46.(C) $R_f = k_1[A]^2$

$R_b = k_2[B][C]$ Net rate $= R_f - R_b = k_1[A]^2 - k_2[B][C]$

47.(C) $k = \frac{1}{2\times10^4}\ell n\left(\frac{800}{50}\right) = \frac{1}{2\times10^4}\ell n\,16 = \frac{4\times0.693}{2\times10^4}$

$k = 1.386\times10^{-4}\ \text{sec}^{-1}$

48.(C) $E_{a_f} = b$ and $E_{a_b} = c = a + b$

$\Delta H^\circ = b - c$

49.(A)

	A	⟶	B
t = 0	0.8 – 0.6 = 0.2 mol		0.6 mol

Two half life's are involved in $0.8\,\text{mol} \rightarrow 0.2$ mol

In second case, $[A]_t = 0.9 - 0.67 = 0.23$ mol.

0.9 mol ⟶ 0.48 mol ⟶ ≈ 0.23 mol

Again two half life's involve, so time taken to produce 0.67 mole B from 0.9 mol A is 1 hr.

50.(B) Half life = 20 years.

For 90 % decomposition time required is approximately 3.3 times of half life. So time required is $\approx 3.3\times20 \approx 70$ years

51.(C) For II[nd] order reaction $t_{1/2} = \frac{1}{kC_{A_0}}$ & $\left(t'_{1/2}\right) = \frac{1}{2kC_{A_0}} = \frac{t_{1/2}}{2}$

52.(B) $\log\frac{k_2}{k_1} = \frac{E_a}{2.303R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$

$\log\frac{k_2}{k_2/10} = \frac{E_a}{2.303R}\left(\frac{1}{200} - \frac{1}{400}\right)$

$\log 10 = \frac{200\,E_a}{2.303\times200\times400R} \Rightarrow E_a = 230.3\times4R \Rightarrow E_a = 921.2R$

53.(C) For elementary reaction $2A + B \rightarrow A_2B$

Rate (r) = k $[A]^2$ [B] Hence, $r' = k\left(2[A]\right)^2\frac{[B]}{2} = 2k[A]^2[B] \Rightarrow r' = 2r$

54.(D) The rate constant is $2.3\times10^{-2}\ \text{s}^{-1}$ which implies first order kinetics since $r = \frac{-d[N_2O_5]}{dt}$

Integrating it will provide $\ln\frac{[N_2O_5]_o}{[N_2O_5]_t} = kt$

55.(B) For first order kinetics $t_{1/2} = \frac{0.693}{k}$

According to rate law r = k [A] $\Rightarrow 1.5\times10^{-2} = k\times0.5 \Rightarrow k = 3\times10^{-2}\ \text{min}^{-1}$

Hence $t_{1/2} = \frac{0.693}{3\times10^{-2}}\ \text{min} = 23.1\ \text{min}$

56.(D) There is no change in energy of activation with change in temperature.

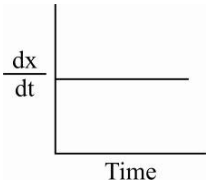
57.(B) $kt = \ell n\left(\frac{4750}{2700}\right) \Rightarrow \frac{0.693}{t_{1/2}}\times5 = 2.303\log\left(\frac{4750}{2700}\right)$

$$t_{1/2} = \frac{0.693 \times 5}{2.303 \log\left(\frac{4750}{2700}\right)} = \frac{0.693 \times 5}{0.565} = 6.13 \text{ min}$$

58.(C) For zero order reaction $A \longrightarrow$ Product

$$\text{Rate} = K\left[A\right]^{\circ}$$

$$\frac{dx}{dt} = K$$



59.(B) On changing concentration half life is changed, so it could not be 1st order reaction

	$t_{1/2}$	C_{A_0}
(1)	0.1	200
(2)	0.4	50

Data indicates on decreasing concentration half-life increases. So, it is 2nd order reaction

60.(A) Temperature coefficient = $\frac{K_{T+10}}{K_T}$

For reactions with activation energy near 50 kT, it's value is approximately 2.