is the net downward force of a submerged object acting on the surrounding liquid.
B. depends on the density of the submerged object.
C. is the difference between a submerged object's weight and the weight of an equal mass of water.
D. is the net upward force of the surrounding liquid acting on a submerged object.
E. is the force of gravity acting on a submerged object.

____110. Archimedes' Principle states that an immersed object is buoyed up by a force equal to the
A. weight of the fluid it displaces.
B. total pressure on the object.
C. difference between the weight of the object and the weight of the fluid it displaces.
D. weight of the object.
E. centrifugal force acting on the object.

____111. If an object is less dense than the fluid in which it is immersed,
A. the object will sink.
B. the object will remain at its present level.
C. the object will rise to the surface and float.
D. the object will expand.
E. the object will be crushed by the liquid.

____112. If an object is more dense than the fluid in which it is immersed,
A. the object will remain at its present level.
B. the object will sink.
C. the object will rise to the surface and float.
D. the object will be crushed by the liquid.
E. the object will expand.

____113. A floating object
A. displaces a weight of fluid equal to its own weight.
B. displaces a volume of fluid equal to its own volume.
C. has a buoyant force less than its own weight.
D. has no weight.
E. has a buoyant force greater than its own weight.

____114. A ship floats higher in salt water than it does in fresh water because
A. salt makes the water more rigid, and the ship does not sink in as far.
B. salt water is denser, and more displacement is needed to achieve the same buoyant force.
C. salt water is less dense, and more displacement is needed to achieve the same buoyant force.
D. salt water is less dense, and less displacement is needed to achieve the same buoyant force.
E. salt water is denser, and less displacement is needed to achieve the same buoyant force.

____115. A ship does not float as high in fresh water as it does in salt water because
A. salt water is denser, and more displacement is needed to achieve the same buoyant force.
B. salt water is less dense, and less displacement is needed to achieve the same buoyant force.
C. salt water is less dense, and more displacement is needed to achieve the same buoyant force.
D. salt makes the water more rigid, and the ship does not sink in as far.
E. salt water is denser, and less displacement is needed to achieve the same buoyant force.

____116. A fish can swim horizontally in water if
A. its buoyant force is greater than its weight.
B. it displaces a weight of water less than its own weight.
C. its density is less than that of water.
D. its buoyant force is equal to its weight.
E. its buoyant force is less than its weight.

____117. If the weight of a submerged object is equal to the buoyant force on the object,
A. the object will rise to the surface and float.
B. the object will sink.
C. the object will be crushed by the liquid.
D. the object will expand.
E. the object will remain at its present level.

____118. 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. cannot be calculated because the block is not completely submerged.
E. is less than the weight of the wood.

____119. An object with a mass of 1 kg displaces 0.6 kg of water. Which of the following is true?
A. The density of this object is less than that of water.
B. The buoyant force on this object is 10 N.
C. This object will not sink in water.
D. The buoyant force on this object is 6 N.
E. The buoyant force on this object is 4 N.

____120. An object with a mass of 1 kg displaces 0.6 kg of water. Which of the following is true?
A. This object will sink in water.
B. The buoyant force on this object is 4 N.
C. The density of this object is less than that of water.
D. The buoyant force on this object is 10 N.
E. The weight of this object is 6 N.

____121. An object with a mass of 1 kg displaces 0.6 kg of water. Which of the following is true?
A. The density of this object is greater than that of water.
B. The buoyant force on this object is 4 N.
C. The weight of this object is 6 N.
D. This object will not sink in water.
E. The buoyant force on this object is 10 N.

____122. An object with a mass of 1 kg displaces 0.6 kg of water. Which of the following is true?
A. The weight of this object is 6 N.
B. The weight of this object is 10 N.
C. The weight of this object is 4 N.
D. The buoyant force on this object is 10 N.
E. The buoyant force on this object is 4 N.

