MCMS Problem Set

Name: Qusai Al-buqaeen Student no: 244849

Question 4 Part 4

Now since $y = \frac{1}{[B]}$ so $[B] = \frac{1}{y}$, then:

$$[B](t) = \frac{1}{Xe^{(\gamma-\beta)t} - \frac{\beta}{N(\gamma-\beta)}} \quad \text{and } [B] = B_0 \text{ at } t=0$$

$$\rightarrow B_0 = \frac{1}{X - \frac{\beta}{N(\gamma-\beta)}} \quad \text{at } t=0$$

$$\rightarrow B_0 \left(X - \frac{\beta}{N(\gamma-\beta)} \right) = 1$$

$$\rightarrow \boxed{X = \frac{1}{B_0} + \frac{\beta}{N(\gamma-\beta)}}$$

so $\therefore$ $$[B](t) = \frac{1}{\left(\frac{1}{B_0} + \frac{\beta}{N(\gamma-\beta)}\right) \cdot e^{(\gamma-\beta)t} - \frac{\beta}{N(\gamma-\beta)}}$$

doing some rearranging

$$[B](t) = \frac{1}{\frac{e^{(\gamma-\beta)t}}{B_0} + \frac{\beta \cdot e^{(\gamma-\beta)t}}{N(\gamma-\beta)} - \frac{\beta}{N(\gamma-\beta)}}$$

$$\boxed{[B](t) = \frac{B_0 \cdot N(\gamma-\beta)}{e^{(\gamma-\beta)t}\left(N(\gamma-\beta) + B_0 \cdot \beta\right) - \beta \cdot B_0}}$$