No

Rivison of 13, 14, 15 :

Example ①:

The normal pressure of blood is 80 mmHg to 120 mmHg. This value is equal to:

① 80 Pa to 120 Pa
② 800 Pa to 1200 Pa
③ 10256 Pa to 17589 Pa.
④ 10526 Pa to 15789 Pa.

→ Solution:

the height of mercury in barometer (above the surface of the sea) = 760 mmHg.

pressure of air (above the surface of the sea) = 1 atm
$= 1 \times 10^5$ Pa

1 mmHg = ... Pa

$$\frac{1 \times 10^5 \text{ Pa}}{760 \text{ mmHg}} = \frac{100,000 \text{ Pa}}{760 \text{ mmHg}} = 131.58 \text{ Pa/mmHg}.$$

80 mmHg = 80 × 131.58 Pa = 10,526 Pa → D
120 mmHg = 120 × 131.58 Pa = 15,789 Pa

... a chemical solvent

(8) the pressure at the bottom of the storage tank due to the solvent.

* Example (2):

The density of sea water is ~1025 Kg/m^3, the maximum depth of the Atlantic ocean is ~8500 m (8.5 Km).

(a) Calculate the water pressure at this depth.

$p = \rho hg = 8500 \times 1025 \times 9.8 = 85400000$ Pa

(to 3 sf, 85400kPa, 8.54×10^7 Pa, 8.54×10^4 KPa)

(b) By what factor is the pressure greater at these depths compared to the ocean surface?

Atmospheric pressure is ~101 KPa

pressure at bottom of ocean ÷ Pressure at surface

$= 85400 \div 101 = 846$ (3 sf).

* Note: this extraordinary increase in pressure mean to explore this "alien" world you need a very strong submersible craft. However, evolution has allowed all sorts of creatures to live down at these depths, all fully pressure adjusted over time!

(2)

ج ⑨

بده ضغط ماء البحر عند هذا

العمق ⇐ بحط قانون $P=\rho hg$

إذا طلب الضغط عند هذا العمق

ما حدد ضغط الماء ⇐ بده

الضغط الكلي

al

rag

xamp

The ... is ~ 1025 K

ximum ... antic ocean

.5 Km).

Calculate the water pressure at this

بالأمتى ⇐

If you (theoretically) brought any such creatures rapidly to the surface and exposed them to normal pressure, it would kill them!

Example ③ :

At a depth of 12.5 m of a chemical solvent the pressure at the bottom of the storage tank due to the solvent was 306 Kpa. Calculate density of the solvent.

$P = \rho g h$ $\quad \rho = \frac{P}{gh} = \frac{306000}{(12.5(9.8))} = 2498 \text{ kg/m}^3$.

Example ④ :

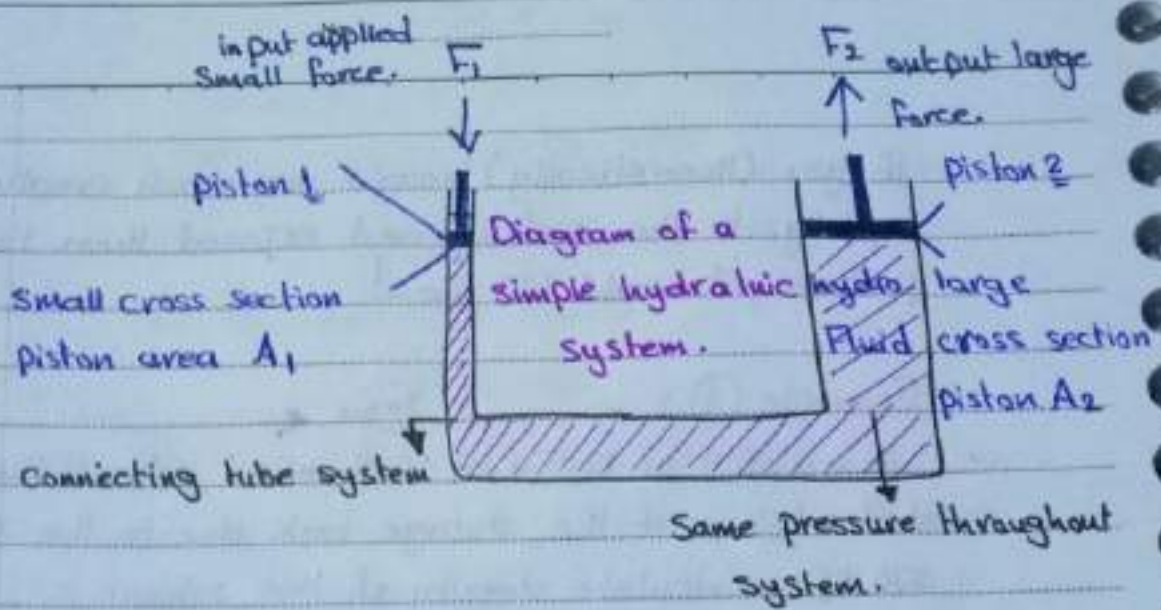
In a simple hydraulic system piston 1 has a cross section area of 0.000050 m^2, and piston 2 has a cross section area of 0.00025. If a force of 35 N is applied to piston

