Section A

1. Which correctly shows the relationship between pressure and depth in a liquid?
   Tick (✓) **one** box.

   The pressure increases with depth under the surface ☐

   The pressure decreases with depth under the surface ☐

   The pressure does not change with depth ☐

2. Which correctly shows the relationship between pressure and altitude?
   Tick (✓) **one** box.

   The pressure increases with altitude ☐

   The pressure decreases with altitude ☐

   The pressure does not change with altitude ☐

3. Identify each quantity represented by the equation below.

$$p = h\rho g$$

p = _____

h = _____

ρ = _____

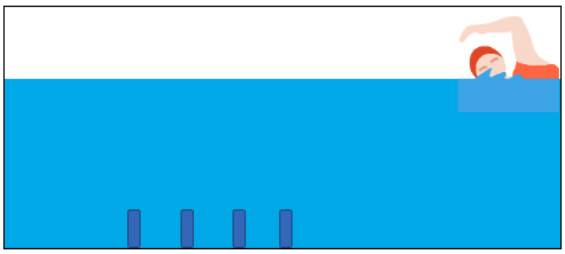
g = _____

4. The unit Pa is usually used to measure pressure. Which of these quantities is 1 Pa equal to?

| | | | | |
|---|---|---|---|---|
| 1 $m^2$ | 1 kg/N | 1 N/kg | 1 $kg/m^3$ | 1 $N/m^2$ |

Section B

5. A child is collecting dive sticks from the bottom of a swimming pool.



a. Describe what happens to the pressure on the child as they swim to the bottom of the pool. Explain why.

b. The child drops another dive stick into the water and it sinks to the bottom. Explain what this shows about the forces acting on the dive stick.

c. Calculate the change in pressure the child experiences when they are 1 m below the water to 2.5 m below the water. The density of water is 997 kg/m$^3$ and the gravitational field strength is 9.8 N/kg.

6. This image shows a water tank that contains rainwater. A watering can is then filled with water from the tap at the bottom and the rainwater is then used to water gardens.

a. Suggest how the time taken to fill the watering can would be different if the tap was higher up on the tank.

b. The bottom of the container has a cross-sectional area of 0.13 m$^2$. When it is full the water inside the tank has a mass of 45 kg. Calculate the pressure exerted by the water on the bottom of the container.

Section C

7. A swimmer is standing on the edge of a stationary boat.
   a. Draw a free body diagram to show the forces acting on the stationary boat.
   b. The swimmer jumps forwards off the boat. What would happen to the boat?
   c. Which of Newton's Laws of motions explains this?
   d. The boat has a mass of 3000 kg. Explain how it is possible for the boat to float.