1. Do problems 11.1 and 11.2 from the textbook.

2. (Sample Question, #160, SOA) A fully discrete 3-year term insurance of 10,000 on (40) is based on a double-decrement model, death and withdrawal:
   (i) Decrement 1 is death.
   (ii) \( \mu_{40}^{(1)}(t) = 0.02, \ t \geq 0 \)
   (iii) Decrement 2 is withdrawal, which occurs at the end of the year.
   (iv) \( q_{40+k}^{(2)} = 0.04, \ k = 0, 1, 2 \)
   (v) \( v = 0.95 \)
   Calculate the actuarial present value of the death benefits for this insurance.

3. (Fall 2005, #3, SOA) A special whole life insurance of 100,000 payable at the moment of death of \((x)\) includes a double indemnity provision. This provision pays during the first ten years an additional benefit of 100,000 at the moment of death for death by accidental means. You are given:
   (i) \( \mu_x^{(1)}(t) = 0.001, \ t \geq 0 \)
   (ii) \( \mu_x^{(1)}(t) = 0.002, \ t \geq 0 \), where \( \mu_x^{(1)} \) is the force of decrement due to death by accidental means.
   (iii) \( \delta = 0.06 \)
   Calculate the single benefit premium for this insurance.

4. (Fall 2005, #33, SOA) For a 3-year fully discrete term insurance of 1000 on (40), subject to a double decrement model:
   (i) \( l_x^{(1)}x \), \( d_x^{(1)}x \), \( d_x^{(2)}x \)
   \[\begin{array}{cccc}
   x & l_x^{(1)} & d_x^{(1)} & d_x^{(2)} \\
   40 & 2000 & 20 & 60 \\
   41 & - & 30 & 50 \\
   42 & - & 40 & - \\
   \end{array}\]
   (ii) Decrement 1 is death. Decrement 2 is withdrawal.
   (iii) There are no withdrawal benefits.
   (iv) \( i = 0.05 \)
   Calculate the level annual benefit premium for this insurance.

5. (Fall 2006, #36, SOA) For a fully discrete 4-year term insurance on (40), who is subject to a double-decrement model:
   (i) The benefit is 2000 for decrement 1 and 1000 for decrement 2.
   (ii) The following is an extract from the double-decrement table for the last 3 years of this insurance:
   \[\begin{array}{cccc}
   x & l_x^{(1)} & d_x^{(1)} & d_x^{(2)} \\
   41 & 800 & 8 & 16 \\
   42 & - & 8 & 16 \\
   43 & - & 8 & 16 \\
   \end{array}\]
   (iii) \( v = 0.95 \)
   (iv) The benefit premium, based on the equivalence principle, is 34.
   Calculate \( 2V \), the benefit reserve at the end of year 2.

6. (Spring 2007, #30, SOA) For a special fully continuous whole life insurance of 1 on \((x)\), you are given:
   (i) Mortality follows a double decrement model.
   (ii) The death benefit for death due to cause 1 is 3. The death benefit for death due to cause 2 is 1.
   (iii) \( \mu_x^{(1)}(t) = 0.02, \mu_x^{(2)}(t) = 0.04, \ t \geq 0 \)
   (iv) The force of interest, \( \delta \), is a positive constant.
   Calculate the benefit premium for this insurance.