Question		Sche	eme					Marks	
1 (a)	Time	taken (<i>t</i> minutes)	5-10	10-14	14 - 18	18-25	25-40	D1	
1 (a)	Frequency (f)		10	16	24	35	15	BI	
							I1	(1)
(b)	10 + 16 -	$+(2 \times 6)$ or $10 + 16 + 16$	$+\frac{24}{2}$ or	$\frac{x-26}{50-26} =$	$=\frac{16-14}{18-14}$			M1	
	_ 20		L	30-20	10-14			A 1	
	- 38								$\overline{\mathbf{n}}$
								(4	2)
(c)	$\sum ft = \int 7.5 \times 10 + 12 \times 16 + 16 \times 24 + 21.5 \times 35' + 32.5 \times 15' = 1891$				M1				
	Mean =	$\frac{1891}{100} = 18.91$						A1	
								Ű	2)
		41022	$(1001)^{2}$	410	$100 \times 100 \times 1000 \times 10000 \times 10000 \times 10000 \times 10000 \times 10000 \times 10000 \times 100000000$	12 0112			_/
(d)	Standard	deviation = $\sqrt{\frac{41033}{100}}$ -	$\left(\frac{1891}{100}\right)'$	or $\sqrt{\frac{410}{3}}$	99	10.91		M1	
		= 7.262		or 7.2	98 a	wrt 7.26 or	awrt	A 1	
	7.3[0]								
				1				(2	2)
	[LQ =] 1	$10 + \frac{15}{16}(14 - 10) [= 13.75]$]	[LQ =] 1	$0 + \frac{15.25}{16} (1$	4 - 10) [= 1	3.8125]		
	or 14	or $14 - \frac{16}{16}(14 - 10) [= 13.75]$ or $14 - \frac{16}{16}(14 - 10) [= 13.8125]$							
(e)	0 - 1	$Q_1 - 10$ 25 - 10 r $Q_2 - 10$ 25.25 - 10 r $Q_2 - 10$				M1			
	or $\frac{\varepsilon_1}{1/1}$	$\int \frac{1}{4-10} = \frac{26}{26-10} \begin{bmatrix} = 13.75 \end{bmatrix} \qquad $							
	0 - 1	-14 25 - 26							
	or $\frac{g_1}{14}$	$\frac{1}{0} = \frac{25 - 20}{26 - 10} [= 13.75]$		or $\frac{g_1}{14}$	$\frac{1}{2} = \frac{23.23}{26}$	$\frac{20}{0}$ [=13.8]	125]		
	I = 1 = 1 $I \cap P = 2$	$\frac{0}{2}$ $\frac{20-10}{13}$		14 - 10 10P - 23	13 8125	U 1		M1	
	-0	<u>3- 13.75</u> 25		= 10K = 25 - 13.8125					
	- 9.	23		— aw	/11 9.19				2)
			No	ntes				.) Total 1(<u>)</u>
		for 35 and 15 (If answer	s given are	in both the t	able and any	wer lines th	en mark the	nswers	J
(a)	B1	given in the table)	S BITCH LICE						
(b)	M1	for $10 + 16 + (2 \times 6)$ or	$10 + 16 + \frac{2}{3}$	$\frac{24}{2}$ or $\frac{x-2}{2}$	$\frac{26}{26} - \frac{16 - 14}{16 - 14}$	4			
(0)	IVII		10 - 10 -	2 50-2	26 18 - 14	4			
	A1	Cao							
(c)	M1	A correct method for fin	ding $\sum ft$	May be imp	plied by 189	1 Allow one	e error		
	A1	18.91 Allow 18.9							
(d)	M1	for a correct calculation	of the stand	lard deviatio	on ft their me	ean			
	Al	awrt 7.26 or awrt 7.3 if i	l sing n - 1		10 05 1	0 0 1	4 25 26		
		for $10 + \frac{15}{14}(14 - 10)$ or 1	$4 - \frac{1}{1}(14 - \frac{1}{14})$	-10) or $\frac{Q_1}{1}$	$\frac{-10}{-10} = \frac{25-1}{-10}$	$\frac{0}{1}$ or $\frac{Q_1 - 14}{1}$	$\frac{4}{2} = \frac{25 - 26}{2}$		
(e)	M1		16`	· 14-	-10 26-1	0 14 - 10) 26-10	05.05 05	
		or $10 + \frac{15.25}{14-10}$	or $14 - \frac{0.75}{$	2 -(14-10) c	or $\frac{Q_1 - 10}{10} =$	$\frac{25.25 - 10}{25.25 - 10}$	or $\frac{Q_1 - 14}{1} =$	25.25 - 26	
	3.54		16	· · · · · ·	14-10	26-10	14-10	26-10	
	MI	UQ - LQ ft their LQ p	provided LQ	$\underline{v} < UQ$					
1	AI	For 9.25 or awrt 9.19 if	$n \pm 1$ is used	L					

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Question		Scheme		Marks
2 (a)	50	$G \xrightarrow{4}{4} G \xrightarrow{5}{13} B$ $G \xrightarrow{4}{13} G$ $G \xrightarrow{6}{13} B$ $G \xrightarrow{7}{13} G$ $G \xrightarrow{7}{13} G$ $G \xrightarrow{7}{13} G$ $G \xrightarrow{7}{13} G$ $G \xrightarrow{7}{13} B$ $G \xrightarrow{7}{13} B$ $G \xrightarrow{7}{13} B$ $G \xrightarrow{7}{13} B$	$ \frac{\frac{5}{8} & \frac{3}{8}}{\frac{8}{13} & \frac{5}{13}}{\frac{7}{13} & \frac{6}{13}} $	B1 B1 B1
				(3)
(b)	$\frac{5}{9} \times \frac{4}{8} + \frac{4}{9}$	$\frac{1}{5} \times \frac{5}{8} = \frac{5}{9}$ oe		M1 A1
	5 4	0 4 2 7 (1		(2)
(c)	$\frac{5}{9} \times \frac{4}{8} \times \frac{1}{2}$	$\frac{8}{13} + \frac{4}{9} \times \frac{3}{8} \times \frac{7}{13} = \frac{61}{234} \text{ oe}$		M1 A1
(d)	$\frac{\frac{5}{9} \times \frac{4}{8} \times \frac{8}{13}}{\frac{61}{234}} = \frac{\frac{20}{117}}{\frac{61}{234}} = \frac{40}{61} \text{ oe}$		M1 A1ft A1	
	234			
	234	L 234		(3)
(a)	234 B1	$\begin{bmatrix} 234 \end{bmatrix}$ Notes for $\frac{5}{8} \& \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375	or 62.5% & 2	(3) Total 10 37.5%
(a)	234 B1 B1	$[234]$ Notes for $\frac{5}{8} & \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375 for $\frac{8}{13} & \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 & 61.5% & awrt 38.5%	or 62.5% & 3 awrt 0.385 c	(3) Total 10 37.5% or awrt
