

4M16 Nuclear Power Engineering 2012

Answers

Q1 (a) $e < 0.01077$

$$\text{Q2 (b)} \quad I_0 = \frac{\gamma_i \Sigma_f \phi_0}{\lambda_i}; \quad X_0 = \frac{(\gamma_x + \gamma_i) \Sigma_f \phi_0}{\lambda_x + \sigma \phi_0}$$

$$\text{(d)} \quad X = \frac{(\gamma_x + \gamma_i) \Sigma_f \phi_0}{2\lambda_{eff}} + \frac{\gamma_i \Sigma_f \phi_0}{2(\lambda_{eff} - \lambda_i)} \exp(-\lambda_i t) \\ + \left[\frac{(\gamma_x + \gamma_i) \Sigma_f \phi_0}{\lambda_x + \sigma \phi_0} - \frac{(\gamma_x + \gamma_i) \Sigma_f \phi_0}{2\lambda_{eff}} - \frac{\gamma_i \Sigma_f \phi_0}{2(\lambda_{eff} - \lambda_i)} \right] \exp(-\lambda_{eff} t)$$

$$\text{where } \lambda_{eff} = \lambda_x + \frac{1}{2} \sigma \phi_0$$

Q3 (c) (ii) $\frac{37}{96} T_1$

Q4 (b) 32.69 te

(c) 220.66 te; 111.7 teSWU