Exercise 4.

$$Pr\{T_C < t\} = Pr\{\theta t > C\}$$
$$= Pr\{\theta > \frac{C}{t}\}$$
$$= 1 - F_\theta(\frac{C}{t})$$

Since, $\theta \sim Normal(\mu=1, \sigma=0.1)$

$$\underbrace{Pr\{T_C < t\}}_{c.d.f.} = 1 - \Phi(\frac{\frac{C}{t}-1}{0.1}) = 1 - \Phi(\frac{\frac{4000}{t}-1}{0.1})$$

given $T_{4000} = 3500$ (the condition)

$\theta 3500 = 4000$

$\therefore \theta = \frac{4000}{3500}$ this condition specifies the θ.

$H = 5000 = \theta \cdot T_H = \frac{4000}{3500} \cdot T_H$

$\therefore T_H = 5000 \cdot \frac{3500}{4000}$ this condition thus specifies the T_H.

$\therefore$ given the condition $T_{4000} = 3500$ revolutions.

T_H is a constant number

$\therefore Pr\{T_H = 5000 \cdot \frac{3500}{4000}\} = 1$

$$\underbrace{Pr\{T_H < t\}}_{c.d.f} = \begin{cases} 1 & \text{if } 5000 \cdot \frac{3500}{4000} < t \\ 0 & \text{otherwise.} \end{cases}$$

The numerical study is not required for the exam. Using Equation 1, 19, 14. (lecture note), the expected long-run cost rate as a function of τ and C. can be calculated. Note that $C_i = 10$ Euro.

$C_{pm} = 3000$ Euro (replacement cost.)

$C_{cm} = 3000 + 1000 = 4000$ Euro (replacement cost + additional cost of corrective maintenance)