(a)	234 B1 B1 B1	$[234]$ Notes for $\frac{5}{8} & \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375 for $\frac{8}{13} & \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 & 61.5% & awrt 38.5% for $\frac{7}{13} & \frac{6}{13}$ in both correct places on the 3 rd branches Allow awrt 0.538 53.8% or awrt 46.2%	or 62.5% & 3 awrt 0.385 c & awrt 0.462	(3) Total 10 37.5% or awrt 2 or awrt
(a)	234 B1 B1 B1 M1	$\begin{bmatrix} 234 \end{bmatrix}$ Notes for $\frac{5}{8} & \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375 for $\frac{8}{13} & \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 & 61.5% & awrt 38.5% for $\frac{7}{13} & \frac{6}{13}$ in both correct places on the 3 rd branches Allow awrt 0.538 53.8% or awrt 46.2% for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ ' ft their tree diagram provided these are probabilities Allow $\frac{5}{9} \times \frac{4}{8} \times \frac{7}{13} + \frac{5}{9} \times \frac{4}{8} \times \frac{6}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{7}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{6}{13}$ '	or 62.5% & 2 awrt 0.385 c & awrt 0.462	(3) Total 10 37.5% or awrt 2 or awrt
(a)	234 B1 B1 M1 A1	$\begin{bmatrix} 234 \end{bmatrix}$ Notes for $\frac{5}{8} \& \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375 for $\frac{8}{13} \& \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 & 61.5% & awrt 38.5% for $\frac{7}{13} \& \frac{6}{13}$ in both correct places on the 3 rd branches Allow awrt 0.538 53.8% or awrt 46.2% for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ ' ft their tree diagram provided these are probabilities Allow $\frac{5}{9} \times \frac{4}{8} \times \frac{7}{13} + \frac{5}{9} \times \frac{4}{8} \times \frac{6}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{7}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{6}{13}$ ' $\frac{5}{9}$ oe Allow awrt 0.556 or awrt 55.6%	or 62.5% & 3 awrt 0.385 c & awrt 0.462	(3) Total 10 37.5% or awrt 2 or awrt
(a) (b) (c)	234 B1 B1 B1 M1 A1 M1	$\begin{bmatrix} 234 \end{bmatrix}$ Notes for $\frac{5}{8} & \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375 for $\frac{5}{8} & \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 & 61.5% & awrt 38.5% for $\frac{7}{13} & \frac{6}{13}$ in both correct places on the 3 rd branches Allow awrt 0.538 53.8% or awrt 46.2% for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ ' ft their tree diagram provided these are probabilities Allow $\frac{5}{9} \times \frac{4}{8} \times \frac{7}{13} + \frac{5}{9} \times \frac{4}{8} \times \frac{6}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{7}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{7}{13}$ ' $\frac{6}{13}$ ' $\frac{5}{9}$ oe Allow awrt 0.556 or awrt 55.6% for $\frac{5}{9} \times \frac{4}{8} \times \frac{18}{13} + \frac{4}{9} \times \frac{3}{8} \times \frac{7}{13}$ ft their tree diagram provided these are p	or 62.5% & 2 awrt 0.385 c & awrt 0.462 s	(3) Total 10 37.5% or awrt 2 or awrt
(a) (b) (c)	234 B1 B1 B1 M1 A1 A1	$\boxed{\begin{array}{c} 234 \\ \hline \\ $	or 62.5% & 3 awrt 0.385 c & awrt 0.462 s	(3) Total 10 37.5% or awrt 2 or awrt
(a) (b) (c) (d)	234 B1 B1 M1 A1 M1 A1 M1	NotesNotesfor $\frac{5}{8} & \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375for $\frac{8}{13} & \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 &61.5% & awrt 38.5%for $\frac{7}{13} & \frac{6}{13}$ in both correct places on the 3 rd branches Allow awrt 0.53853.8% or awrt 46.2%for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ ' ft their tree diagram provided these are probabilitiesAllow $\frac{5}{9} \times \frac{4}{8} \times \frac{7}{13} + \frac{5}{9} \times \frac{4}{8} \times \frac{6}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{7}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{6}{13}$ ' $\frac{5}{9}$ oe Allow awrt 0.556 or awrt 55.6%for $\frac{5}{9} \times \frac{4}{8} \times \frac{8}{13} + \frac{4}{9} \times \frac{3}{8} \times \frac{7}{13}$ ft their tree diagram provided these are probabilitiesAllow awrt 0.556 or awrt 55.6%for $\frac{5}{2} \times \frac{4}{8} \times \frac{8}{13} + \frac{4}{9} \times \frac{3}{8} \times \frac{7}{13}$ ft their tree diagram provided these are p $\frac{61}{234}$ oe Allow awrt 0.261 or awrt 26.1%for $\frac{a \text{ probability}}{\text{part (c)}}$ where numerator < denominator and 0 < part (c) < 1	or 62.5% & 3 awrt 0.385 c & awrt 0.462 s	(3) Total 10 37.5% or awrt 2 or awrt
