Question #181
Answer: B

$\Pr(\text{dies in year 1}) = p^{02} = 0.1$

$\Pr(\text{dies in year 2}) = p^{00}p^{02} + p^{01}p^{12} = 0.8(0.1) + 0.1(0.2) = 0.10$

$\Pr(\text{dies in year 3}) = p^{00}p^{00}p^{02} + p^{00}p^{01}p^{12} + p^{01}p^{11}p^{12} + p^{01}p^{10}p^{02} = 0.095$

$EPV(\text{benefits}) = 100,000[0.9(0.1) + 0.9^2(0.10) + 0.9^3(0.095)] = 24,025.5$

$\Pr(\text{in State 0 at time 0}) = 1$

$\Pr(\text{in State 0 at time 1}) = p^{00} = 0.8$

$\Pr(\text{in State 0 at time 2}) = p^{00}p^{00} + p^{01}p^{10} = 0.8(0.8) + 0.1(0.1) = 0.65$

$EPV(\$1 \text{ of premium}) = 1 + 0.9(0.8) + 0.9^2(0.65) = 2.2465$

Benefit premium = 24,025.5/2.2465 = 10,695.