Question Number	Scheme	Marks
7(a)	$X \sim \text{Po}(1)$ $\quad \text{P}(X \geq n) < 0.05$ or $\text{P}(X < n) > 0.95$	M1
	$n = 4$	A1
		(2)
(b)	$Y \sim \text{Po}(0.5m)$ $\quad \text{P}(Y = 0) < 0.05$ or $\text{e}^{-\frac{1}{2}m} < 0.05$	M1
	$m = 6$	A1
		(2)
(c)	$W \sim \text{Po}(0.5)$ and $\text{P}(W \geq 1)$	M1
	$[\text{P}(W \geq 1)]^3 = (1 - \text{P}(W = 0))^3 = (1 - 0.6065)^3 = 0.06093\ldots$ awrt 0.0609	M1A1
		(3)
(d)	$S \sim \text{Po}(4)$	M1
	$\text{P}(S = 4) = 0.1953\ldots$ awrt 0.195	A1
		(2)
(e)	$A \sim \text{Po}(1)$ $\quad B \sim \text{Po}(2)$	
	P(sightings in last 2 months> sightings in first 2 months | 4 sightings in 4 months) = $\dfrac{\text{P}(A=1)\times\text{P}(A=3)+\text{P}(A=0)\times(A=4)}{\text{P}(B=4)} = \dfrac{\text{e}^{-1}\times\frac{\text{e}^{-1}}{3!}+\text{e}^{-1}\times\frac{\text{e}^{-1}}{4!}}{\frac{\text{e}^{-2}\times 2^4}{4!}}$	M1M1
	$= \dfrac{5}{16}$ oe	A1
		(3)
ALT (e)	$X \sim \text{B}(4, 0.5)$	M1
	$\text{P}(X \leqslant 1)$ or $\text{P}(X \geqslant 3)$	M1
	$= \dfrac{5}{16}$ oe	A1

	Notes	Total 12
(a)	**M1**	for writing or using Po(1) **and** $\text{P}(X \geqslant n) < 0.05$ or $\text{P}(X < n) > 0.95$ or for Po(1) **and** $[\text{P}(X \leq 2) =] \ 0.9197$ or $[\text{P}(X \leq 3) =] \ 0.9810$ or $[\text{P}(X > 2) =] \ 0.0803$ or $[\text{P}(X > 3) =] \ 0.019$
	A1	Cao Answer only is 2/2
(b)	**M1**	for $\text{P}(Y = 0) = 0.1353$ from Po(2) or $\text{P}(Y = 0) = 0.0821$ from Po(2.5) or $\text{P}(Y = 0) = 0.0498$ from Po(3) or $\text{e}^{-\frac{1}{2}m} < 0.05$ (May be implied by $0.5m$ = awrt 3)
	A1	Cao Answer only is 2/2
(c)	**M1**	For writing or using Po(0.5) **and** $\text{P}(W \geq 1)$
	M1	for using $(1 - \text{P}(W = 0))^3$ Allow $W \sim \text{Po}(\lambda)$ $\lambda > 0$
	A1	Awrt 0.0609
(d)	**M1**	For use of Po(4)
	A1	Awrt 0.195
(e)	**M1**	For $\text{P}(A = 1) \times \text{P}(A = 3)$ [=0.02255…] + $\text{P}(A = 0) \times \text{P}(A = 4)$ [=0.0056…] from Po(1) or 0.0282… May be implied by awrt 0.312/0.313 or writing or using B(4, 0.5)
	M1	For a conditional probability with $\text{P}(B = 4)$ [=0.0902…] on the denominator from Po(2) provided this gives a probability. May be implied by awrt 0.312/0.313 or for writing or using $\text{P}(X \leqslant 1)$ or $\text{P}(X \geqslant 3)$ if B(4, 0.5) stated
	A1	Allow awrt 0.312/0.313