(a) (b) (c) (d)	234 B1 B1 M1 A1 M1 A1 M1 A1ft	Notesfor $\frac{5}{8} & \frac{3}{8}$ in the correct place on the 2 nd branches Allow 0.625 & 0.375for $\frac{8}{13} & \frac{5}{13}$ in the correct place on the 3 rd branches Allow awrt 0.615 &61.5% & awrt 38.5%for $\frac{7}{13} & \frac{6}{13}$ in both correct places on the 3 rd branches Allow awrt 0.53853.8% or awrt 46.2%for $\frac{5}{9} \times \frac{4}{8} + \frac{4}{9} \times \frac{5}{8}$ ' ft their tree diagram provided these are probabilitiesAllow $\frac{5}{9} \times \frac{4}{8} \times \frac{7}{13} + \frac{5}{9} \times \frac{4}{8} \times \frac{6}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{7}{13} + \frac{4}{9} \times \frac{5}{8} \times \frac{6}{13}$ 'for $\frac{5}{9} \times \frac{4}{8} \times \frac{7}{13} + \frac{5}{9} \times \frac{4}{8} \times \frac{7}{13}$ ft their tree diagram provided these are probabilitiesAllow awrt 0.556 or awrt 55.6%for $\frac{5}{9} \times \frac{4}{8} \times \frac{8}{13} + \frac{4}{9} \times \frac{3}{8} \times \frac{7}{13}$ ft their tree diagram provided these are p $\frac{61}{234}$ oe Allow awrt 0.261 or awrt 26.1%for $\frac{a \text{ probability}}{\text{part (c)}}$ where numerator < denominator and 0 < part (c) < 1for finding the correct numerator Allow awrt 0.171 or awrt 17.1% or ft	or 62.5% & 3 awrt 0.385 c & awrt 0.462 s robabilities	(3) Total 10 37.5% or awrt 2 or awrt agram If the

Question		Scheme		Marks
3 (a)	E(X) = 2	$2a+3\times0.4+4(0.6-a)$ [=3.6-2a]		M1 A1
				(2)
(b)	0 < a < 0	0.6 oe		B1
	$2 \times 0.6 +$	$3 \times 0.4[= 2.4]$ or $3.6 - 2 \times 0.6[= 2.4]$	Alternative	
	and		0 > -2a > -1.2	M1
	$3 \times 0.4 +$	$4 \times 0.6[=3.6]$ or $3.6 - 2 \times 0[=3.6]$	3.6 > 3.6 - 2a > 2.4	
	2.4 < E(<i>X</i>) < 3.6		A1
				(3)
(c)	Var(X)	$= \mathrm{E}(X^2) - \mathrm{E}(X)^2$		
	$\left[\mathrm{E}(X^2) \right]$	=]4a + 3.6. + 9.6 - 16a[= 13.2 - 12a]		M1 A1
	Var(X)	$='(13.2-12a)'-('3.6-2a')^2$		M1
	$-4a^2+2$	a - 0.32 = 0		Al
	-'2.	$4' \pm \sqrt{2.4'^2 - 4 \times - 4' \times - 0.32'}$		2.41
	<i>a</i> =	2×'-4'		MI
	$a = \frac{1}{a}$	$a = \frac{2}{2}$		A 1
	$u = \frac{1}{5}$	$u = \frac{1}{5}$		AI
				(6)
		Notes	1	Total 11
(a)	MI	For an attempt to find $E(X)$ with 2 out of the 3 property of the	oducts correct	
	Al	10f $2a+1.2+4(0.0-a)$ de	$a = \frac{1}{2} = $	
(b)	B1	We allow this to be written in words e.g. $a > 0$	and $a < 0.6$, Allow the use of \leq or , ween 0 and 0.6	\geq 10r < 0r >
		for a correct method for finding the lower and up	per end of the range. May be implie	d by
	IVI I	$2.4 \le E(X) \le 3.6$ or sight of 2.4 and 3.6		
	A1	Allow e.g. 2.4 , $3.6-2a$, 3.6		
		NB 2.4 < $E(X)$ < 3.6 or 2.4, 3.6 - 2 <i>a</i> , 3.6	scores 3/3	
(c)	M1	An attempt at an expression for $E(X^2)$ with 2 to Var(Y)	erms correct. May be seen in an atter	mpt at
		x a correct expression for $F(X^2)$ May be seen in	an attempt at Var(V) Does not have t	o be fully
	A1	simplified allow $4a + 36 + 96 - 16a$ or better		o be fully
	M1	use of Var(X) = $E(X^2) - E(X)^2$ ft their $E(X)$	2) and their part (a)	
	A1	a correct 3TQ e.g. $25a^2 - 15a + 2 = 0$		
		correct method for solving their 3TQ e.g. $(5a -$	2)(5a-1) = 0	
	M1	May be implied by $a = \frac{1}{5}$ and $a = \frac{2}{5}$		
		If the 3TQ is incorrect then a correct substitution and c are both negative, allow the omission of ne in the denominator) or a complete method using must be seen before their values of a	of their values into the quadratic for egatives in 4 <i>ac</i> and allow a correct si completing the square or a correct fa	rmula (If <i>a</i> ngle value actorisation
	A1	$a = \frac{1}{5}$ oe and $a = \frac{2}{5}$ oe Allow any letter for a		

Question		Scheme	Marks
$A(\mathbf{i})(\mathbf{a})$	$n \perp a = -$	$\frac{7}{100}$ or $a + r = \frac{1}{100}$ or $a + r = \frac{8}{100}$ or	M1 M1
+ (1)(a)	p + q - p	$\frac{1}{25}$ $q + r = \frac{1}{5}$ $q + r = \frac{1}{25}$ $q = r = \frac{1}{25}$	M1
	2 <i>p</i> +2 <i>q</i> -	$+2r = \frac{7}{25} + \frac{1}{5} + \frac{8}{25} \left[= \frac{4}{5} \right] *$	A1* (4)
(i)(b)	eg $p+q$	+r+s=1	M1
	1	2 3 3	A1 A1
	$p = -\frac{5}{5}$	$q = \frac{1}{25}$ de $r = \frac{1}{25}$ de $s = \frac{1}{5}$ de	A1 A1
			(5)
<i>(</i>)	x 5	$x^{2}+5(x+5)$ x 5 $x+5-5$ 5	
(11)	$\frac{1}{x+5}$ $\frac{1}{x}$	$x = \frac{1}{x(x+5)}$ or $\frac{1}{x+5} + \frac{1}{x} = \frac{1}{x+5} + \frac{1}{x}$	MI
	$r^2 + 5$	r + 25 5 5	
	$=\frac{x+3}{x^2}$	$\frac{x+25}{5x}$ or $=1-\frac{5}{x+5}+\frac{5}{x}$	M1
		-5x $x+5$ x	
	$=1+\frac{2}{r^2}$	or as $x^2 + 5x + 25 > x^2 + 5x$ P(C) + P(D) > 1 or As $x + 5 > x$ then	
	5 5	5 5 5	A1
