Question Number	Scheme	Marks
6(a)	$[10k = 1 \Rightarrow] k = 0.1$	B1
		(1)
(b)	e.g. $P(X = 1) = 0.1$ and $P(X = 2)[= F(2) - F(1)] = 0.1$	B1
	e.g. $P(X = 3)[= F(3) - F(2)] = 0.1$	M1
	X | 1 | 2 | 3 | 4 | 5 | 6 $P(X = x)$ | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3	A1
		(3)
(c)	$a + a + a + b + b + b + 0.11 + 0.05 = 1 \quad [3a + 3b = 0.84]$	M1
	$a + 2a + 3a + 4b + 5b + 6b + 0.77 + 0.4 = 4.02 \quad [\Rightarrow 6a + 15b = 2.85]$	M1
	e.g. $9a = 1.35 \Rightarrow a = 0.15$*	A1*
		(3)
(d)	$b = 0.13$	
	$E(Y^2) = 1^2 \times 0.15 + 2^2 \times 0.15 + 3^2 \times 0.15 + 4^2 \times '0.13' + 5^2 \times '0.13' + 6^2 \times '0.13'$ $+ 7^2 \times 0.11 + 8^2 \times 0.05 = [20.7]$*	M1 A1*
		(2)
(e)	$[\text{Var}(Y) =] 20.7 - 4.02^2 [= 4.5396]$	M1
	$\text{Var}(5 - 2Y) = 4\text{Var}(Y) = 4 \times '4.5396' = 18.1584$ awrt 18.2	M1 A1
		(3)
(f)	$'0.1' \times 0.15 + '0.1' \times 0.15 = 0.03$	M1 A1
		(2)

	Notes	Total 14
(a)	**B1**	For $k = 0.1$ oe
(b)	**B1**	For correct use of F(x) to find 2 probabilities May be implied by two correct probabilities
	M1	For correct use of F(x) to find one other probability. May be implied by one other correct probability
	A1	For a fully correct probability distribution. Need not be in a table but probabilities must be attached to the correct X values
(c)	**M1**	For use of the sum of the probabilities = 1 to form a linear equation in a and b (May be implied by $3a + 3b = 0.84$)
	M1	For use of $\sum y \times P(Y = y) = 4.02$ to form a linear equation in a and b (May be implied by $6a + 15b = 2.85$)
	A1*	Answer is given so there must be a correct line between the 2 equations and the given answer
(d)	**M1**	For finding E(Y^2) with their b (At least 4 correct terms). Values for a and b must be substituted into their expression for E(Y^2)
	A1*	For a fully correct expression (no incorrect working seen) eg. $14 \times 0.15 + 77 \times 0.13 + 49 \times 0.11 + 64 \times 0.05$ Allow 0.15 + 0.6 + 1.35 + 2.08 + 3.25 + 4.68 + 5.39 + 3.2
(e)	**M1**	For a correct expression for Var(Y). May be implied by awrt 4.54 Allow E(5 – 2Y) = $-{}^{76}\!/_{25}$ oe and E((5 – 2Y)^2) = ${}^{137}\!/_{5}$
	M1	For use of 4Var(Y) ft their Var(Y) provided Var(Y) is not 20.7 or 4.02 Do not allow 5 + 4Var(Y) Allow Var(5 – 2Y) = $\frac{137}{5} - \left(-\frac{76}{25}\right)^2$ ft their E(5 – 2Y) and their E((5 – 2Y)^2)
	A1	awrt 18.2
(f)	**M1**	For use of P(X = 1) × P(Y = 2) + P(X = 2) × P(Y = 1) ft their X distribution probabilities
	A1	Cao