Question	Scheme	Marks
1. (a)	4	B1 (1)
(b)	$P(X=2)=3\times0.2\times0.8^2\left[=\frac{48}{125}=0.384\right]$ **or** $P(X=3)=0.8^3\left[=\frac{64}{125}=0.512\right]$	M1
	$[X=]$ 3 is the mode	A1 (2)
(c)	$P(W_1=2)=\frac{e^{-4}4^2}{2}$ [=0.1465] **and** $P(X_1=2)=3\times0.2\times0.8^2$ $[=\frac{48}{125}=0.384]$	M1
	$P(W_1 \text{ and } X_1=2)=\frac{e^{-4}4^2}{2}\times(3\times0.2\times0.8^2)$ [= 0.1465 × 0.384]	M1
	= 0.05626564… awrt **<u>0.0563</u>**	A1 (3)
(d)	$X_1=0$ and $W_1>0$, $X_1=1$ and $W_1>1$, $X_1=2$ and $W_1>2$, $X_1=3$ and $W_1>3$	M1
	$0.008\times(1-0.0183)+0.096\times(1-0.0916)+0.384\times(1-0.2381)+0.512\times(1-0.4335)$	M1M1
	= 0.677677… awrt **<u>0.678</u>**	A1 (4)
		[10 marks]

	Notes
(a)	B1 cao
(b)	M1 valid attempt at either probability.
	A1 3 (M1 must be scored)
	NB answer only with no method is M0A0
(c)	1st M1 both $P(W_1=2)$ Allow (0.2381 – 0.0916) and $P(X_1=2)$
	2nd M1 Poisson probability × binomial probability. If no working shown these probabilities must be correct
	A1 awrt 0.0563
(d)	1st M1 for listing at least 3 combinations. Implied by 2nd M1.
	2nd M1 for sum of at least 3 correct products Condone consistent use of the tables for 3.5 or 4.5 rather than 4
	3rd M1 for a fully correct expression eg 0.008×(0.9817) + 0.096×(0.9084) + 0.384×(0.7619) + 0.512×(0.5665) condone 0.9816 and 0.7618 Allow figures to 3sf for method or awrt 0.00785 + awrt 0.0872 + awrt 0.293 + awrt 0.290 (allow 0.29)
	A1 awrt 0.678
	Alternative: $W_1=1$ and $X_1=0$, $W_1=2$ and $X_1<2$, $W_1=3$ and $X_1<3$, $W_1\geq4$ 0.0733×0.008 + 0.1465×0.104 + 0.1954×0.488 + (1 – 0.4335) awrt 0.000586 + awrt 0.0152 + awrt 0.0954 + awrt 0.567