	$\left \frac{3}{r+5} < \frac{3}{r} \right $	$r \Rightarrow -\frac{\sigma}{r+5} + \frac{\sigma}{r} > 0$ So $P(C) + P(D) > 1$	
	$P(C \cup D)$	$\frac{1}{2} + \frac{1}{2} + \frac{1}$	Alcso
	1(0 0 D), 1 01 1(01 12), 0	(4)
		Notes	Total 13
	NB	In (i) Allow the use of exact decimals throughout and mark (a) and (b) together	
(i)(a)	M1	for $p + q = \frac{7}{25}$ or $p + q = P(A)$	
	M1	for $q + r = \frac{1}{5}$ oe or $q + r = P(B)$	
	M1	for $p+r = \frac{8}{25}$ or $p+r = P[(A \cap B') \cup (A' \cap B)]$	
	A1*	we must see $2p + 2q + 2r = \frac{7}{25} + \frac{1}{5} + \frac{8}{25}$ and no errors	
		any correct equation involving at least two of p , q , r and s . May be implied by two c	orrect
(i)(b)	M1	values. Do not allow just $2n+2a+2r = \frac{4}{2}$ This mark may be awarded in part (a)	
		5 - 2p + 2q + 2r = 5	
	A1	for $\frac{1}{2}$ or 0.2 oe This mark may be awarded in part (a)	
		5	
	A1	for $\frac{2}{25}$ or 0.08 oe This mark may be awarded in part (a)	
	A1	for $\frac{3}{25}$ or 0.12 or This mark may be awarded in part (a)	
	A1	for $\frac{3}{5}$ oe This mark may be awarded in part (a)	
	SC	for one correct value M0 A1 A0 A0 A0	
(ii)	M1	For an attempt to add P(C) and P(D) e.g. $\frac{x^2}{x(x+5)} + \frac{5(x+5)}{x(x+5)}$ May be implied by $\frac{x^2}{x(x+5)}$	$\frac{+5x+25}{x^2+5x}$ or
		$1 - \frac{5}{5} + \frac{5}{5}$	
		x+5 x 2 + 5 + 25 5 5	
	M1	For $\frac{x^2 + 5x + 25}{x^2 + 5x}$ or $1 - \frac{5}{x + 5} + \frac{5}{x}$	
	A1	for recognising that $P(C) + P(D)$ is > 1	
	A1 cso	a fully correct solution showing that C and D cannot be mutually exclusive	

Question		Scheme	Marks
5 (a)	P(L < 3)	$.86) = P\left(Z < \pm \frac{3.86 - 4.5}{0.4}\right)$	M1
	= P(Z <	(x-1.6) = 1 - 0.9452 or $1 - 0.945200 = 0.0548$ awrt 0.0548	M1 A1 (3)
(b)(i)	P(L < Q)	$(Q_3) = 0.75$ gives $\frac{Q_3 - 4.5}{0.4} = 0.67$ or $P(L < Q_1) = 0.25$ gives $\frac{Q_1 - 4.5}{0.4} = -0.67$	M1 B1
	$[Q_3 =]4.$	768 awrt 4.77 or $Q_1 = 4.232$ awrt 4.23	A1
(ii)	$[Q_1 =]'4$.232' awrt 4.23 or $[Q_3 =]$ '4.768' awrt 4.77	B1 ft (4)
(c)	$1.5('Q_3')$	$-'Q_1')[=0.804]$ (0.81)	M1
	Lower li	mit = 3.428 ($3.42 - 3.43$) Upper limit = 5.572 ($5.57 - 5.58$)	A1 A1 (3)
	P('3.42	$ ' < L < '5.58') = P \left(\frac{'3.42' - 4.5}{0.4} < Z < \frac{'5.58' - 4.5}{0.4} \right) $	M1 A1ft
(d)		$= \left[P(-2.7 < Z < 2.7) \right] = 0.9930*$	A1*
	(Calcula	tor gives 0.99306)	(3)
	P(5 < L)	$<'5.58'$) = P $\left(\frac{5-4.5}{2} < Z < \frac{'5.58'-4.5}{2}\right) = 0.1021$	M1 A1
(e)	(Calcula	tor gives 0.10218) awrt 0.102	
	P(L>5)	$ '3 42' < L < '5 58'\rangle = \frac{P(5 < L < '5.58')}{P(5 < L < '5.58')} \left[= \frac{'0.102'}{} \right]$	M1
	1 (1 > 5	P('3.42' < L < '5.58') = 0.993	1011
		$= 0.1027 \qquad \text{awrt } 0.103$	A1 (4)
		Notes	I Utal 17
(a)	M1	for standardising with 3.86 1.5 and 0.1	
(a)	M1 M1	for standardising with 3.86, 4.5 and 0.4 for $1 - n$ where $0.5 \le n \le 1$	
(a)	M1 M1 A1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5for awrt 0.0548 (NB awrt 0.0548 scores 3/3)$	
(a) (b)(i)	M1 M1 A1 M1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3)for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65$	5 < z < 0.7
(a) (b)(i)	M1 M1 A1 M1 B1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z _{,,} 0.675 This may be implied by a final answer of 4.769 or 4.2$	5 < z < 0.7 2302
(a) (b)(i)	M1 M1 A1 M1 B1 A1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1$	5 < z < 0.7 2302
(a) (b)(i)	M1 M1 A1 M1 B1 A1 R1ft	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)$	5 < <i>z</i> < 0.7 2302
(a) (b)(i) (b)(ii)	M1 M1 A1 M1 B1 A1 B1ft	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9$	5 < <i>z</i> < 0.7 2302
(a) (b)(i) (b)(ii) (c)	M1 M1 A1 M1 B1 A1 B1ft M1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be sh$	5 < z < 0.7 2302
(a) (b)(i) (b)(ii) (c)	M1 M1 A1 M1 B1 A1 B1ft M1 A1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor lower limit awrt 3.42 to 3.43$	5 < z < 0.7 2302
(a) (b)(i) (b)(ii) (c)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor lower limit awrt 3.42 to 3.43for upper limit awrt 5.57 to 5.58$	5 < z < 0.7 2302
(a) (b)(i) (b)(ii) (c) (d)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 M1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor lower limit awrt 3.42 to 3.43for upper limit awrt 5.57 to 5.58for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrawrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown$	5 < z < 0.7 2302 nown rt -2.7 or
