Question Number	Scheme	Marks
3(a)(i)	$X \sim \text{Po}(5)$ $[[\text{P}(X \geqslant 4)\ (=1-\text{P}(X \leqslant 3))=1-0.2650]$	M1
	$=0.735$ **awrt 0.735**	A1
(ii)	$"0.735"^3 = 0.397065...$ **awrt 0.397**	M1A1
		(4)
(b)	$\text{H}_0 : \lambda = 2.5 \qquad \text{H}_1 : \lambda > 2.5$	B1
		(1)
(c)	$X \sim \text{Po}(10)$ where X is the number of detections in one hour	
	$\text{P}(X \leqslant 15) = 0.9513 \Rightarrow \text{P}(X \geqslant 16) = 0.0487$	M1A1
	Critical region $X \geqslant 16$	A1
		(3)
(d)	13 is not in the critical region (so do not reject H_0) so insufficient evidence to suggest that the **mean rate** (o.e) of **detecting** (o.e) motion has **increased** (o.e).	B1ft
		(1)

		Notes	Total 9
(a)(i)	**M1**	Sight or use of the correct Poisson distribution. May be implied by awrt 0.265	
	A1	awrt 0.735 Calc: 0.73497…) (Correct answer 2/2)	
(ii)	**M1**	for attempting their (a)(i)^3 or ${}^3\text{c}_3$(a)(i)^3 (1- a(i))^0	
	A1	awrt 0.397	
(b)	**B1**	correct hypotheses in terms of λ or μ (may write 10 instead of 2.5)	
(c)	**M1**	for attempting to use Po(10). May be implied by awrt 0.9513, awrt 0.9730, awrt 0.0487, awrt 0.0270	
	A1	for finding $\text{P}(X \geqslant 16) =$ awrt 0.0487 (or a clear statement that probability is awrt 0.0487).	
	A1	for a correct critical region. Must be expressed as e.g. $X \geqslant 16$ (o.e.) and not a probability statement. Can use a different letter to X and condone $\text{CR} \geqslant 16$	
(d)	**B1ft**	dep on a CR $X \geqslant a$ o.e. such that 13 is not in the critical region (condone a probability statement for a CR) For 13 is not in the critical region **and** a correct conclusion in context that there is insufficient evidence to suggest that the **mean rate** of **detections** has **increased**. (o.e). Withhold this mark if there are contradictory statements or incorrect comparisons.	