Department of Electrical Engineering
Sessional Assignment
Date: 06/05/2020

Course Details

Course Title: Thermodynamics **Module:** 02
Instructor: sir mujtaba **Total Marks:** 20

Student Details

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Q1.		Let the initial volume of the gas in a container be 06 liters and the initial pressure be 04 atm. The piston is compressed at a constant temperature to a new final volume of 2.50 L. **Evaluate** the final pressure in units of atm, mmHg and psi.	Marks 06 CLO 2
Q2.		**State** the following statement as **True** or **False** and also give the reason for your answer: "There is a direct relationship between air pressure and altitude".	Marks 03 CLO 2
Q3.		A volume of 8 ft^3 of steam at a pressure of 100 lb-f/in^2 is expanded hyperbolically to a pressure of 18.3 lb-f/in^2 **Calculate** the work done by steam.	Marks 06 CLO 1
Q4.	i. ii.	**Outline** the differences between work and heat. **Describe** the meaning of the term $\Delta Q = \Delta W$	Marks 03+02 CLO 1

Q NO 1

ANS: Given data:

$V_1 = 6\ L$

$P_1 = 4\ atm$

$V_2 = 2.50\ L$

Required:

Final pressure = $P_2 = ?$

Solution:

According to boyle's Law

$P_1 V_1 = P_2 V_2$

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

$P_2 = \frac{(6\ L)(4\ atm)}{(2.5\ L)}$

$\boxed{P_2 = 9.6\ atm}$

Converting into mmgh

$$9.6 \text{ atm} \left(\frac{760. \text{ mmgh}}{1 \text{ atm}} \right)$$

$P_2 = 7296 =$

$$\boxed{P_2 = 7.2 \times 10^{-3} \text{ mmgh}}$$

Converting into Psi

$$9.6 \text{ atm} \left(\frac{14.7 \text{ Psi}}{1 \text{ atm}} \right)$$

$P_2 = 141.12$

$$\boxed{P_2 = 1.4 \times 10^{-2} \text{ Psi}}$$

Q NO 2

ANS: False there is not a direct but inverse relation between air pressure & altitude.

Reason:

This is due to the amount of air above us. For example, if we are on the lower surface so we have more air above us which will exert more pressure but we move to higher surface there will be less air above us thus less air will exert less pressure

Conclusion:

We Concluded that there is inverse relation b/w air pressure & altitude.

Q NO 3

Ans Given:

$V_1 = 8\ ft^3$

$P_1 = 100\ lb.f/in^2$

$P_2 = 19.3\ lb.f/in^2$

Solution:

We know that

$P_2 V_2 = P_1 V_1$

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

$V_2 = \frac{100 \times 8}{19.3}$

$V_2 = 43.7158\ ft^3$

Workdone $= P.V$

as the process is hyperbolic

So

$W = P_1 V_1$

$= 8 \times 100$

$W = 800\ J$

Now

$$W = P_2 V_2$$

$$= (19.3)(4, 3.7158)$$

$$= 800.075$$

Result

$$W \cong 800$$

Q NO 4 (A)

ANS:- Heat and energy are two different ways of transferring energy from one system to another. Following are difference b/w heat & work

Heat	WORK
(1) Heat is the transfer of thermal energy b/w system	work is the transfer of mechanical energy b/w two system.
(2) work to be transformed fully into heat.	Heat cannot be fully converted into work
(3) Heat is the energy associated with the random motion of particles.	work is the energy of ordered motion in one direction.
(4) Change in Heat is represented by ΔH	Change in work is represented by ΔW.

Q.104 (Part b)

Ans

The term $\Delta Q = \Delta W$ implies that the heat supplied by the surrunding is equal to the work done by the system on the surrounding.

i.e ΔQ = heat supplied

ΔW = work done by system.