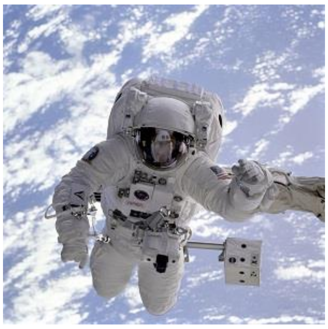
Name : **Date:**

HVAC Learning.com

Exercise Booklet

Print this exercise booklet before studying the lesson on line. It will enable you to write your answers to the HVAC learning exercises. You will thus be able to switch between reading or listening to the file on-line and writing in the booklet.



WEIGHTS, PRESSURES IN HVAC

English lesson:
https://hvac-learning.com/base-physics/physics-level-1/weights-pressures-in-hvac/

French lesson:
https://formation.xpair.com/cours/poids-pressions-genie-climatique.htm

For each exercise, you will write your answer, then you will study its correction on-line before going to the next exercise.
If you cannot do an exercise, you will be able to study its correction directly, but ***force yourself to write your answer*** *as often as possible.*

Note that between 2 exercises, you will find it necessary to study the course. As a warning, in the booklet, you will sometimes find the following indication:
- *"* ***Study the course on-line before doing the next exercise****" or*
- *"* ***Study the course on-line before going to the next paragraph****"*

Only study the paragraphs or the exercises which have an equal or a lower level than the one your training requires.
NVQ Level = Vocational Certificate
A Level = High school Diploma
HND Level = Associate's Degree
MSC Level = Engineering Schools

Then, when you have completed a file, you will be able to assess your level on-line through a Multiple Choice Questionnaire in which you will only answer the questions related to the themes you have studied.
So now off you go and work well!
Good luck!
The Authors.

N°1 – Weight training – NVQ level

Study the course on-line before treating the next exercise.

Question 1

What is the weight in Newtons of a mass of 1 [kg]?

N°2 – Pressures training – NVQ to A level

Study the course on-line before treating the next exercise.

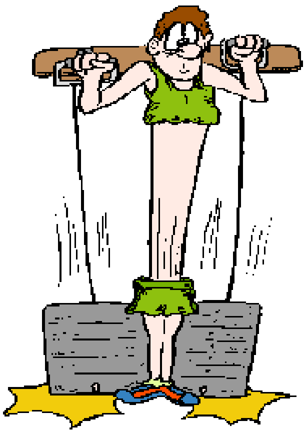
p = **F** / **S**

With :

– F: force in Newton

– S: surface area of the applying force in [m^2]

– p: pressure in [kg/m^2]   (in Pascal)



Question 1

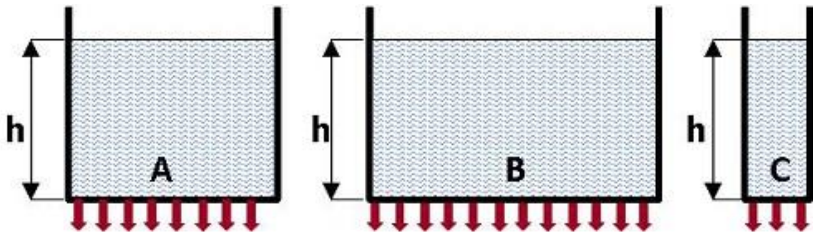
What is the weight of a mass of steel of 1,019.37 [kg]?
What is the pressure in [Pa], [daPa], [kPa], or [bar] exerted by this mass if applied to an area of 1 [m^2]?

Question 2

What is the weight of 1,019.37 [kg] of water?
What is the pressure in [Pa], [daPa], [kPa], or bar exerted by this mass if applied to an area of 2 [m^2]?

N°3 – Water pressures training – NVQ level

Study the course on-line before treating the next exercise.



Question 1

Study the course on-line before treating the next exercise.

Question 2

This diver is in water 15 [m] deep. What pressure does **he feel**?

Question 3

What pressure can we measure at the bottom of a 30 [m] high water tower?

N°4 – Units of pressure training – NVQ level

Study the course on-line before treating the next exercise.