(a) (b)(i) (b)(ii) (c) (d)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 M1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.69for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor upper limit awrt 5.57 to 5.58for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrawrt 2.7 If lower/upper limits are incorrect then the standardisation must be shownfor a correct standardisation for their 3.42 and their 5.58 May be implied by awr -2.$	5 < z < 0.7 2302 nown et -2.7 or 7 and awrt
(a) (b)(i) (b)(ii) (c) (d)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 M1 A1ft	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor lower limit awrt 3.42 to 3.43for upper limit awrt 5.57 to 5.58for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrawrt 2.7 If lower/upper limits are incorrect then the standardisation must be shownfor a correct standardisation for their 3.42 and their 5.58 May be implied by awrt -2.2.7 If lower/upper limits are incorrect then the standardisation must be shownare chere use of aurometers of Q_1 = Q_2 = 0.5 and Q_2 = 0.5 and Q_3 = 0.5 and Q_3 = 0.5 and Q_4 = 0.5 an$	5 < z < 0.7 2302 nown rt -2.7 or 7 and awrt
(a) (b)(i) (b)(ii) (c) (d)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 M1 A1ft	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.69for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor lower limit awrt 3.42 to 3.43for upper limit awrt 5.57 to 5.58for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrawrt 2.7 If lower/upper limits are incorrect then the standardisation must be shownfor a correct standardisation for their 3.42 and their 5.58 May be implied by awrawrt 2.7 If lower/upper limits are incorrect then the standardisation must be shownfor a correct standardisation for their 3.42 and their 5.58 May be implied by awrt -2.2.7 If lower/upper limits are incorrect then the standardisation must be shownor clear use of symmetry e.g. (0.9965 - 0.5) \times 2 Do not allow use of negative limits$	5 < z < 0.7 2302 nown rt -2.7 or 7 and awrt
(a) (b)(i) (b)(ii) (c) (d)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 M1 A1ft A1*	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a z value, 0.65for use of 0.67,, z , 0.675 This may be implied by a final answer of 4.769 or 4.2awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i)You will need to check whether Q_1 + Q_3 = 9use of 1.5(Q_3 - Q_1) ft their Q_3 and Q_1 If these are not correct then working must be shfor lower limit awrt 3.42 to 3.43for upper limit awrt 5.57 to 5.58for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrtawrt 2.7 If lower/upper limits are incorrect then the standardisation must be shownfor a correct standardisation for their 3.42 and their 5.58 May be implied by awrt -2.2.7 If lower/upper limits are incorrect then the standardisation must be shownor clear use of symmetry e.g. (0.9965 - 0.5) \times 2 Do not allow use of negative limitsanswer is given so there must be a fully correct solution given with no errors Allow (better or 0.9965 - 0.0035 oe or 1 - 0.0035 - 0.0035 oe$	5 < z < 0.7 2302 nown rt -2.7 or 7 and awrt s 0.9930 or
(a) (b)(i) (b)(ii) (c) (d) (e)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 M1 A1ft A1* M1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 \le p \le 1$ for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a <i>z</i> value, 0.69 for use of 0.67, $ z $, 0.675 This may be implied by a final answer of 4.769 or 4.2 awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1 awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i) You will need to check whether $Q_1 + Q_3 = 9$ use of $1.5(Q_3 - Q_1)$ ft their Q_3 and Q_1 If these are not correct then working must be sh for lower limit awrt 3.42 to 3.43 for upper limit awrt 5.57 to 5.58 for a correct standardisation for either their 3.42 or their 5.58 May be implied by awr awrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown for a correct standardisation for their 3.42 and their 5.58 May be implied by awr -2. 2.7 If lower/upper limits are incorrect then the standardisation must be shown or clear use of symmetry e.g. $(0.9965 - 0.5) \times 2$ Do not allow use of negative limits answer is given so there must be a fully correct solution given with no errors Allow (better or $0.9965 - 0.0035$ oe or $1 - 0.0035 - 0.0035$ oe for writing or using P(5 < L < '5.8') Maybe implied by awrt 0.102	5 < z < 0.7 2302 nown et -2.7 or 7 and awrt s 0.9930 or