ⓐ what is the force multiplying ratio?

$$\text{Force ratio} = \frac{A_2}{A_1} = \frac{0.00025}{0.000050} = 5$$

ⓑ what output force is generated by piston 2?

$$F_2 = F_1 \times \frac{A_2}{A_1} = 35 \times 5 = 175 \text{ N}.$$



Example ⑤:

water is flowing in a fire hose with a velocity of 1 m/s and a pressure of 200000 Pa. At the nozzle the pressure decreases to atmospheric pressure (101300 Pa), there is no change in height. Use the Bernoulli equation to calculate the velocity of the water exiting the nozzle. (Hint: The density of water is 1000 Kg/m³ and gravity g is 9.8 m/s². pay attention to units!).

$$\tfrac{1}{2}\rho v_1^2 + \cancel{\rho g h_1} + P_1 = \tfrac{1}{2}\rho v_2^2 + \cancel{\rho g h_2} + P_2$$

$$h_1 = h_2$$

$$\tfrac{1}{2}\rho v_1^2 + P_1 = \tfrac{1}{2}\rho v_2^2 + P_2$$

$$\sqrt{\frac{2}{\rho}\left(\tfrac{1}{2}\rho v_1^2 + P_1 - P_2\right)} = 14 \text{ m/s}$$

No.

Example ⑥:

Through a refinery. fuel ethanol is flowing in a pipe at a velocity of 1m/s and a pressure of 101500 Pa. The refinery needs the ethanol to be at a pressure of 2 atm (202600) Pa on a lower level. How far must the pipe drop in height in order to achieve this pressure? Assume the velocity does not change. (Hint: Use the Bernoulli equation. The density of ethanol is 789 kg/m^3 and gravity g is 9.8 m/s^2. pay attention to units!)

$\cancel{\frac{1}{2}\rho v_1^2} + \rho g h_1 + P_1 = \cancel{\frac{1}{2}\rho v_2^2} + \rho g h_2 + P_2$ * $v_1 = v_2$

$\rho g h_1 + P_1 = \rho g h_2 + P_2$

$\frac{P_1 - P_2}{\rho g} = h_2 - h_1 = \Delta h = -13.1\ m.$ بعد الاختلاف بالنسبة لـ level اللي انا فيه.

Example ⑦:

Convert the room temperature in K → F°. Room temperature = 293 K?

$F^\circ = \frac{9}{5}(K - 273) + 32 = 68^\circ F.$

* التحويل من F° ← K بالعكس.

No.

Example (8):

The average body temperature of a person is 98.6°F. what is the average body temperature of a person in K?

$$K = \frac{5}{9}(F^\circ - 32) + 273.15 = 310.15\ K.$$

← الأفضل أتعامل مع الهنك بوحدة الإمتال.

(6)

أسأل الله لكم التوفيق 🤍