Question 1

Convert the following into the units required:

42 [kPa]	=	[bar]		3000 [mmH_2O]	=	[bar]	
4500 [daPa]	=	[bar]		30 [kPa]	=	[bar]	
45 [mH_2O]	=	bar]		150 [daPa]	=	[bar]	

Question 2

Convert the following into the units required:

300 [mmH_2O]	= [bar]		27 [kPa]	= [bar]	
7 [mH_2O]	= [daPa]		4500 [mmH_2O]	= [kPa]	
400 [mbar] (millibar)	= [bar]		0.3 [bar]	= mbar]	
12 [kPa]	= [mH_2O]		200 [daPa]	= [kPa]	

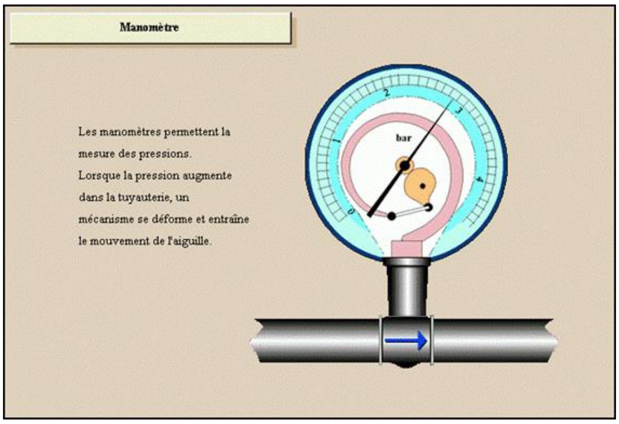
Question 3

Convert the following into the units required:

30 [mmH_2O]	= [daPa]	75 [kPa]	= [mH_2O]
3 atm (standard atmosphere)	= [bar]	5 [kgf/cm²] (kg force per sq. cm)	= [bar]
7.5 [bar]	= [kPa]	45 [mmH_2O]	= [kPa]
7.5 [kPa]	= [bar]	200 [daPa]	= [bar]

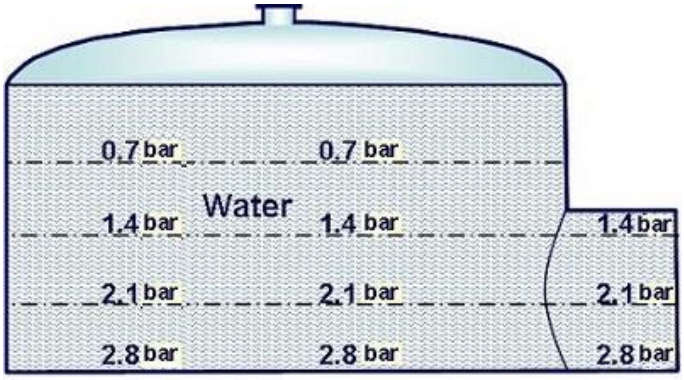
N°5 – Pressure measuring training – NVQ level

Study the course on-line.



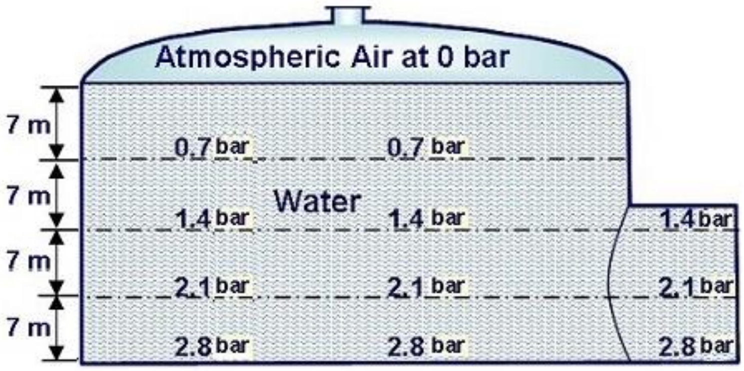
N°6 – Water pressures on a similar level training – NVQ level

Study the course on-line.



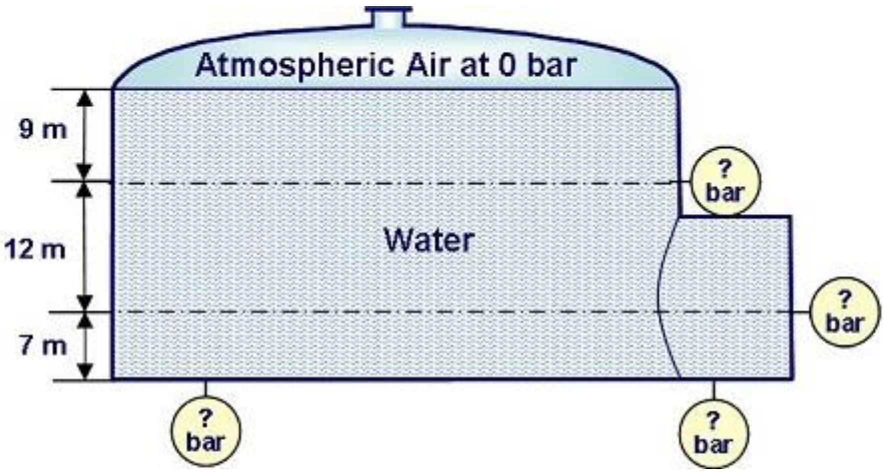
N°7 – Water pressures on a vertical plain – NVQ level

Study the course on-line before treating the next exercise.