____123. An object with a mass of 1 kg displaces 0.7 kg of water. Which of the following is true?
A. The buoyant force on this object is 10 N.
B. The density of this object is less than that of water.
C. The buoyant force on this object is 7 N.
D. The buoyant force on this object is 3 N.
E. This object will not sink in water.

____124. An object with a mass of 1 kg displaces 0.7 kg of water. Which of the following is true?
A. The weight of this object is 7 N.
B. The density of this object is less than that of water.
C. This object will sink in water.
D. The buoyant force on this object is 3 N.
E. The buoyant force on this object is 10 N.

____125. An object with a mass of 1 kg displaces 0.7 kg of water. Which of the following is true?
A. The buoyant force on this object is 10 N.
B. The density of this object is greater than that of water.
C. The buoyant force on this object is 3 N.
D. This object will not sink in water.
E. The weight of this object is 7 N.

____126. An object with a mass of 1 kg displaces 0.7 kg of water. Which of the following is true?
A. The buoyant force on this object is 10 N.
B. The weight of this object is 3 N.
C. The buoyant force on this object is 3 N.
D. The weight of this object is 10 N.
E. The weight of this object is 7 N.

____127. An object with a mass of 1 kg displaces 600 ml of water. Which of the following is true?
A. This object will not sink in water.
B. The buoyant force on this object is 10 N.
C. The buoyant force on this object is 6 N.
D. The buoyant force on this object is 4 N.
E. The density of this object is less than that of water.

____128. An object with a mass of 1 kg displaces 600 ml of water. Which of the following is true?
A. The buoyant force on this object is 10 N.
B. The weight of this object is 6 N.
C. The density of this object is less than that of water.
D. The buoyant force on this object is 4 N.
E. This object will sink in water.

____129. An object with a mass of 1 kg displaces 600 ml of water. Which of the following is true?
A. The buoyant force on this object is 4 N.
B. The weight of this object is 6 N.
C. This object will not sink in water.
D. The density of this object is greater than that of water.
E. The buoyant force on this object is 10 N.

____130. An object with a mass of 1 kg displaces 600 ml of water. Which of the following is true?
A. The weight of this object is 4 N.
B. The buoyant force on this object is 4 N.
C. The weight of this object is 6 N.
D. The buoyant force on this object is 10 N.
E. The weight of this object is 10 N.

____131. An object with a mass of 1 kg displaces 700 ml of water. Which of the following is true?
A. This object will not sink in water.
B. The buoyant force on this object is 7 N.
C. The buoyant force on this object is 3 N.
D. The density of this object is less than that of water.
E. The buoyant force on this object is 10 N.

____132. An object with a mass of 1 kg displaces 700 ml of water. Which of the following is true?
A. The buoyant force on this object is 10 N.
B. This object will sink in water.
C. The weight of this object is 7 N.
D. The density of this object is less than that of water.
E. The buoyant force on this object is 3 N.

____133. An object with a mass of 1 kg displaces 700 ml of water. Which of the following is true?
A. The buoyant force on this object is 10 N.
B. The density of this object is greater than that of water.
C. The weight of this object is 7 N.
D. This object will not sink in water.
E. The buoyant force on this object is 3 N.

____134. 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 3 N.
B. The buoyant force on this object is 3 N.
C. The weight of this object is 10 N.
D. The weight of this object is 7 N.
E. The buoyant force on this object is 10 N.

____135. Pressure is defined as the ____ per unit ____ .
A. mass; length
B. mass; volume
C. force; area
D. force; mass
E. force; volume

____136. The water pressure in a lake behind a dam depends on
A. the number of fish in the lake.
B. the distance from the dam at which the pressure is measured.
C. the surface area of the lake.
D. the volume of lake water behind the dam.
E. the depth below the surface at which the pressure is measured.

