Question Number	Scheme	Marks
3(a)	Poisson/Po/Poiss with $(\lambda =)$ 8.5 or $[X \sim]\text{Po}(8.5)$ (o.e)	B1
		(1)
(b)	**Cars** pass the junction **singly/randomly/independently**/at a **constant** (mean/average **rate**)	B1
		(1)
(c)	$\text{P}(X < 3) = \text{P}(X \leqslant 2) = 0.0093$ (calc 0.00928…) **awrt 0.0093**	B1
	$\text{P}(5 < X < 11) = \text{P}(X \leqslant 10) - \text{P}(X \leqslant 5) = 0.7634 - 0.1496$	M1
	= 0.6138 (calc 0.6137…) **awrt 0.614**	A1
		(3)
(d)	N(255, 255)	M1
	$[\text{P}(X > 280) =]\text{P}\left(Z > \frac{280.5 - "255"}{\sqrt{"255"}}\right)$ or $[\text{P}(X > 280) =]\text{P}\left(Z > \frac{"255" - 280.5}{\sqrt{"255"}}\right)$ $\Rightarrow [= \text{P}(Z > \pm "1.596...")]$	M1M1
	= 0.0548 ((Calc: 0.055147…)) **awrt 0.0548 – awrt 0.0552**	A1
		(4)
(e)	$\text{H}_0 : \lambda = 4.25$ $\text{H}_1 : \lambda < 4.25$ **Allow 8.5**	B1
		(1)
(f)	$[\text{P}(X \leqslant 3)] =$ awrt 0.0301 **or** $[\text{P}(X \leqslant 4)] =$ awrt 0.0744	M1
	$X \leqslant 3$	A1
		(2)
(g)	5 is not in the critical region/Do not reject H_0	M1
	Insufficient evidence to suggest /prove that the **mean rate** of cars passing the junction has **decreased (o.e)**	A1ft
		(2)

	Notes		Total 14
(a)	**B1**	For Poisson / Po and 8.5 e.g. Po(8.5), (Condone Poisson/Po with mean 8.5). P(8.5) B0	
(b)	**B1**	For a correct assumption (must have the context of cars, and bolded words).	
(c)	**B1**	awrt 0.0093 (Calc: 0.00928…)	
	M1	For writing or using $\text{P}(X \leqslant 10) - \text{P}(X \leqslant 5)$ (o.e) May be implied by awrt 0.614	
	A1	awrt 0.614 (Calc: 0.61376…)	
(d)	**M1**	Writing or using $\text{N}(255, 255)$. (Implied by the standardisation $\frac{x - 255}{\sqrt{255}}$)	
	M1	Standardising with (279.5 / 280 / 280.5) **,** their mean **and** standard deviation.	
	M1	Correct continuity correction seen (279.5 or 280.5)	
	A1	awrt 0.0548 – awrt 0.0552 (Calc: 0.055147…) (**NB exact Poisson is 0.05687 and scores 0/4)**	
(e)	**B1**	For correct hypotheses and attached to H_0 and H_1 in terms of λ or μ. (Allow 8.5)	
(f)	**M1**	Either $[\text{P}(X \leqslant 3)] =$ awrt 0.0301 or $[\text{P}(X \leqslant 4)] =$ awrt 0.0744. Implied by a correct CR coming from correct working. If a two-tail critical region is being calculated award M1 for $X \leqslant 3$ seen, ignore upper tail	
	A1	For a correct critical region (o.e) e.g. $X \leqslant 3$, $X < 4$, $0 \leq X \leq 3$, $0 < X \leq 3$, $0 < X < 4$ etc Do not allow if written as a probability statement. Allow any letter. Accept $CR \leqslant 3$ (o.e)	

		Correct answer only (2/2)
(g)	**M1**	Follow through their CR. Correct non contextual statement (ignore any comparison of numbers). Don't allow contradictory statements. Implied by a correct contextual statement. (Condone acceptance region)
	A1ft	Correct contextual statement in context, contains words in bold (o.e). Must have an idea of rate. (Condone councillor officer claim (the number of cars passing the junction during a 2-minute period) is incorrect o.e.) Insufficient evidence to suggest that there are fewer cars passing **each minute / per minute (o.e)** is fine (Sufficient evidence to suggest that) the rate is **8.5** cars every **2 minutes** \ **4.25** cars **every 1 minutes** (o.e)