Answer on Question 66067, Physics, Other

Question:

An underwater diver is working at a depth of 30 m below mean sea level. What is the total pressure on the diver at that depth?

Solution:

We can find the total pressure on the diver at the depth of 30 m from the formula:

$$P_{total} = P_{atm} + P_{sea\ water} = P_{atm} + \rho_{sea\ water} gh,$$

here, P_{total} is the total pressure on the diver at the depth of 30 m, $P_{atm} = 1.013 \cdot 10^5\ N/m^2$ is the pressure of the atmosphere acting on the surface of the sea, $P_{sea\ water}$ is the pressure of the sea water acting on the diver, $\rho_{sea\ water} = 1.025 \cdot 10^3\ \frac{kg}{m^3}$ is the density of the sea water, $g = 9.8\ \frac{m}{s^2}$ is the acceleration due to gravity, $h = 30\ m$ is the depth.

Then, we get:

$$P_{total} = P_{atm} + \rho_{sea\ water} gh = 1.013 \cdot 10^5\ Pa + 1.025 \cdot 10^3\ \frac{kg}{m^3} \cdot 9.8\ \frac{m}{s^2} \cdot 30\ m =$$
$$= 4.03 \cdot 10^5\ Pa.$$

Answer:

$P_{total} = 4.03 \cdot 10^5\ Pa.$