Q14.1

The sphere on the right has twice the mass and twice the radius of the sphere on the left.

Compared to the sphere on the left, the larger sphere on the right has

A. twice the density.

B. the same density.

C. 1/2 the density.

D. 1/4 the density.

E. 1/8 the density.
The sphere on the right has twice the mass and twice the radius of the sphere on the left.

Compared to the sphere on the left, the larger sphere on the right has

A. twice the density.

B. the same density.

C. 1/2 the density.

D. 1/4 the density.  

E. 1/8 the density.
A block of ice (density 920 kg/m$^3$) and a block of iron (density 7800 kg/m$^3$) are both submerged in a fluid. Both blocks have the same volume. Which block experiences the greater buoyant force?

A. the block of ice
B. the block of iron
C. Both experience the same buoyant force.
D. The answer depends on the density of the fluid.
A block of ice (density 920 kg/m³) and a block of iron (density 7800 kg/m³) are both submerged in a fluid. Both blocks have the same volume. Which block experiences the greater buoyant force?

A. the block of ice

B. the block of iron

✓ C. Both experience the same buoyant force.

D. The answer depends on the density of the fluid.
A cylinder is completely filled with water. The top of the cylinder is sealed with a tight-fitting lid.

If you push down on the lid with a pressure of 1000 Pa, the water pressure at the bottom of the cylinder

A. increases by more than 1000 Pa.
B. increases by 1000 Pa.
C. increases by less than 1000 Pa.
D. is unchanged.
E. The answer depends on the height of the cylinder.
A cylinder is completely filled with water. The top of the cylinder is sealed with a tight-fitting lid.

If you push down on the lid with a pressure of 1000 Pa, the water pressure at the bottom of the cylinder

A. increases by more than 1000 Pa.

B. increases by 1000 Pa.

C. increases by less than 1000 Pa.

D. is unchanged.

E. The answer depends on the height of the cylinder.
An incompressible fluid flows through a pipe of varying radius (shown in cross-section). Compared to the fluid at point $P$, the fluid at point $Q$ has

A. greater pressure and greater volume flow rate.
B. greater pressure and the same volume flow rate.
C. the same pressure and greater volume flow rate.
D. lower pressure and the same volume flow rate.
E. none of the above
An incompressible fluid flows through a pipe of varying radius (shown in cross-section). Compared to the fluid at point $P$, the fluid at point $Q$ has

A. greater pressure and greater volume flow rate.

B. greater pressure and the same volume flow rate.

C. the same pressure and greater volume flow rate.

D. lower pressure and the same volume flow rate.

E. none of the above

[Diagram showing a pipe with radius $R$ transitioning to a larger radius $2R$, with points $P$ and $Q$.]
Q14.5

An incompressible fluid flows through a pipe of varying radius (shown in cross-section). Compared to the fluid at point $P$, the fluid at point $Q$ has

A. 4 times the fluid speed.
B. 2 times the fluid speed.
C. the same fluid speed.
D. 1/2 the fluid speed.
E. 1/4 the fluid speed.
A14.5

An incompressible fluid flows through a pipe of varying radius (shown in cross-section). Compared to the fluid at point $P$, the fluid at point $Q$ has

A. 4 times the fluid speed.
B. 2 times the fluid speed.
C. the same fluid speed.
D. 1/2 the fluid speed.
E. 1/4 the fluid speed.