

Show all work for full credit, use correct notation., and clearly mark your answer.

All questions use the following:

For a fully discrete whole insurance of 40,000 on (40), you are given:

- (i) $A_{40} = 0.2$
- (ii) $A_{50} = 0.3$
- (iii) $d = 0.05$
- (iv) The annual gross premium is 1.2 times the annual net premium.
- (v) A settlement expense of 500 is owed at the time the death benefit is paid.
- (vi) Per policy expense are:
100 in the first year; 10 in renewal years
- (vi) Percent of premium expenses are:
50% in the first year; 5% in renewal years
- (vii) $p_{40} = 0.995$
- (viii) $p_{50} = 0.990$

1. Show that the gross premium reserve at time $t = 10$ is 4310.
2. Show that the net premium reserve at time $t = 10$ is 5000.
3. Calculate the expense reserve at time $t = 10$.
4. Calculate the full preliminary term reserve at time $t = 10$, ${}_{10}V^{FPT}$.
5. Use 1-year recursion to calculate the gross premium reserve at time $t = 11$.