1. $$\dot{[B]} = \beta \frac{[B][A]}{N} - \gamma [B] \quad \text{—— (i)}$$

$$\dot{[A]} = -\beta \frac{[B][A]}{N} + \gamma [B] \quad \text{—— (ii)}$$

$$[A] + [B] = N \quad \text{—— (iii)}$$

Using equation (i) & (iii)

$$\dot{[B]} = \beta \frac{[B][N-[B]]}{N} - \gamma [B]$$

$$\dot{[B]} = \beta [B] - \frac{\beta [B]^2}{N} - \gamma [B]$$

$$\dot{[B]} = [B](\beta - \gamma) - \frac{\beta [B]^2}{N}$$