

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**

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

$$\begin{aligned} q_x^{(1)} &= \left[\frac{\ln(p_x^{(1)})}{\ln(p_x^{(\tau)})} \right] q_x^{(\tau)} \text{ since UDD in double decrement table} \\ &= \left[\frac{\ln(0.8)}{\ln(0.56)} \right] 0.44 \\ &= 0.1693 \end{aligned}$$

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

To elaborate on the last step:

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

Since UDD in double decrement,

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