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(1)

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Assignment

Ans 1)

Given that :-

$$P_1 = 4 \text{ atm}$$

$$V_1 = 6 \text{ L}$$

$$V_2 = 2.50 \text{ L}$$

Find :-

$$P_2 = ?$$

Solution :-

We know that

$$P_1 V_1 = P_2 V_2$$

$$\frac{P_1 V_1}{V_2} = \frac{P_2 \cancel{V_2}}{\cancel{V_2}}$$

$$P_2 = \frac{P_1 V_1}{V_2}$$

$$= \frac{(4) (6)}{2.50} \Rightarrow \boxed{P_2 = 9.6 \text{ atm}}$$

Now,

For mm Hg

$$1 \text{ atm} = 29.9 \text{ Hg} \quad \& \quad 29.9 \text{ Hg} = 760 \text{ mm Hg}$$

So,

$$9.60 \text{ atm} = 7296 \text{ mm Hg}$$

For Psi

$$1 \text{ atm} = 14.7 \text{ Psi}$$

So,

$$9.60 \text{ atm} = 14.12 \text{ Psi} \quad \text{Ans.}$$

(2)

Ans 3)

Given that:-

$$V_1 = 8 \text{ ft}^3$$

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

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

Find:-

Work done $w = ?$

Solution:-

As we know

$$P_1 V_1 = P_2 V_2$$

$$\frac{P_1 V_1}{P_2} = \frac{P_2 V_2}{P_2}$$

$$V_2 = \frac{P_1 V_1}{P_2}$$

$$= \frac{(100)(8)}{(18.3)} = \frac{800}{18.3}$$

$$V_2 = 43.71 \text{ ft}^3$$

Now

$$\begin{aligned} \text{Work done, } w &= P_1 V_1 \ln\left(\frac{V_2}{V_1}\right) \\ &= (100)(8)(18.3) \ln\left(\frac{43.71}{8}\right) \end{aligned}$$

$$= 14640 \ln\left(\frac{43.71}{8}\right)$$

$$\boxed{\text{Work done} = 24260.70 \text{ ft-lbs}}$$

Ans 2)

The above statement is false because they both have an inverse relationship.

Reason:-

When altitude increases, the air pressure decreases. This is due to the amount of air on top of you at your current altitude. At lower altitude, you have more air above you & thus more pressure. And at higher altitude, you have less air above you, & thus less pressure.

Therefore at high altitude, food takes longer time to cook due to low pressure.

Ans 4)

Heat	Work
1) Heat is a form of energy	Work is the amount of energy transferred by a force acting through distance.
2) It requires temperature difference.	It requires force & displacement.
3) It cannot be totally converted into form of work.	It can be transferred to heat.
4) The efficiency of the transfer of heat to work is lower.	The efficiency of the transfer to work to heat is higher.

(4)

Ans 4)

As according to the first law of thermodynamics:

Q is the net heat transferred into the system. That is Q is the sum of all heat transfer into 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.