(a) (b)(i) (b)(ii) (c) (d) (e)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 M1 A1ft A1* M1 A1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 \le p \le 1$ for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a <i>z</i> value, 0.62 for use of 0.67,, $ z $, 0.675 This may be implied by a final answer of 4.769 or 4.2 awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1 awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i) You will need to check whether $Q_1 + Q_3 = 9$ use of $1.5(Q_3 - Q_1)$ ft their Q_3 and Q_1 If these are not correct then working must be sh for lower limit awrt 3.42 to 3.43 for upper limit awrt 5.57 to 5.58 for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrt awrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown for a correct standardisation for their 3.42 and their 5.58 May be implied by awrt -2. 2.7 If lower/upper limits are incorrect then the standardisation must be shown or clear use of symmetry e.g. $(0.9965 - 0.5) \times 2$ Do not allow use of negative limits answer is given so there must be a fully correct solution given with no errors Allow (better or $0.9965 - 0.0035$ oe or $1 - 0.0035 - 0.0035$ oe for writing or using P(5 < L < '5.8') Maybe implied by awrt 0.102 awrt 0.102	5 < z < 0.7 2302 nown rt -2.7 or 7 and awrt s 0.9930 or
(a) (b)(i) (b)(ii) (c) (d) (e)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 M1 A1ft A1* M1 A1 M1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 \le p \le 1$ for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a <i>z</i> value, 0.62 for use of 0.67,, $ z $, 0.675 This may be implied by a final answer of 4.769 or 4.2 awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1 awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i) You will need to check whether $Q_1 + Q_3 = 9$ use of $1.5(Q_3 - Q_1)$ ft their Q_3 and Q_1 If these are not correct then working must be sh for lower limit awrt 3.42 to 3.43 for upper limit awrt 5.57 to 5.58 for a correct standardisation for either their 3.42 or their 5.58 May be implied by awrt awrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown for a correct standardisation for their 3.42 and their 5.58 May be implied by awrt -2. 2.7 If lower/upper limits are incorrect then the standardisation must be shown or clear use of symmetry e.g. $(0.9965 - 0.5) \times 2$ Do not allow use of negative limits answer is given so there must be a fully correct solution given with no errors Allow 0 better or $0.9965 - 0.0035$ oe or $1 - 0.0035 - 0.0035$ oe for writing or using P($5 < L < 5.8^{\circ}$) Maybe implied by awrt 0.102 awrt 0.102 for a correct probability statement in either form or a correct ratio ft their lower and u Allow $\frac{P(5 < L < 5.8^{\circ})}{0.003}$	5 < z < 0.7 2302 nown rt -2.7 or 7 and awrt s 0.9930 or upper limits
(a) (b)(i) (b)(ii) (c) (d) (e)	M1 M1 A1 M1 B1 A1 B1ft M1 A1 A1 A1 M1 A1ft A1* M1 A1 A1	for standardising with 3.86, 4.5 and 0.4 for $1 - p$ where $0.5 \le p \le 1$ for awrt 0.0548 (NB awrt 0.0548 scores 3/3) for standardising with Q_3 or Q_1 (o.e.), 4.5 and 0.4 and setting equal to a <i>z</i> value, 0.69 for use of 0.67,, $ z $, 0.675 This may be implied by a final answer of 4.769 or 4.2 awrt 4.77 or awrt 4.23 for Q_1 correctly labelled NB it is possible to score M1B0A1 awrt 4.23 if Q_3 given in (i) or awrt 4.77 if Q_1 given in (i) ft their part (b)(i) You will need to check whether $Q_1 + Q_3 = 9$ use of $1.5(Q_3 - Q_1)$ ft their Q_3 and Q_1 If these are not correct then working must be sh for lower limit awrt 3.42 to 3.43 for upper limit awrt 5.57 to 5.58 for a correct standardisation for either their 3.42 or their 5.58 May be implied by awr awrt 2.7 If lower/upper limits are incorrect then the standardisation must be shown for a correct standardisation for their 3.42 and their 5.58 May be implied by awrt -2. 2.7 If lower/upper limits are incorrect then the standardisation must be shown or clear use of symmetry e.g. $(0.9965 - 0.5) \times 2$ Do not allow use of negative limits answer is given so there must be a fully correct solution given with no errors Allow (better or 0.9965 - 0.0035 oe or $1 - 0.0035 - 0.0035$ oe for writing or using P(5 < L < '5.58') Maybe implied by awrt 0.102 awrt 0.102 for a correct probability statement in either form or a correct ratio ft their lower and u Allow $\frac{P(5 < L < '5.58')}{0.993}$	5 < z < 0.7 2302 nown rt -2.7 or 7 and awrt s 0.9930 or

