

Thermodynamics Assignment

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Dept :

BE-E

Subject :

Thermodynamics

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Instructor :

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QNO.1

Problem

Solution

$$\text{Initial Volume} = V_1 = 6 \text{ liters}$$

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

$$\text{Final Volume} = V_2 = 2.50 \text{ Liters}$$

$$\text{Final Pressure} = P_2 = ?$$

Pressure find in atm, mmHg
and Psi

So

as temperature is constant,

$$P_1 V_1 = P_2 V_2$$

$$(4 \text{ atm})(6 \text{ L}) = (P_2)(2.50 \text{ L})$$

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

$$P_2 = 9.6 \text{ atm}$$

(b)

$$V_1 = \text{Water} = 6 \text{ liters}$$

$$P_1 = \text{Water} = 3040.00 \text{ mmHg}$$

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

$$P_2 = (?) \text{ mmHg}$$

So

$$P_1 V_1 = P_2 V_2$$

$$(3040.00 \text{ mmHg})(6 \text{ L}) = P_2(2.50 \text{ L})$$

$$P_2 = \frac{(3040.00 \text{ mmHg})(6 \text{ L})}{(2.50 \text{ L})}$$

$$P_2 = 7296 \text{ mmHg}$$

$$(C) \quad V_1 = 6 \text{ Liters}$$

$$P_1 = 4 \text{ atm} = 58.78 \text{ Psi}$$

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

$$P_2 = ? \text{ (Psi)}$$

so

$$P_1 V_1 = P_2 V_2$$

$$(58.78 \text{ Psi})(6 \text{ L}) = P_2(2.50 \text{ L})$$

$$P_2 = \frac{(58.78) \text{ Psi} (6 \text{ L})}{(2.50 \text{ L})}$$

$$P_2 = 141.07 \text{ Psi}$$

QNO.03

Solution

$$\text{Volume} = V_1 = 87 \text{ ft}^3$$

$$\text{Pressure} = P_1 = 100 \text{ lb./in}^2$$

$$\text{Pressure} = P_2 = 18.3 \text{ lb./in}^2$$

$$\text{Work done} = W = ?$$

So

According to Boyle's Law

$$P_1 V_1 = P_2 V_2$$

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

$$V_2 = \frac{(100)(87)}{(18.3)}$$

$$V_2 = 475.35 \text{ ft}^3$$

Work done = $PV = \text{constant}$

So The process is hyperbolic

So,

$$W = P_1 V_1 = P_2 V_2$$

$$W = P_1 V_1 = 87 \times 100$$

$$W = 8700 \text{ J}$$

$$W = P_2 V_2$$

$$W = (18.3)(43.72)$$

$$W = 800.07 \text{ J}$$

Q NO. 4

(a)

Ans.

Heat :-

- (i) Heat is a way of transferring of energy from one system to another system.
- (ii) This is the transfer of Thermal energy.
- (iii) Heat associate with random motion of particles.
- (iv) Heat is low quality energy.
- (v) Heat is changed by Temperature difference.
- (vi) Microscopic process ^{collisions} is occurred in heat.

Work :-

- (i) Work is also a way of transferring of energy from one system to another.

(ii) Work Transfers mechanical energy of a system.

(iii) Work is associated with ordered motion of energy.

(iv) Work is High quality energy.

(v) Work is changed by displacement and force.

(vi) Macroscopic pushes and pulls is occurred in work.

QNO.02

Ans.

This statement is false because,

" Air pressure and altitude both have inverse relationship. When altitude increases, air pressure decreases.

This is due to amount of air on top of you at your current location.

At lower altitude, you have more air above you and Thus more air pressure.

At higher altitude, you have less air above you, and Thus less pressure."