Name: _____ **Class:** _____ **Date:** _____ **ID: A**

AP physics B - Web review ch 9 fluids

Please do not write on my tests - but you may write on your printed copy

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

____ 1. The Greenland ice sheet can be one km thick. Estimate the pressure underneath the ice. (The density of ice is 918 kg/m^3.)
a. 9.0×10^5 Pa (9 atm)
b. 2.5×10^6 Pa (25 atm)
c. 4.5×10^6 Pa (45 atm)
d. 9.0×10^6 Pa (90 atm)
e. 1.2×10^7 Pa (120 atm)

____ 2. What is the total force on the bottom of a 2.0-m-diameter by 1.0-m-deep round wading pool due to the weight of the air and the weight of the water? (Note the pressure contribution from the atmosphere is 1.0×10^5 N/m^2, the density of water is 1 000 kg/m^3, and $g = 9.8$ m/s^2.)
a. 3.4×10^5 N
b. 2.4×10^6 N
c. 3.2×10^6 N
d. 6.0×10^6 N
e. 8.7×10^6 N

____ 3. In a large tank of liquid, the hydrostatic pressure at a given depth is a function of:
a. depth.
b. surface area.
c. liquid density.
d. Choices a and c are both valid.
e. Choices a and b are both valid.

____ 4. By what factor is the total pressure greater at a depth of 850 m in water than at the surface where pressure is one atmosphere? (water density = 1.0×10^3 kg/m^3, 1 atmosphere pressure = 1.01×10^5 N/m^2, and $g = 9.8$ m/s^2)
a. 100
b. 83
c. 74
d. 19
e. 10

____ 5. Dams at two different locations are needed to form a lake. When the lake is filled, the water level will be at the top of both dams. The Dam #2 is twice as high and twice as wide as Dam #1. How much greater is the force of the water on Dam #2 than the force on Dam #1? (Ignore atmospheric pressure; it is pushing on both sides of the dams.)
a. 2
b. 4
c. 8
d. 16
e. 32

____ 6. The water behind Grand Coulee Dam is 1 200 m wide and 150 m deep. Find the hydrostatic force on the back of the dam. (Hint: the total force = average pressure × area)
   a. 5.2×10^9 N
   b. 8.8×10^{10} N
   c. 13.2×10^{10} N
   d. 18.0×10^{10} N
   e. 21.0×10^{10} N

____ 7. A piece of aluminum has density 2.70 g/cm^3 and mass 775 g. The aluminum is submerged in a container of oil of density 0.650 g/cm^3. A spring balance is attached with string to the piece of aluminum. What reading will the balance register in grams (g) for the submerged metal?
   a. 960 g
   b. 775 g
   c. 588 g
   d. 190 g
   e. 123 g

____ 8. What volume of water is displaced by a submerged 2.0-kg cylinder made of solid aluminum? (aluminum density = 2.7×10^3 kg/m^3 and water density = 1.0×10^3 kg/m^3)
   a. 7.4×10^{-4} m^3
   b. 1.4×10^3 m^3
   c. 9.9×10^3 m^3
   d. 6.0×10^2 m^3
   e. 4.2×10^2 m^3

____ 9. A cube of wood of density 0.78 g/cm^3 is 10 cm on a side. When placed in water, what height of the block will float above the surface? (water density = 1.00 g/cm^3)
   a. 7.8 cm
   b. 5.0 cm
   c. 2.2 cm
   d. 6.4 cm
   e. 1.8 cm

____ 10. A large stone is resting on the bottom of the swimming pool. The normal force of the bottom of the pool on the stone is equal to the:
   a. weight of the stone.
   b. weight of the water displaced.
   c. sum of the weight of the stone and the weight of the displaced water.
   d. difference between the weight of the stone and the weight of the displaced water.
   e. weight of the water in the swimming pool.

____ 11. A heavily loaded boat is floating in a pond. The boat starts to sink because of a leak but quick action plugging the leak stops the boat from going under although it is now deeper in the water. What happens to the surface level of the pond?
   a. It stays the same.
   b. It goes up.
   c. It goes down.
   d. More information is needed to reach a conclusion.

____ 12. An ideal fluid, of density 0.90×10^3 kg/m^3, flows at 6.0 m/s through a level pipe with radius of 0.50 cm. The pressure in the fluid is 1.3×10^5 N/m^2. This pipe connects to a second level pipe, with radius of 1.5 cm. Find the speed of flow in the second pipe.
a. 54 m/s
b. 18 m/s
c. 0.67 m/s
d. 0.33 m/s
e. 0.21 m/s

____ 13. Water (density = 1×10^3 kg/m^3) flows at 10 m/s through a pipe with radius 0.030 m. The pipe goes up to the second floor of the building, 2.0 m higher, and the pressure remains unchanged. What is the radius of the pipe on the second floor?
a. 0.046 m
b. 0.034 m
c. 0.015 m
d. 0.012 m
e. 0.010 m

____ 14. Water comes down the spillway of a dam from an initial vertical height of 170 m. What is the highest possible speed of the water at the end of the spillway?
a. 15 m/s
b. 25 m/s
c. 58 m/s
d. 87 m/s
e. 1 370 m/s

____ 15. A fountain sends water to a height of 100 m. What must be the pressurization (above atmospheric) of the underground water system? (1 atm = 10^5 N/m^2)
a. 1 atm
b. 4.2 atm
c. 7.2 atm
d. 9.8 atm
e. 12 atm

____ 16. A jet of water flowing from a hose at 15 m/s is directed against a wall. If the mass flow in the fluid stream is 2.0 kg/s, what force is the water applying to the wall if backsplash is negligible?
a. 30 N
b. 40 N
c. 65 N
d. 127 N
e. 143 N

____ 17. It takes 2.0 minutes to fill a gas tank with 40 liters of gasoline. If the pump nozzle is 1.0 cm in radius, what is the average speed of the gasoline as it leaves the nozzle? (1 000 liters = one cubic meter)
a. 0.27 m/s
b. 1.1 m/s
c. 11 m/s
d. 64 m/s
e. 76 m/s

____ 18. Water is being sprayed from a nozzle at the end of a garden hose of diameter 2.0 cm. If the nozzle has an opening of diameter 0.50 cm, and if the water leaves the nozzle at a speed of 10 m/s, what is the speed of the water inside the hose?

a. 0.63 m/s
b. 0.80 m/s
c. 2.5 m/s
d. also 10 m/s
e. 12 m/s

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Answer Section

MULTIPLE CHOICE

1. D
2. A
3. D
4. B
5. C
6. C
7. C
8. A
9. C
10. D
11. A
12. C
13. B
14. C
15. D
16. A
17. B
18. A