$_2 = mRT_2\ V_2P$

$_2 = T_1\ T$

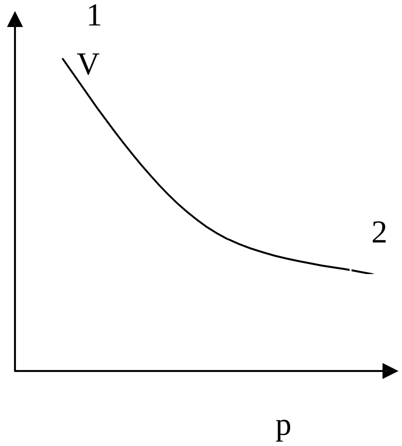
$^2 = V_1 \therefore\ P$

— —

$_1V_2P$

st law Q=W1and from 0 $then\ \Delta u = 0$ Also since $\Delta T =$

&



1/v2And w=pv ln v

the adiabatic process 2.6

It is a special case of polytropic process in which heat Q not allowed to be entered or leave the system

This process follow the law $PV^n = cons\tan t$

Q-W=ΔU

0W+ ΔU=

$0) = {}_1 - T_2 - n) + mC_v(T1)/({}_1 - T_2\ mR(T$

$\frac{R}{-n1} 0 + C_v = \therefore$

$0 - n)C_v = 1R + ($

$0R + C_v - C_v n =$

$n = \frac{R + C_v}{C_v}$

$R = C_p - C_v$ But

ry= γ

for air1.4 Where γ is the adiabatic index=

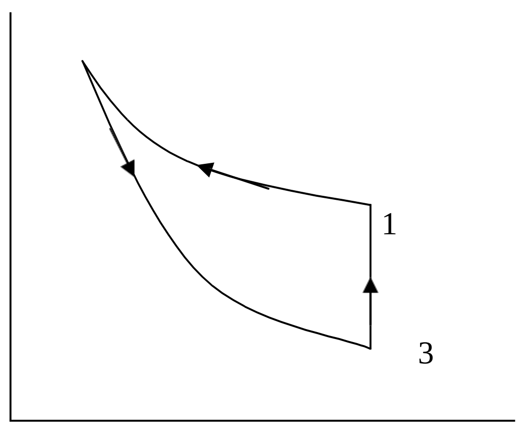
and a temperature of ^{2} kN/m 100at a pressure of ^{3} m 0.3 Ex A quantity of gas occupies a volume of
and then expanded ^{2} kN/m 500° C. The gas is compressed isothermally to a pressure of 20
adiabatically to its initial volume, then the gas is compressed under constant volume process to its
؛kJ/kg.K1 , C_p =1.4 initial state, if γ=

؟Draw P-V diagram for the cycle .What is The mass of the gas **(a**

(st law of thermodynamics for the cycle (i.e. $\sum Q = \sum W$ 1**b)**) Verify

2

P



V

(a

‘ $\gamma = \frac{C_p}{C_v}$ KJ/kg.K0.714 =1/1.4Cv=Cp/ γ=

R=Cp-Cv KJ/kg.K0.286 =1-0.714then R=

then m=PV/RT

PV=mRT

Then $m = \frac{x1000 x100 \quad 0.3}{(20+273 \; x(1000x0.286}$ kg 0.3584=

(b

(isothermal) 1-2 process

2V2 =P1V1 P