Daily Tutorial Sheet-15	Level - 3

159.(B) $\ln\frac{k_1'}{k_1}=\frac{E_1}{R}\left[\frac{1}{T_1}-\frac{1}{T_2}\right]$ ....(i)

$\ln\frac{k_2'}{k_2}=\frac{E_2}{R}\left[\frac{1}{T_1}-\frac{1}{T_2}\right]$ ....(ii)

Solving we get (ii) – (i)

$\ln\frac{k_2'}{k_2}-\ln\frac{k_1'}{k_1}=\left(\frac{E_2-E_1}{R}\right)\left(\frac{1}{T_1}-\frac{1}{T_2}\right)$

(for equimolar formation of B and C, $k_2'=k_1'$)

$\ln\left(\frac{k_1}{k_2}\right)=\left(\frac{8314}{8.314}\right)\frac{(T_2-300)}{300\times T_2}$

$\ln 2=(1000)\left(\frac{T_2-300}{300\times T_2}\right)$

$T_2=378.74\,K$

160.(C) Reaction decay shows emission of two helium atoms.

Thus, in two half-lifes A decomposed $=\frac{3}{4}$ mol

and helium formed $=\frac{3}{4}\times 2=1.5$ mol

$p=\frac{n}{V}RT=1.5\times 0.0821\times 300=36.94$ atm

161.(A)

	$2A(g) \longrightarrow$	$B(g)$ + $C(s)$	
Initial pressure at t = 0	p_i	0	solid does not give pressure
After time t = 10 min	p_c-2x	x	
After complete reaction	$pi-p_i$	$\frac{p_i}{2}$	

$p_t=p_c-2x+x=p_i-x=300\,P$

$p_\infty=p_i-p_c+\frac{p_c}{2}=\frac{p_t}{2}=200\,P$

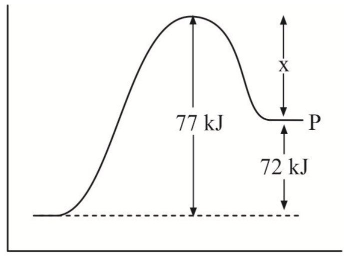
Thus, $p_C=400\,P=a$

$x=100\,P$

Thus, $p_i-x=300-100=200\,P$

$\therefore$ $k=\frac{2.303}{t}\log\frac{p_i}{p_c-x}=\frac{2.303}{10}\log\frac{400}{200}=0.0693\,min^{-1}$

162.(C)



$x(H_2O_2 \longrightarrow H_2O + O) = 77 - 72 = 5\,kJ$

163.(B) T_{50} is independent of concentration of A. Hence, first order reaction.

	$A \longrightarrow$	$N_2(g)$	
at t = 0	a	0	
at time t	(a – x)	x = 10L	(after 10 min)
at complete reaction,	(a – a)	a = 50 L	

$\therefore \quad (a - x) = 40L$

$\therefore \quad k = \frac{2.303}{10}\log\frac{50}{40} = \frac{2.303}{10}\log 1.25\,min^{-1}$

164.(B) $pV = nRT$

$\therefore \quad p = \frac{n}{V}RT$

$p_{CH_3CHO} = [CH_3CHO]RT$

$\therefore \quad [CH_3CHO] = \frac{p_{CH_3CHO}}{RT}$

$\therefore \quad \frac{-d[CH_3CHO]}{dt} = -\frac{1}{RT}\frac{dp_{CH_3CHO}}{dt}$