Operational Research II

June 23th 2005

II Midterm

Familiy Name:_____

Name:_____

Matricola:_____

Write your official answers in the dedicated space below each question. Justify your answers utilizing either the dedicated space or rough copy for the calculations. Not justified answers will not be considered.

Problem 1 What is the limit unavailability for a system composed by 2 components with $MTTF = 1$ year and $MTTR = 2$ weeks?

Answer:

Problem 2 A standby system is composed by two components with failure rates (while operating) $\lambda_1 = 1/year$ and $\lambda_s = 1.5/year$.

2.1 What is the 1 year reliability of the system?

2.2 What is the Mean Time to Failure of the System?

2.3 If You now exchange the two components, how does Your answer to point 2.1 changes?

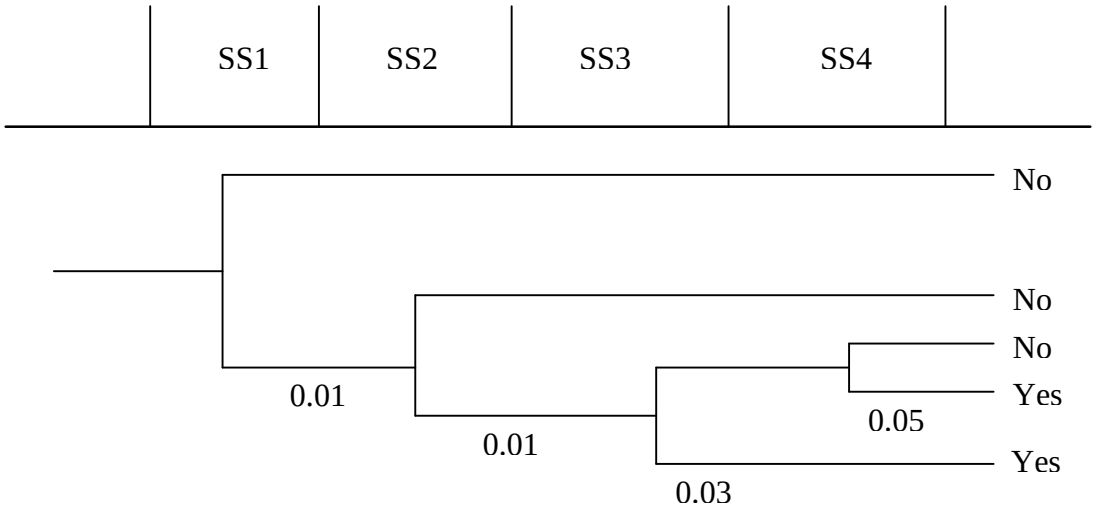
Answer

2.1

2.2

2.3

Problem 3 Given the following event tree



compute the undesired event probability.

Answer

Problem 4 A system is composed by 1 component subject to periodic test and maintenance. Given:

$$\gamma := 0.001$$

$$Q := 0.01$$

$$\lambda := 1$$

$$\tau := 1$$

$$\tau r := \frac{2}{365}$$

4.1 Compute the average system unavailability

4.2 Supposing $L = 10$, and $C_q = 100c_0$ compute the optimal maintenance interval (neglect γ and Q).

4.3 What would be the average unavailability now? (reconsider γ and Q)

Answer

4.1

4.2

4.3