Question		Scheme	Marks
6 (a)	An incre	ase/change of 1°C will allow an extra 2.72 grams [of sugar] to dissolve	B1
			(1)
(b)	151.2 + 2	$2.72 \times 90 = 396$	M1 A1
			(2)
(c)	The temp	perature/90[°C] is outside of the range ; so (may be) unreliable	B1;dB1
		(2110)	(2)
(d)	Use of \overline{y}	$\overline{y} = 151.2 + 2.72\overline{x}$ So $\sum x = \left(\frac{\frac{3119}{12} - 151.2}{2.72}\right) \times 12 = 479.63235$	M1 A1
	$S_{yy} = 85$	$1093 - \frac{3119^2}{12} [= 40412.9166]$	M1
	$S_{xx} = 243$	$500 - \frac{'479.63235'^2}{12} [= 5329.4005]$	M1
	$S_{xy} = 2.7$	72×'5329.4005'[=14495.9693]	M1
	$r = \frac{1}{\sqrt{53}}$	$\frac{14495.9693'}{29.4005'\times 40412.9166'} \text{or} r = 2.72 \times \sqrt{\frac{5329.4005'}{40412.9166'}}$	M1
	= 0.98	38 *	A1*
			(7)
(e)	e.g. the p is close t	points lie reasonably close to a straight line/positive correlation and the PMCC o 1 therefore supports a linear model	B1 B1
			(2)
		Notes	Total 14
(a)	B1	Notes for a correct interpretation of the gradient in context including grams and degrees	Total 14
(a) (b)	B1 M1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line	Total 14
(a) (b)	B1 M1 A1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line cao 396 on its own scores 2 out 2	Total 14
(a) (b) (c)	B1 M1 A1 B1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line cao 396 on its own scores 2 out 2 for a comment that implies the temperature/90[°C] is outside of the range. Allow extra not linked to 396. (Do not allow comments that imply that 396 is out of range or the	Total 14
(a) (b) (c)	B1 M1 A1 B1 dB1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line cao 396 on its own scores 2 out 2 for a comment that implies the temperature/90[°C] is outside of the range. Allow ext not linked to 396. (Do not allow comments that imply that 396 is out of range or the dependent on 1 st B1 for a correct conclusion	Total 14
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1	Notesfor a correct interpretation of the gradient in context including grams and degreesfor substitution of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3rd M1)	Total 14
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1	Notesfor a correct interpretation of the gradient in context including grams and degreesfor substitution of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3rd M1)	Total 14
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1	Notesfor a correct interpretation of the gradient in context including grams and degreesfor a correct interpretation of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3rd M1)for a correct expression for S _{yy} May be implied by awrt 40400	rapolation if use of "it")
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1 M1	Notesfor a correct interpretation of the gradient in context including grams and degreesfor a correct interpretation of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3rd M1)for a correct expression for S _{yy} May be implied by awrt 40400for a correct expression for S _{xx} ft their $\sum x$ or \overline{x} May be implied by awrt 5330	Total 14
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1	Notesfor a correct interpretation of the gradient in context including grams and degreesfor substitution of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3rd M1)for a correct expression for S _{yy} May be implied by awrt 40400for a correct expression for S _{xx} ft their $\sum x$ or \overline{x} May be implied by awrt 5330for use of the gradient to find S _{xy} ft their S _{xx} May be implied by awrt 14500 or use of the gradient to find S _{xy} ft their S _{xx} May be implied by awrt 14500	Total 14 Tapolation if use of "it") of
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1 M1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line cao 396 on its own scores 2 out 2 for a comment that implies the temperature/90[°C] is outside of the range. Allow ext not linked to 396. (Do not allow comments that imply that 396 is out of range or the dependent on 1 st B1 for a correct conclusion for clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3 rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3 rd M1) for a correct expression for S _{yy} May be implied by awrt 40400 for a correct expression for S _{xx} ft their $\sum x$ or \overline{x} May be implied by awrt 5330 for use of the gradient to find S _{xy} ft their S _{xx} May be implied by awrt 14500 or use $x = b \sqrt{\frac{ S_{xx} }{ S_{yy} }}$	Total 14 rapolation if use of "it") of
