EXAM MLC QUESTIONS OF THE WEEK

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Week of August 13/07

A fully discrete whole life policy with death benefit of $100,000 is issued to (35) .
The annual benefit premium is $1200, the single benefit premium is $20,000,
and the 30th year terminal reserve is $40,000.

Based on the same mortality table and interest rate as the first policy, another fully discrete
policy has a death benefit of $100,000 up to age 65 and $200,000 after age 65. The annual
benefit premium is $1200 payable for the first 30 years, and the benefit premium is Q payable
from age 65 on. Find Q.

The solution can be found below.

Week of August 13/07 - Solution

We are given the following:

$100,000 P_{35} = 1200$, $100,000 A_{35} = 20,000$, $100,000 \,_{30}V_{35} = 40,000$.

From $P_x = \frac{dA_x}{1 - A_x}$, we get $d = \frac{(.012)(1 - .2)}{.2} = .048$,

and from $_nV_x = \frac{A_{x+n} - A_x}{1 - A_x}$, we get $A_{65} = (.4)(1 - .2) + .2 = .52$.

The second policy has the same benefit and premium for the first 30 years, so it must have the same reserves as the first policy during the first 30 years, so $_{30}V = 40,000$ for the second policy. The prospective form of the reserve for policy 2 at time 30 is $200,000 A_{65} - Q\ddot{a}_{65}$.

We get $\ddot{a}_{65} = \frac{1 - A_{65}}{d} = \frac{1 - .52}{.048} = 10$, so that

$200,000 A_{65} - Q\ddot{a}_{65} = 200,000(.52) - 10Q = 40,000$.

Solving for Q results in $Q = 6400$.