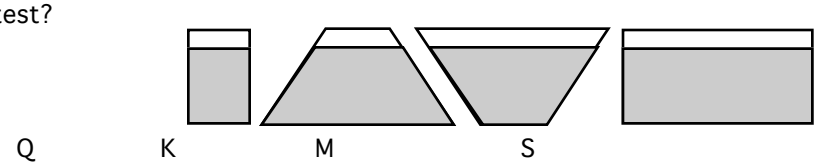
____137. Pressure in a liquid is equal to
A. the mass density of the liquid times the depth.
B. the weight density of the liquid times the depth.
C. the mass density of the liquid times the volume.
D. the weight density of the liquid times the volume.
E. the weight density of the liquid times the surface area.

____138. At any given point in the middle of a glass of water, the water pressure will be
A. greatest in the downward direction.
B. equal to the pressure at all other points in the glass of water.
C. greatest in the sideways direction.
D. greatest in the upward direction.
E. equal in all directions.

____139. Water pressure acts ____ the sides of a container and ____ with increasing depth.
A. perpendicular to; increases
B. perpendicular to; decreases
C. parallel to; increases
D. parallel to; decreases
E. perpendicular to; remains constant

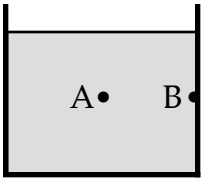
____140. Pressure is defined as the ____ per unit area.
A. mass
B. work
C. volume
D. force
E. density

____141. Four different containers are filled to the same depth with water, as shown. At the bottom of which container will the pressure be the greatest?



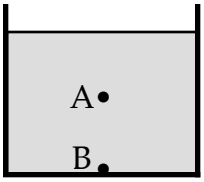
A. K
B. M
C. Q
D. S
E. The pressure will be *the same* at the bottom of each container.

____142. How does the pressure at point A compare to the pressure at point B in this water-filled container?



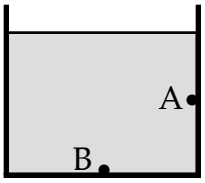
A. It is greater at A because A is in the middle and feels pressure from all directions.
B. It is greater at A because friction with the wall reduces the pressure at B.
C. It is the same at A and B because they are at the same depth.
D. It is greater at B because the wall of the container exerts an extra force on the water there.
E. It is the same at A and B because all points in the water have the same pressure.

____143. How does the pressure at point A compare to the pressure at point B in this water-filled container?



A. It is greater at B because B is at a greater depth.
B. It is greater at A because A is in the middle and feels pressure from all directions.
C. It is the same at A and B because they are equidistant from the walls of the container.
D. It is greater at B because the bottom of the container exerts an extra force on the water there.
E. It is the same at A and B because all points in the water have the same pressure.

____144. How does the pressure at point A compare to the pressure at point B in this water-filled container?



A. It is the same at A and B because the side and the bottom both push equally on the water.
B. It is greater at B because B is at a greater depth.
C. It is greater at A because the side wall of the container exerts an extra force on the water there.
D. It is the same at A and B because all points in the water have the same pressure.
E. It is greater at B because water does not push sideways – only down.

____145. Alcohol has a density 79% that of water; the pressure at the bottom of a glass full of alcohol will be
A. 79% less than at the bottom of a similar glass filled with water.
B. the same as at the bottom of a similar glass filled with water.
C. 21% less than at the bottom of a similar glass filled with water.
D. 21% greater than at the bottom of a similar glass filled with water.
E. 79% greater than at the bottom of a similar glass filled with water.

____146. Alcohol has a density 79% that of water; the pressure at the top of a glass full of alcohol will be
A. 21% greater than at the bottom of a similar glass filled with water.
B. 79% greater than at the bottom of a similar glass filled with water.
C. the same as at the bottom of a similar glass filled with water.
D. 79% less than at the bottom of a similar glass filled with water.
E. 21% less than at the bottom of a similar glass filled with water.

____147. Atmospheric pressure
A. acts every direction except upwards.
B. acts only sideways.
C. acts only downward.
D. acts in all directions.
E. acts only upwards.