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1 M1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line cao 396 on its own scores 2 out 2 for a comment that implies the temperature/90[°C] is outside of the range. Allow ext not linked to 396. (Do not allow comments that imply that 396 is out of range or the dependent on 1 st B1 for a correct conclusion for clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3 rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3 rd M1) for a correct expression for S _{yy} May be implied by awrt 40400 for a correct expression for S _{xx} ft their $\sum x$ or \overline{x} May be implied by awrt 5330 for use of the gradient to find S _{xy} , ft their S _{xx} May be implied by awrt 14500 or use of $r = b \sqrt{\frac{ S_{xx} }{ S_{yy} }}$	rapolation if use of "it") of
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1 M1 M1 M1	Notesfor a correct interpretation of the gradient in context including grams and degreesfor a correct interpretation of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1 st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3 rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3 rd M1)for a correct expression for S _{yy} May be implied by awrt 40400for use of the gradient to find $\sum x$ or \overline{x} May be implied by awrt 5330for use of the gradient to find S _{xy} ft their S _{xx} May be implied by awrt 14500 or use of $r = b \sqrt{\frac{ S_{xx} }{ S_{yy} }}$ for a correct expression for r ft their S _{xy} , S _{xx} and S _{yy} or 2.72, 'S _{xx} ' and 'S _{yy} ' If thecorrect then they must be labelled before an expression for r is given for this mark to awarded	rapolation if use of "it") of se are not o be
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1 M1 M1 M1 A1*	Notesfor a correct interpretation of the gradient in context including grams and degreesfor a correct interpretation of 90 into the regression linecao 396 on its own scores 2 out 2for a comment that implies the temperature/90[°C] is outside of the range. Allow extnot linked to 396. (Do not allow comments that imply that 396 is out of range or thedependent on 1st B1 for a correct conclusionfor clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by awrt 40400for a correct expression for S _{yy} May be implied by awrt 40400for use of the gradient to find $\sum x$ or \overline{x} May be implied by awrt 5330for use of the gradient to find S _{xy} ft their S _{xx} May be implied by awrt 14500 or use of the gradient to find S _{xy} , ft their S _{xx} and S _{yy} or 2.72, 'S _{xx} ' and 'S _{yy} ' If thecorrect expression for r ft their S _{xy} , S _{xx} and S _{yy} or 2.72, 'S _{xx} ' and 'S _{yy} ' If thecorrect then they must be labelled before an expression for r is given for this mark to awardedAnswer is given so a fully correct solution must be seen	rapolation if use of "it") of se are not o be
(a) (b) (c) (d)	B1 M1 A1 B1 dB1 M1 A1 M1 M1 M1 M1 M1 A1* B1	Notes for a correct interpretation of the gradient in context including grams and degrees for substitution of 90 into the regression line cao 396 on its own scores 2 out 2 for a comment that implies the temperature/90[°C] is outside of the range. Allow ext not linked to 396. (Do not allow comments that imply that 396 is out of range or the dependent on 1 st B1 for a correct conclusion for clear use of the regression line to find $\sum x$ or \overline{x} (may be implied by 3 rd M1) $\sum x = awrt 480$ or $\overline{x} = awrt 40$ (may be implied by 3 rd M1) for a correct expression for S _{yy} May be implied by awrt 40400 for a correct expression for S _{xx} ft their $\sum x$ or \overline{x} May be implied by awrt 5330 for use of the gradient to find S _{xy} ft their S _{xx} May be implied by awrt 14500 or use of $r = b \sqrt{\frac{ S_{xx} }{ S_{yy} }}$ for a correct expression for r ft their S _{xy} , S _{xx} and S _{yy} or 2.72, 'S _{xx} ' and 'S _{yy} ' If thes correct then they must be labelled before an expression for r is given for this mark to awarded Answer is given so a fully correct solution must be seen for either the points lie reasonably close to a straight line/points or data are linear/pos correlation or the PMCC is close to 1 (Ignore any reference to strength)	rapolation if use of "it") of se are not o be sitive