Question #37
Answer: E

The benefit premium is $\frac{1}{\bar{a}_x} - \delta = \frac{1}{12} - 0.04 = 0.04333$

$$
\begin{aligned}
{}_oL &= v^T - (0.04333 + 0.0066)\bar{a}_{\overline{T}|} + 0.02 + 0.003\bar{a}_{\overline{T}|} \\
&= v^T - 0.04693\left(\frac{1 - v^T}{\delta}\right) + 0.02 \\
&= v^T\left(1 + \frac{0.04693}{\delta}\right) - \frac{0.04693}{\delta} + 0.02
\end{aligned}
$$

$$Var\left({}_oL\right) = Var\left(v^T\right)\left(1 + \frac{0.04693}{\delta}\right)^2 = 0.1(4.7230) = 0.4723$$

Question #38 - Removed

Question # 39 - Removed

Question # 40
Answer: D

Use Mod to designate values unique to this insured.

$$\ddot{a}_{60} = \left(1 - A_{60}\right)/d = \left(1 - 0.36933\right)/\left[\left(0.06\right)/\left(1.06\right)\right] = 11.1418$$

$$1000P_{60} = 1000A_{60}/\ddot{a}_{60} = 1000\left(0.36933/11.1418\right) = 33.15$$

$$A_{60}^{Mod} = v\left(q_{60}^{Mod} + p_{60}^{Mod}A_{61}\right) = \frac{1}{1.06}\left[0.1376 + \left(0.8624\right)\left(0.383\right)\right] = 0.44141$$

$$\ddot{a}^{Mod} = \left(1 - A_{60}^{Mod}\right)/d = \left(1 - 0.44141\right)/\left[0.06/1.06\right] = 9.8684$$

$$
\begin{aligned}
E\left[{}_0L^{Mod}\right] &= 1000\left(A_{60}^{Mod} - P_{60}\ddot{a}_{60}^{Mod}\right) \\
&= 1000\left[0.44141 - 0.03315\left(9.8684\right)\right] \\
&= 114.27
\end{aligned}
$$