____148. Water rises in a drinking straw when you suck on it because
A. the air pressure inside the straw is greater than the air pressure on the water surface.
B. the air pressure inside the straw is equal to the air pressure on the water surface.
C. a gas always attempts to fill a vacuum.
D. a liquid always attempts to fill a vacuum.
E. the air pressure inside the straw is less than the air pressure on the water surface.

____149. 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 outside of the can is greater than the air pressure on the inside of the can.
B. the loss of air molecules from inside the can weakens the metal.
C. the air pressure on the inside of the can is greater than the air pressure on the outside of the can.
D. of Bernoulli's principle.
E. the opposite sides of the empty can strongly attract each other.

____150. A barometer made with mercury will be about 30 inches high while a barometer made with water will be about 34 feet high. This is because mercury and water have different
A. accelerations.
B. densities.
C. volumes.
D. colors.
E. potential energies.

____151. The air pressure at the top of a mountain is ____ the air pressure at sea level because _____ .
A. greater than; the air on the mountain top can press from all sides, rather than just from above.
B. equal to; the air is in contact with the earth in both locations
C. greater than; the air has more potential energy at the top of the mountain
D. less than; gravity is not as strong at the top of the mountain
E. less than; there is less air above the mountain top

____152. Bernoulli's principle says that when the speed of a fluid increases,
A. pressure in the fluid decreases.
B. the fluid does more work.
C. gravitational potential energy of the fluid increases.
D. pressure in the fluid increases.
E. kinetic energy of the fluid decreases.

____153. Bernoulli's principle explains why
A. a hot air balloon rises.
B. dead fish float.
C. liquid rises in a drinking straw.
D. submarines can remain submerged.
E. airplanes fly.

____154. An airplane wing is shaped such that
A. air flows more rapidly across the bottom than over the top of the wing.
B. air flows more rapidly over the top than across the bottom of the wing.
C. air does not flow over the top of the wing.
D. air flows at the same rate across the bottom and over the top of the wing.
E. air does not flow across the bottom of the wing.

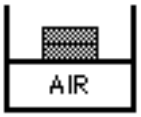
____155. Bernoulli's principle says that when the speed of a fluid decreases,
A. kinetic energy of the fluid increases.
B. pressure in the fluid increases.
C. gravitational potential energy of the fluid decreases.
D. pressure in the fluid decreases.
E. the fluid does less work.

____156. Boyle's Law says that if the temperature of a given mass of gas does not change, the ____ will be constant.
A. density
B. sum of the volume and the pressure
C. product of the pressure and the volume
D. ratio of the pressure to the volume
E. ratio of the volume to the pressure

____157. In order to increase the pressure in an automobile tire, one normally
A. increases the temperature of the tire.
B. decreases the volume of the tire.
C. decreases the surface area of the tire.
D. decreases the number of air molecules in the tire.
E. increases the density of air in the tire.

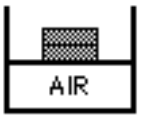
____158. In order to decrease the pressure in an automobile tire, one normally
A. decreases the number of air molecules in the tire.
B. increases the density of air in the tire.
C. increases the volume of the tire.
D. decreases the temperature of the tire.
E. decreases the surface area of the tire.

____159. Two identical weights rest on a movable piston inside a cylinder, supported by the pressure of the trapped air below. If a third identical weight is placed on top of the original weights, what will happen?



A. nothing
B. The volume of trapped air will increase.
C. The number of trapped air molecules will increase.
D. The volume of trapped air will decrease.
E. The number of trapped air molecules will decrease.

____160. Two identical weights rest on a movable piston inside a cylinder, supported by the pressure of the trapped air below. If a one of the weights is removed, what will happen?



A. nothing
B. The volume of trapped air will decrease.
C. The number of trapped air molecules will decrease.
D. The volume of trapped air will increase.
E. The number of trapped air molecules will increase.

