Daily Tutorial Sheet-1	JEE Advanced (Archive)

1.(T) I law does not predict about spontaneity of a process

2.(R) $C_p - C_v = R$ for ideal gas

3.(900) Total energy $= 3 \times \frac{1}{2} nRT = 3 \times \frac{1}{2} \times 1 \times 2 \times 300 = 900\,Cal$

4.(T) C_v for diatomic gas $= \frac{5R}{2}$

C_v for monoatomic $= \frac{3R}{2}$

5. Isolated system $\longrightarrow$ No exchange of mass and energy

6. Enthalpy is mass dependent.

7.(0) $Fe(s) + 2HCl(aq) \longrightarrow FeCl_2 + H_2(g)$

$w = 0$ (as $\Delta V = 0$)

8. -116.4 J

$\Delta H = nC_p\Delta T$

$T_1V_1^{\gamma-1} = T_2V_2^{\gamma-1} \quad \Rightarrow \quad \gamma = \frac{C_p}{C_v}$

$C_p = \frac{5R}{2}$; $\quad C_V = \frac{3R}{2}$ for He Ar

9.(B) Free isothermal expansion, $w = 0, \Delta U = 0 \quad \Rightarrow \quad q = 0$

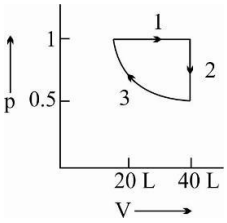
Volume occupied by molecular of an ideal gas is zero

10. $\Delta_r G° = -257.2$ kJ < 0; $\quad \Delta H° = -285.4$ kJ < 0

11. $\Delta G_1^\circ = 16$ kJ; $\quad \Delta G_2^\circ = 12.3$ kJ

12.(C) $\Delta H = \Delta U + \Delta(pv)$, $\Delta H = \Delta U + (p_2v_2 - p_1v_1)$

13. **(i)**



(ii) $W = -6.14$ L atm $\quad Q = 6.14$ L atm

(iii) All the state functions, $\Delta U, \Delta H$ and ΔS are zero for cyclic process.

14. He is monatomic, so it has only three degree of freedom (translational only) at all temperature hence, C_V value is always $\frac{3}{2}R$.

Hydrogen molecule is diatomic, has three translational, two rotational and one vibrational degree of freedom. The energy spacing between adjacent levels are in the order of:

Translational < rotational < vibrational

At lower temperature only translational degree of freedom contribute to heat capacity while at higher temperature rotational and vibrational degree of freedom starts contributing to heat capacity.

15.(B) $\Delta S = \frac{\Delta H}{T_b}$