Physics 240: Unquiz 09	Name:_________________

A diatomic ideal gas with all possible degrees of freedom realized goes through an isobaric process at $P=1x10^5$ Pa and changes volume from 1 m^3 to 2 $m^{3.}$

(a) Calculate $c_{v.}$

(b) Calculate C_p.

(c) Calculate ϒ.

(d) Calculate W

1 mole of the same gas with all possible degrees of freedom realized goes through an isovolumeric process and changes temperature from 0C to 100c.

(e) Calculate W

(f) Calculate Q

(g) Calculate ΔU

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A diatomic ideal gas with all possible degrees of freedom realized goes through an isobaric process at $P=1x10^5$ Pa and changes volume from 1 m^3 to 2 m^3.

(a) Calculate c_v.

$$c_v=\frac{3}{2}R+\frac{2}{2}R+\frac{2}{2}R=\frac{7}{2}R=29\frac{J}{\text{mole K}}$$

(b) Calculate C_p.

$$C_p=C_v+R=\frac{7}{2}R+\frac{2}{2}R=\frac{9}{2}R=37.413\frac{J}{\text{mole K}}$$

(c) Calculate ϒ.

$$\gamma=\frac{c_p}{c_v}=\frac{\frac{9}{2}}{\frac{7}{2}}=\frac{9}{7}=1.29$$

(d) Calculate W

$$W=P\Delta V=1x10^5(1)=1x10^5 J$$

1 mole of the same gas with all possible degrees of freedom realized goes through an isovolumeric process and changes temperature from 0C to 100c.

(e) Calculate W $W=P\Delta V=0$

(f) Calculate Q $Q=nc_v\Delta T=1x7/2x8.314x100=2909.9 J$

(g) Calculate ΔU $\Delta U=Q-W=Q=2909.9 J$