

**Question # 35****Answer: B**

$$\bar{a}_x = \bar{a}_{x:\overline{5}|} + {}_5E_x \bar{a}_{x+5}$$

$$\bar{a}_{x:\overline{5}|} = \frac{1 - e^{-0.07(5)}}{0.07} = 4.219, \text{ where } 0.07 = \mu + \delta \text{ for } t < 5$$

$${}_5E_x = e^{-0.07(5)} = 0.705$$

$$\bar{a}_{x+5} = \frac{1}{0.08} = 12.5, \text{ where } 0.08 = \mu + \delta \text{ for } t \geq 5$$

$$\therefore \bar{a}_x = 4.219 + (0.705)(12.5) = 13.03$$

**Question #36****Answer: D**

$$p_x^{(\tau)} = p_x^{(1)} p_x^{(2)} = 0.8(0.7) = 0.56$$

$$q_x^{(1)} = \left[ \frac{\ln(p_x^{(1)})}{\ln(p_x^{(\tau)})} \right] q_x^{(\tau)} \text{ since UDD in double decrement table}$$

$$= \left[ \frac{\ln(0.8)}{\ln(0.56)} \right] 0.44$$

$$= 0.1693$$

$${}_{0.3}q_{x+0.1}^{(1)} = \frac{0.3q_x^{(1)}}{1 - 0.1q_x^{(\tau)}} = 0.053$$

To elaborate on the last step:

$${}_{0.3}q_{x+0.1}^{(1)} = \frac{\left( \begin{array}{l} \text{Number dying from cause} \\ \text{1 between } x + 0.1 \text{ and } x + 0.4 \end{array} \right)}{\text{Number alive at } x + 0.1}$$

Since UDD in double decrement,

$$= \frac{l_x^{(\tau)} (0.3) q_x^{(1)}}{l_x^{(\tau)} (1 - 0.1 q_x^{(\tau)})}$$