1) $\lambda = \frac{n}{\sum_{i=1}^{n} t_i} = \frac{25}{1048{,}36} = 0{,}000954 \simeq 9{,}6 \cdot 10^{-4}$

(2)

$$L(\lambda) = \prod_{i=1}^{n} f(\lambda, x) = \pi \left[\lambda^n x^n \cdot e^{-\frac{\lambda}{2} \cdot \sum x_i^2} \right]$$

Aplicando o ln

$$l(\lambda) = \ln(L(\lambda)) = n \ln \lambda + n \ln x + \frac{-\lambda}{2} \sum_{i}^{n} x_i^2$$

derivando e igualando a zero

$$\frac{\partial l(\lambda)}{\partial \lambda} = \frac{n}{\lambda} + 0 + \frac{-1}{2} \cdot \sum_{i}^{n} x_i^2 = 0$$

$$\frac{n}{\lambda} = \frac{\sum_{i}^{n} x_i^2}{2} \rightarrow \boxed{\lambda = \frac{2n}{\sum_{i=1}^{n} x_i^2}}$$

3) $$L(\lambda) = \prod_{i=1}^{n} f(\gamma, t) = \prod \left[\gamma^{-n} \cdot e^{-\gamma^2 \cdot \sum t_i} \right]$$

$$\ln(L(\gamma)) = -n \ln \gamma + -\gamma^2 \cdot \sum_{i=1}^{n} t_i$$

Aplicando a derivada

$$\frac{\partial}{\partial \gamma} (l(\alpha)) = \frac{-n}{\gamma} + -2\gamma \cdot \sum_{i=1}^{n} t_i = 0$$

$$\frac{n}{\gamma} = -2\gamma \cdot \sum_{i}^{n} t_i \rightarrow \gamma = \sqrt{\frac{-n}{2 \sum_{i=1}^{n} t_i}}$$

4) $f(x) = \lambda^x (5-2\lambda)^{1-2x}$

$$L(\lambda) = \pi \left[\lambda^{\sum_{i=1}^{n} x_i} (5-2\lambda)^{n-2\sum_{1}^{n} x_i} \right]$$

$$l(\lambda) = \ln(L(\lambda)) = \sum_{1}^{n} x_i \ln\lambda + n - 2\sum_{1}^{n} x_i \ln(5-2\lambda)$$

Derivando e igualando a zero.

$$\frac{\partial}{\partial\lambda} = \frac{\sum_{1}^{n} x_i}{\lambda} + (n-2\sum_{1}^{n} x_i)\frac{-2}{5-2\lambda} = 0 \quad \frac{\sum_{1}^{n} x_i}{\lambda} + \frac{(-2n+4\sum_{1}^{n} x_i)}{5-2\lambda} = 0$$

$$\frac{\sum_{1}^{n} x_i}{\lambda} = \frac{(2n-4\sum_{1}^{n} x_i)}{5-2\lambda} = 0$$

$$\frac{5-2\lambda(\Sigma x_i) - (2n\lambda - 4\Sigma x_i \lambda)}{\lambda(5-2\lambda)} = 0$$

$$5\Sigma x_i - 2\lambda\Sigma x_i - 2n\lambda + 4\Sigma x_i \lambda = 0$$

$$5\Sigma x_i - 2n\lambda + 2\Sigma x_i \lambda = 0$$

$$5\Sigma x_i = 2n\lambda - 2\Sigma x_i \lambda$$

$$5\Sigma_1 x_i = \lambda(2n - 2\Sigma x_i)$$

$$\boxed{\lambda = \frac{5\Sigma x_i}{2n - 2\sum_{1}^{n} x_i}}$$

5) a) $\lambda = h(T) =$ Taxa de falhas

$$\lambda = \frac{m}{\sum_{i=1}^{n} T_i} = \frac{6}{396} = 0,015151515 \approx 1.515 \cdot 10^{-2}$$

b) $MTTF = \frac{1}{\lambda} \approx 66$ mil horas de uso

c) $R = e^{-\lambda T}$ para $T = 300 =$ [illegible] $\approx$ [illegible]

$R = e^{-1,515 \cdot 15} = 0,21978$