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

Course Details

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

Student Details

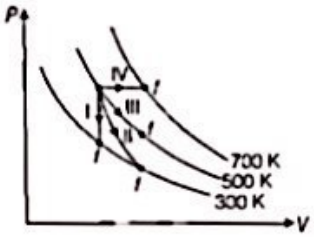
Name: **Student ID:**

Adnan khan 16208

Q1. (a) Express the temperature of 139 °C on degree Fahrenheit, Rankine and Kelvin scales. Marks 06 | CLO 1

(b) Derive the equation highlighting the work done by a gas or vapour in expanding for a constant temperature process. Marks 05 | CLO 1

Q2. Analyze the given figure and match column 1 with the correct option of column 2. Marks 08



Column 1	Column 2
Process I	Adiabatic
Process II	Isobaric
Process III	Isochoric
Process IV	Isothermal

CLO 1

Q3. (a) 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. Marks 07 | CLO 1

(b) Differentiate between enthalpy and entropy using examples from daily life. Marks 04 | CLO 1

Q1:-

a)

Answer:-

Given that:

139 C° into F, K and Ranking

Now

Fahrenheit:

As we know that

$F° = (1.8 \times C°) + 32$

putting the value of $C° = 139$

$F° = (1.8 \times 139) + 32$

$F° = 250.2 + 32$

$F° = 282.2F°$

(139 C° = 282.2 F°)

Kelvin:

As we know that:

$K = C° + 273$

putting the value of $C° = 139$

$K = 139 + 273$

$K = 412\,k$

(139 C° = 412 k)

Ranking:

$R = F° + 460$

$R = 282.2 + 460$ $\quad \therefore F° = 282.2$

$R = 742.2R^{\circ}$

So $(139c^{\circ} = 742.2R)$

Q 1 :->

b :->

Answer :->

The amount of work done by a gas or vapor in expending defend upon the method by which expension is done.

As,

$$W = \int p \Delta V$$

Constant temprature

$$W = \int_{V_2} p dv$$

$$P_1 V_1 = P_2 V_2$$

$$PV = C$$

$$P = C/V$$

$$W = \int_{V_1}^{V_2} C/V \, dv$$

$$= C \text{ in } V \int_{V_1}^{V_2}$$

$$W = C \ (V_2/V_1)$$

$$W = P_1 V_1 \ (V_2/V_1)$$

Q2 :→

Answer :-

ideal gas eqⁿ — PV = NRT

Isobaric process — Constant . P

Isochoric process — Constant . V

Isothermal process — Constant . T

Q3 :→

a :→

Solution :-

Given that :-

pressure , P = 7560 lb/ft²

volume , V = 12 ft³

volume 2 , V_2 = 28 ft³

work done , W = ?

As we know that solution is an constant pressure process workdone

$W = (P)(V_2 - V_1)$

putting the values.

$W = 40 \times 144 (28 - 12)$

$W = 40 \times 144 (16)$

$W = 5760 (16)$

$W = 120,960$ ft - lbf

(W = 120960 ft - lbf)

Q 3:->

b :->

Answer:->

Enthalpy :-

A thermodynamic quantity equivalent to the total heat content of a System. It is equal to the internal energy of the system plus the product of pressure and volume.

It is denoted with H

Example:-

Imagine a glass of hot water Now, it has internal energy and no flow energy. let's Say you decided to put a straw and drink it, Now, The flowing hot water into mouth is best represented by enthalpy. It has internal energy as well as flowing energy.

Entropy :-

The entropy of an object is a measure of the amount of energy which is unavilable to do work. Entropy is also a measure of the number of possible arrangement the atoms in a system can have, In this sense, entropy is a measure of ~~entire~~ uncertainty and randomness

Example:-

Sun is very big So number of molecule are more, more possible configurations and its temprature is very high So molecule are highly disorderd and moon is small and cool so molecule will be ordered compared to Sun.

So sun entropy is higher the the moon entropy.