Homework

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Numericals

(1) $P = P_0 + \rho g h$

$\Rightarrow P = 10^5 + 10^3 \times 10 \times 2$

$\Rightarrow P = 10 \times 10^4 + 2 \times 10^4$

$\Rightarrow P = 1.2 \times 10^5$ Pa.

(2) $F = mg$

$= 60 \times 10 = 600$ N.

Now,

$P = \frac{F}{A} = \frac{600}{6 \times 10^3} = \frac{1}{10} = 0.1$

(3) (a) FE = 10 mm

AB = 65 + 65 + 10 = 140 mm = 0.14 m

EC = 65 + 65 = 130 mm = 0.13 m

Pressure at point B: $P_B = P_0 + \rho_{oil} g (AB)$, where P_0 is the atmospheric pressure.

$\therefore P_B = P_0 + \rho_{oil} g (0.14)$

Pressure at point C = $P_C = P_0 + \rho_{water} g (EC)$

where $\rho_{water} = 1000$ kg/m^3.

$P_C = P_0 + \rho_{water} g (0.13)$

$P_B = P_C$

$\therefore P_0 + \rho_{oil} g (0.14) = P_0 + \rho_{water} g (0.13)$

Or, $\rho_{oil} g (0.14) = \rho_{water} g (0.13)$

Density of oil, $\rho_{oil} = \frac{1000 \times 0.13}{0.14} = 928$ kgm^{-3}

MCQ's

1. (a) lower than
2. (c) color of fluid
3. D > B > A > C

MCQ's

1. (b) 4800 Pa.
2. (a) 10000 N.
3. 2000 cm^2.