Question Number	Scheme	Marks
4(i)(a)	$\mathrm{E}(X^2) = \int_1^3 x^2 \times \frac{x^3}{20}\,\mathrm{d}x \quad \left(= \int_1^3 \frac{x^5}{20}\,\mathrm{d}x\right)$	M1
	$= \left[\frac{x^6}{120}\right]_1^3$	A1
	$= \frac{729}{120} - \frac{1}{120} = \frac{91}{15}$	A1
		(3)
(b)	$\mathrm{Var}(E) = \text{"}\mathrm{E}(X^2)\text{"} - (2.42)^2$	
	$= \frac{91}{15} - (2.42)^2 = 0.21026...$	M1
	awrt 0.210	A1ft
		(2)
(ii)(a)	No smaller than Q_3, $S \sim \mathrm{B}(10, 0.75)$ $\mathrm{P}(S \ldots 7) = 1 - \mathrm{P}(S \,„\, 6)$ $= 1 - 0.22412...$ $= 0.77587...$ awrt 0.776 Alt: No larger than Q_3, $L \sim \mathrm{B}(10, 0.25)$ $\mathrm{P}(L \,„\, 3)$ $= 0.77587...$ (tables give 0.7759) awrt 0.776	B1 M1 A1
		(3)
(b)	$\mathrm{P}(S \ldots 5) = 1 - \mathrm{P}(S \,„\, 4)$ $= 1 - 0.019727...$ $= 0.98027...$ $\mathrm{P}(L \,„\, 5)$ $= 0.98027...$ (tables give 0.9803) awrt 0.980	M1 A1
		(2)
	Notes	**Total 10**

(i)(a)	**M1**	correct method stated or implied condone missing limits
	A1	$\frac{x^6}{120}$ correct **and** correct limits shown or used (which may be implied by final answer)
	A1	$\frac{91}{15}$ oe (provided $\frac{x^6}{120}$ oe seen). May be seen in (b).
(b)	**M1**	correct calculation ft their $\mathrm{E}(X^2)$ from (a)
	A1ft	awrt 0.210 accept $\frac{1577}{7500}$ Correct answer 2/2. Condone 0.21 with working seen ft if (a) is rounded to 6.07 leading to awrt 0.214
(ii)(a)	**B1**	$\mathrm{B}(10, 0.75)$ or $\mathrm{B}(10, 0.25)$ oe stated in either (ii)(a) or (ii)(b), or implied by a correct probability in (ii)(a) or (ii)(b)
	M1	correct probability statement for their $\mathrm{B}(10, p)$, where $p = 0.25$ or $p = 0.75$ or allow if $\mathrm{Po}(10p)$ used. Implied by correct answer.
	A1	awrt 0.776
(b)	**M1**	correct probability statement for their $\mathrm{B}(10, p)$, where $p = 0.25$ or $p = 0.75$ or allow if $\mathrm{Po}(10p)$ used. Implied by correct answer.
	A1	awrt 0.980 (condone 0.98 with correct working seen)