## Chapter 8 Exercise

An insurer offers permanent disability insurance using the model in Figure 8.3 of the text. A life aged 55 purchases a policy with a 20-year term that provides benefits of \$50,000 on transition from the healthy state to death; \$100,000 on transition from the healthy state to the disabled state; and \$25,000 on transition from the disabled state to death.

- a. Write down an expression in terms of transition intensities, probabilities, and  $\delta$  for the actuarial present value (EPV) of this benefit at force of interest  $\delta$  per year.
- b. Calculate the EPV of this benefit given
  - $\mu_x^{01} = 0.008$
  - $\mu_x^{02} = 0.015$
  - $\mu_x^{12} = 0.020$
  - $\delta = 0.04$

for all  $x \in [55, 75]$ .