Question Number	Scheme	Marks
5 (a)	$X \sim \text{Po}(5)$	
	$\text{P}(X \leqslant 5) = 0.6160$ awrt 0.616	M1 A1
		(2)
(b)	$X \sim \text{B}(4,"0.616")$	B1ft
	$\text{P}(X < 2) = \text{P}(X \leqslant 1)$	M1
	$= 0.384^4 + 4 \times 0.616 \times 0.384^3$	M1
	$= 0.16126...$ awrt 0.161	A1
		(4)
(c)	X = The number of defects per x meters	
	$X \sim \text{N}\left(\frac{x}{16}, \frac{x}{16}\right)$	B1
	$\text{P}(X < 26) = \text{P}\left(Z < \frac{25.5 - \frac{x}{16}}{\sqrt{\frac{x}{16}}}\right) = 0.5398$	M1
	$\frac{25.5 - \frac{x}{16}}{\frac{1}{4}\sqrt{x}} = 0.1$	B1 M1 A1ft
	$\frac{1}{16}x + \frac{1}{40}\sqrt{x} - 25.5 = 0 \rightarrow \sqrt{x} = 20$ (or $\sqrt{x} = -20.4$)	M1
	$(\sqrt{x})^2 = 20^2$	M1
	$x = 400$	A1
		(8)

	Notes	Total 14
(a)	**M1**	For writing or using $\text{P}(X \leqslant 5)$
	A1	awrt 0.616
(b)	**B1ft**	For $X \sim \text{B}(4,0.616)$ Follow through their part (a). May be implied by a correct ft expression for the 2nd M1
	M1	For writing or using $\text{P}(X \leqslant 1)$ (May be implied by 2nd M1)
	M1	For $= [{}^4C_0](1-p)^4 + {}^4C_1 \times p \times (1-p)^3 \quad 0 < p < 1$
	A1	awrt 0.161 correct answer on its own scores 4 out of 4
(c)	**B1**	For $X \sim \text{N}\left(\frac{x}{16}, \frac{x}{16}\right)$ May be implied by values in standardisation.
	M1	For use of a continuity correction either 25.5 or 26.5 (Allow 24.5)
	B1	$z = \pm 0.1$ Allow calculator value if seen $\pm 0.0999(2986\ldots)$
	M1	Standardising using either 24.5 or 25 or 25.5 or 26 or 26.5 and equate to a z value. Follow through their mean and variance
	A1ft	A correct equation with compatible signs ft their mean and variance provided mean = variance
	M1	For solving their 3 term equation by factorising, completing the square or use of formula. May be implied by –20.4 , otherwise if answer is incorrect working must be shown.
	M1	For correct squaring of both sides. May be implied by 416[.16] from correct equation This mark may be scored prior to solving a 3TQ, e.g. $\left(25.5 - \frac{x}{16}\right)^2 = \left(\frac{1}{40}\sqrt{x}\right)^2$. Do not award if squaring each individual term
	A1	$x = 400$ only. This is dependent upon all previous marks in (c).
	SC	Use of $X \sim \text{N}\left(\frac{x}{16}, \frac{15x}{256}\right)$ leading to $x = 400$ scores max B0M1B1M1A0M1M1A0