IQRA NATION UNIVESITY

Thermodynamic

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(1)

ANS1 Given data:

$P_1 = 4\,atm$
$V_1 = 6\,L$
$V_2 = 2.50\,L$
$P_2 = ?$

Solution:

Now

$$P_1V_1 = P_2V_2$$

$$\frac{P_1V_1}{V_2} = \frac{P_2\cancel{V_2}}{\cancel{V_2}}$$

$$P_2 = \frac{P_1V_1}{V_2}$$

$$P_2 = \frac{(4)(6)}{2.50}$$

$$P_2 = \frac{24}{2.50} \Rightarrow \boxed{P_2 = 9.6\,atm}$$

Now

$1\,atm = 29.9\,Hg$ and

$29.9\,Hg = 760\,mm\,Hg$

So

$9.6\ atm = 7296\ mm\ Hg$

$1\ atm = 14.7\ Psi$

$9.60\ atm = 14.12\ Psi$ Ans

Ans 2:-

The above statement is false Because They both have an inverse relationship.

Reason:-

When altitude increases, the air pressure decrease. This is due to the amount of air on top of you at your curent altitude. At lower altitude, you have more air above you and thus more pressure. And at higher altitude, you have less air above you, and thus less pressure. Therefore at high altitude. Food takes longer time to cook due to low pressure.

ANS 3:-

Given data:

$V_1 = 8\ ft^3$

$P_1 = 100\ lb\text{-}f/in^2$

$P_2 = 18.3\ lb\text{-}f/in^2$

Work done, $W = ?$

Solution:-

Now

$$P_1V_1 = P_2V_2$$

$$\frac{P_1V_1}{P_2} = \frac{P_2V_2}{P_2}$$

$$V_2 = \frac{P_1V_1}{P_2}$$

$$V_2 = \frac{(100)(8)}{18.3}$$

$$V_2 = \frac{800}{18.3}$$

$$\boxed{V_2 = 43.95\ ft^3}$$

(4)

$$W = p_1 v_1 \ln\left(\frac{v_2}{v_1}\right)$$

$$= (100)(8)(18.3) \ln\left(\frac{43.95}{8}\right)$$

$$= 14640 \ln\left(\frac{43.95}{8}\right)$$

Work done = 24860.70 ft-lbs

Ans 4(i):-

Defference between work and heat.

	Heat	Work
(1)	Heat is a form of energy	work is the amount of energy transfered by a force acting through distance.
(2)	Three modes of heat transfer are	There are as many types of work interactions as There are generalised.
(3)	Being Zero for an adiabatic system, connot affect its temperature.	can cause a temperature rise in an adiabatic system.

	heat	work
(4)	It require temperature difference	It requires force and displacement
(5)	It cannot be totally converted into form of work	It can be transfere to heat

Ans 4(ii):

As according to the first law of thermodynamic. "Q" is the net heat transfere into the system. That is Q is the sum of all heat transfer into and out of the system. "W" is the net work done by the system. That is "W" is the sum of all the work done on or by the system.