

**291.** For a special term life insurance on (40) you are given:

- (i) If the policyholder is diagnosed with a specified critical illness (SCI), a benefit of 50,000 is paid at the end of the month of diagnosis with the remaining 150,000 paid at the end of the month of death upon subsequent death.
- (ii) If the policyholder dies without being diagnosed with a specified critical illness (SCI) a benefit of 200,000 is paid at the end of the month of death.
- (iii) Premium is 700 per month payable at the beginning of each month.
- (iv) Expenses are 10 per month payable at the beginning of each month.
- (v)  $i = 0.06$

The insurer profit tests the insurance using monthly time steps, and using a multiple state model with three states:

0 = Healthy (no SCI diagnosis); 1 = Diagnosed with a SCI, alive; 2 = Dead  
and transition probabilities:  ${}_{1/12}p_{41}^{00} = 0.9965$ ,  ${}_{1/12}p_{41}^{01} = 0.0015$ ,  ${}_{1/12}p_{41}^{02} = 0.0020$ .

You are also given:

- (i) Reserve at start of the 13<sup>th</sup> month: 6,000
- (ii) Reserve at end of the 13<sup>th</sup> month: 6,200 in state 0, 15,000 in state 1

Calculate the expected profit for the 13th month, given that the policyholder is healthy at the start of the month.

- (A) 32
- (B) 47
- (C) 69
- (D) 77
- (E) 96