EXAM MLC QUESTION OF THE WEEK

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Week of April 21/08

A 2-year fully discrete endowment insurance issued to (x) has death benefit 1000 and endowment amount 2000. The policy has no expenses. The annual effective rate of interest is 25% and the mortality probabilities are $q_x = .25$ and $q_{x+1} = .4$. The annual benefit premium for this policy, on a one decrement basis is 605.00 and the benefit reserve at the end of the first year is 675.00. The same policy is modified to incorporate a policy cancellation decrement. In the new policy model, mortality will be decrement 1 with $q_x^{(1)} = .25$, $q_{x+1}^{(1)} = .4$. Policy cancellation will be decrement 2, at it will occur only at the end of the first year, just before the second premium is due. Suppose that $q_x^{(2)} = .25$, and the policy cancellation benefit, payable at the end of the first year is 500. Find the annual benefit premium for the policy.

The solution can be found below.

Week of April 21/08 - Solution

$$Q(1 + vp_x^{(\tau)}) = 1000(vq_x^{(1)} + v^2 \,_{2|}q_x^{(1)}) + 500vq_x^{(2)} + 2000v^2 \,_2p_x^{(\tau)} \,.$$

$$Q = \frac{1000[\frac{.25}{1.25} + \frac{(.5)(.4)}{(1.25)^2}] + 500(\frac{.25}{1.25}) + 2000\frac{(.5)(.6)}{(1.25)^2}}{1 + \frac{.5}{1.25}} = 580.00 \,.$$