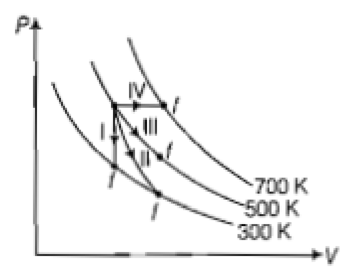
Department of Electrical Engineering
Assignment
Date: 20/04/2020

Course Details

Course Title: Thermodynamics **Module:** 02
Instructor: sir mujtaba **Total Marks:** 30

Student Details

Name: amjad ali **Student ID:** 16012

<table>
<tr><td>Q1.</td><td>(a)</td><td>Express the temperature of 139 °C on degree Fahrenheit, Rankine and Kelvin scales.</td><td>Marks 06
CLO 1</td></tr>
<tr><td></td><td>(b)</td><td>Derive the equation highlighting the work done by a gas or vapour in expanding for a constant temperature process.</td><td>Marks 05
CLO 1</td></tr>
<tr><td>Q2.</td><td></td><td>Analyze the given figure and match column 1 with the correct option of column 2.


<table>
<tr><th>Column 1</th><th>Column 2</th></tr>
<tr><td>Process I</td><td>Adiabatic</td></tr>
<tr><td>Process II</td><td>Isobaric</td></tr>
<tr><td>Process III</td><td>Isochoric</td></tr>
<tr><td>Process IV</td><td>Isothermal</td></tr>
</table></td><td>Marks 08
CLO 1</td></tr>
<tr><td>Q3.</td><td>(a)</td><td>Hydrogen is compressed under a constant pressure of 5760 lb/ft^2 until its volume is reduced from 28 to 12 ft^3. Calculate the work done in compressing the gas.</td><td>Marks 07
CLO 1</td></tr>
<tr><td></td><td>(b)</td><td>Differentiate between enthalpy and entropy using examples from daily life.</td><td>Marks 04
CLO 1</td></tr>
</table>

Answer 1(a):

Given
Temperature=139c^0

Require
F^0=?
R^0=?
K^0=?
Solution

Degree Fahrenheit

Formula
$F^0=(1.8*c^0)+32$
Put the value
$F^0=(1.8*139)+32$
$F^0=(250.2)+32$
$F^0=282.2\ F^0$

Ran king

Formula
($R^0= F^0+460$)
Put the value
$R^0= 282.2+460$
$R^0=742.2\ R^0$

Kelvin scales

Formula
$K^0= c^0+273$)
Put the value
$K^0= 139+273$
$K^0= 412K^0$

Answer 1(b):

work done by a gas or vapor in expanding:
the amount of work done by a gas or vapor in expending defend on the method by which expansion is perform .
as
w=∫ p Δ v
constant temperature

$w=\int_{v1}^{v2} p\ d\ v$

as p1 v1 =p2 v2= pv=c

p=c/v

$w=\int_{v1}^{v2} c/v\ \ dv$

$=c\ \ \ln\ \ v\int_{v1}^{v2}$

=c ln (v2/v1)

Work =p1v1 ln (v2/v)

Answer 2:

Ideal gas eq^n _pv =NRT

Isobaric process _ constant .P

Isochoric process _ constant .V

Isothermal process _constant .T

Adiabatic process _ no exchange of heat or mass =the great answer

Answer 3(a):

Solution:
P=7560lb/ ft^2
V2 =28ft^3
V=12ft^3
Work don =?
Solution is an constant presser process work don =(p)v2 –v1
=40*144 (28-12)
=40*144 (16)
=120,960 ft –lbf

Answer 3(b):

Explanation of terms entropy and enthalpy which are related to physics sub topic of thermodynamics using analogy (resemblance) from social lives of humans, thus below is the explanation.
A group of young friends in the peak of their youth is very energetic and needs a large play ground to play football or hockey etc., while, when the same group of friends becomes old they become less energetic and then they only need a corner in a small coffee shop to sit together and remember the days of their youth, the memories of those days when they were more energetic and they always wanted to wander here and there.
They always wanted to play and run fast therefore they wanted permissions from their parents to participate in sports that could even harm them so they wanted more allowances, liberties and freedoms from their parents, because such allowances are demand of their energy.

Example :

Imagine a football tightly filled with air and a large empty balloon which you want to fill by transferring all of the football's air to the balloon, while doing so you are giving the air in football an opportunity to show off its energy (enthalpy) by getting size (entropy) as large as the enthalpy or energy of this air is.

An interesting fact also worth noting is that when you release the air in football to the large balloon, you also increase the hunger or thirst of this air for heat or warmth from nearby objects, surroundings or environment because now this air (after being released has become cooler and as you know that cool things absorb heat energy from surrounding environment on the other hand when earlier we put the air in football previously it turned warmer hence this air tried to release its warmth to the environment.