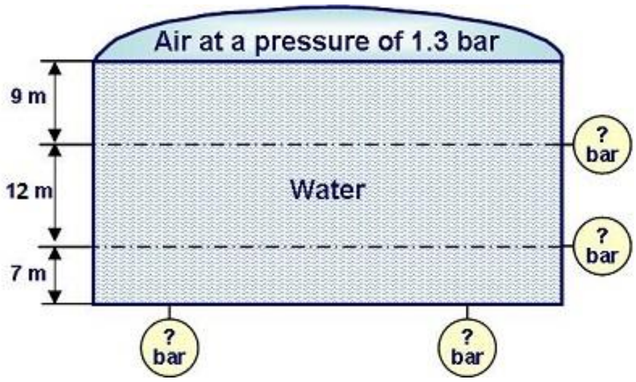
Question 1

Indicate in [bar] the pressures in the tank.



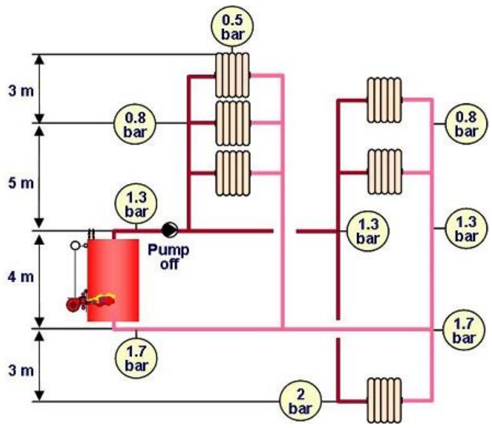
Question 2

Indicate in [bar] the pressures in the tank.



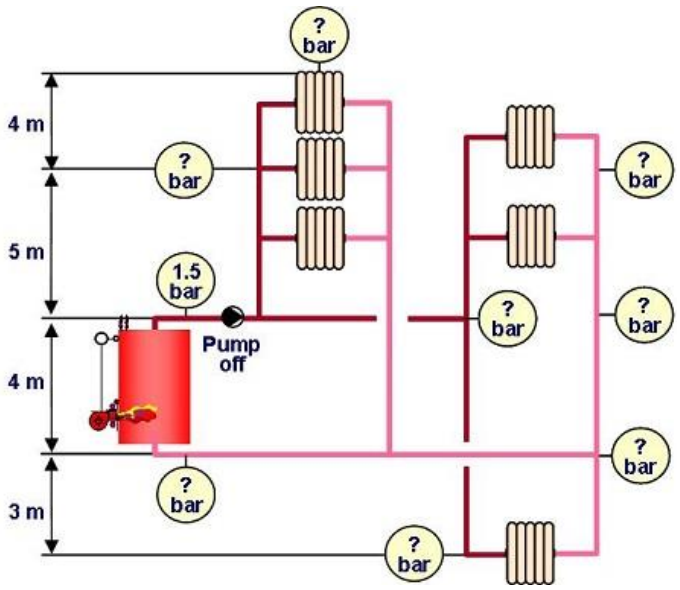
N°8 – Water pressure in heating systems training – A level

Study the course on-line before treating the next exercise.



Question 1

Indicate the pressures in the heating system below (pump off).
The pressure is known at the boiler, the other pressures can be determined by taking into account the water height levels.



Question 2

Pump off, we measure at the boiler a pressure of 3.5 [bar].
At the same moment, at another point of the same circuit we measure a pressure of 4.7 [bar].

Question 3

The safety valve at the boiler opens if the pressure becomes excessive.
With a boiler rooftop installation the valve is set to open at 2 [bar].
To what maximum pressure could a radiator climb to, if situated 30 [m] below the boiler (disregarding the influence of the pump)?

Question 4

The safety valve situated at the boiler is set at 4 [bar].
To what maximum pressure could a radiator climb to, if situated 15 [m] above the boiler (disregarding the influence of the pump)?

Question 5

At the end of water-filling, we measure 2.8 [bar] at the boiler and at the top of the system a pressure of 0.5 [bar].
With the boiler at operating temperature, the thermal expansion of water leads to an increase in pressure and we measure, at the boiler, a pressure of 4 [bar].
What, at this moment, is the pressure at the top of the system (disregarding the influence of the pump)?

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