Discussion question

Consider an age-structured population that has four life stages:

- Stage 1 lasts from age 0 to τ_1. During this stage, individuals die at rate μ_1.

- Stage 2 lasts from age τ_1 to τ_2. During this stage, individuals die at rate μ_2.

- Stage 3 lasts from age τ_2 to τ_3. During this stage, individuals die at rate μ_3. In addition, individuals in Stage 3 give birth at rate β to new individuals (of age 0).

- Stage 4 lasts from age τ_3 to infinity. During this stage, individuals die at rate μ_4.

Write a PDE system for this population? Can you write it as a system of delay differential equations?

What is the steady-state population?
What is the characteristic equation?