____161. A Super Soaker squirt gun is filled with water and pumped with air such that pulling the trigger causes a stream of water to be 'shot' from the gun. However, if the trigger is pulled continuously, the water stream gradually weakens and finally stops; this is best explained by ____ .
A. Newton's Third Law
B. Pascal's Principle
C. Boyle's Law
D. Bernoulli's Principle
E. Murphy's Law

____162. According to Boyle's Law, if the volume occupied by a certain gas is doubled,
A. the number of atoms in the gas will be halved.
B. the pressure of the gas will remain constant.
C. the pressure of the gas will be doubled.
D. the pressure of the gas will be quadrupled.
E. the pressure of the gas will be halved.

____163. According to Boyle's Law, if the volume occupied by a certain gas is halved,
A. the pressure of the gas will be halved.
B. the number of atoms in the gas will be doubled.
C. the pressure of the gas will be quadrupled.
D. the pressure of the gas will be doubled.
E. the pressure of the gas will remain constant.

____164. When a fixed amount of air is compressed, at constant temperature, to half its original volume,
A. the pressure of the air will be twice as much as before.
B. the density of the air will be one half as much as before.
C. the pressure of the air will be four times as much as before.
D. the pressure of the air will be one half as much as before.
E. the density of the air will be one fourth as much as before.

____165. When a fixed amount of air is compressed, at constant temperature, to one fourth its original volume,
A. the pressure of the air will be twice as much as before.
B. the pressure of the air will be one fourth as much as before.
C. the density of the air will be one half as much as before.
D. the density of the air will be one fourth as much as before.
E. the pressure of the air will be four times as much as before.

____166. When a fixed amount of air is compressed, at constant temperature, to one third its original volume,
A. the pressure of the air will be three times as much as before.
B. the pressure of the air will be nine times as much as before.
C. the density of the air will be one third as much as before.
D. the pressure of the air will be one third as much as before.
E. the density of the air will be nine times as much as before.

____167. 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 Archimedes.
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 the object.

____168. A balloon will cease rising in air only when
A. the buoyant force on the balloon equals the weight of the balloon.
B. the buoyant force on the balloon is zero.
C. the weight of the balloon is zero.
D. the air pressure is zero.
E. the balloon reaches the very top of the atmosphere.

____169. Two helium-filled balloons have the same mass but one is larger than the other. Which will rise more rapidly in air?
A. The larger one, because it has a greater buoyant force.
B. They will rise at the same rate because they both contain helium.
C. The smaller one, because it has a greater buoyant force.
D. The smaller one, because it has a higher density.
E. The larger one, because it has a higher density.

____170. Two lighter-than-air helium-filled containers have the same fixed volume but one holds twice as many helium atoms as the other. Which will rise more rapidly in air?
A. The one with more helium, because it has a higher density.
B. The one with less helium, because it has a greater buoyant force.
C. The one with more helium, because it has a greater buoyant force.
D. The one with less helium, because it has a lower weight.
E. They will rise at the same rate because they both contain helium.

____171. Humans generally do not rise into the air like helium-filled balloons because
A. our bodies contain bones.
B. our bodies contain no helium.
C. our bodies are more dense than air.
D. there is no buoyant force acting on our bodies.
E. air pressure pushes us down onto the ground.

____172. On which of these would air produce the greatest buoyant force?
A. a flying robin
B. an elephant
C. a cat
D. a perching robin
E. a flying mosquito

____173. A helium-filled balloon released at the Earth's surface rises into the air. If an identical helium-filled balloon were released at the surface of the Moon, where there is less gravity and no atmosphere, what would happen to the balloon?
A. The balloon would rise from the Moon's surface, but at a slower rate than it did on Earth.
B. The balloon would rise from the Moon's surface, but at a faster rate than it did on Earth.
C. The balloon would rise from the Moon's surface at the same rate as it did on Earth.
D. The balloon would fall to the Moon's surface.
E. The balloon would hover above the Moon's surface.