Standardized Test Prep

MULTIPLE CHOICE

1. Which of the following is the correct equation for the net force acting on a submerged object?

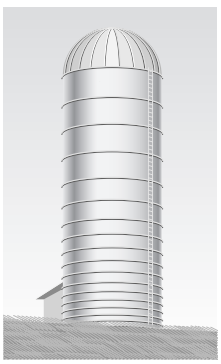
A. $F_{net} = 0$
B. $F_{net} = (\rho_{object} - \rho_{fluid})gV_{object}$
C. $F_{net} = (\rho_{fluid} - \rho_{object})gV_{object}$
D. $F_{net} = (\rho_{fluid} + \rho_{object})gV_{object}$

2. How many times greater than the lifting force must the force applied to a hydraulic lift be if the ratio of the area where pressure is applied to the lifted area is $\frac{1}{7}$?

F. $\frac{1}{49}$
G. $\frac{1}{7}$
H. 7
J. 49

3. A typical silo on a farm has many bands wrapped around its perimeter, as shown in the figure below. Why is the spacing between successive bands smaller toward the bottom?

A. to provide support for the silo's sides above them
B. to resist the increasing pressure that the grains exert with increasing depth
C. to resist the increasing pressure that the atmosphere exerts with increasing depth
D. to make access to smaller quantities of grain near the ground possible



4. A fish rests on the bottom of a bucket of water while the bucket is being weighed. When the fish begins to swim around in the bucket, how does the reading on the scale change?

F. The motion of the fish causes the scale reading to increase.
G. The motion of the fish causes the scale reading to decrease.
H. The buoyant force on the fish is exerted downward on the bucket, causing the scale reading to increase.
J. The mass of the system, and so the scale reading, will remain unchanged.

Use the passage below to answer questions 5–6.

A metal block (ρ = 7900 kg/m^3) is connected to a spring scale by a string 5 cm in length. The block's weight in air is recorded. A second reading is recorded when the block is placed in a tank of fluid and the surface of the fluid is 3 cm below the scale.

5. If the fluid is oil (ρ < 1000 kg/m^3), which of the following must be true?

A. The first scale reading is larger than the second reading.
B. The second scale reading is larger than the first reading.
C. The two scale readings are identical.
D. The second scale reading is zero.

6. If the fluid is mercury (ρ = 13 600 kg/m^3), which of the following must be true?

F. The first scale reading is larger than the second reading.
G. The second scale reading is larger than the first reading.
H. The two scale readings are identical.
J. The second scale reading is zero.