Question	Answer	Marks
1(a)	$\begin{array}{c} 0.6 \\ 0.2 \\ 0.45 \\ 0.35 \\ W \\ 0 \\ 0 \\ NE \end{array}$	
	Fully correct labelled tree for method of transport with correct probabilities.	B1
	Fully correct labelled branches with correct probabilities for lateness with either 1 branch after W or 2 branches with the probability 0.	B1
		2
1(b)	$P(C E) = \frac{P(C \cap E)}{P(E)} = \frac{0.2 \times 0.6}{0.2 \times 0.6 + 0.45 \times 0.1 + 0.35 \times 1}$	M1
	Summing three appropriate 2-factor probabilities	M1
	$\frac{0.12}{0.515}$	A1
	0.233 or $\frac{12}{515}$	A1
		4

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Question	Answer	Marks
2(a)	$0.22^3 = 0.0106$	B1
		1
2(b)	$P(2, 3, 4) = {}^{16}C_2 \ 0.22^2 0.78^{14} + {}^{16}C_3 0.22^3 0.78^{13} + {}^{16}C_4 0.22^4 0.78^{12}$	M1
	0.179205 + 0.235877 + 0.216221	A1
	0.631	A1
		3

Question	Answer	Marks
3(a)	$P(X < 21) = P\left(z < \frac{21 - 15.8}{4.2}\right) = \Phi(1.238)$	M1
	0.892	A1
		2
3(b)	$z = \pm 0.674$	B1
	$\frac{k-15.8}{4.2} = 0.674$	M1
	18.6	A1
		3

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Question	Answer									Marks
4(a)	-1	0	0	1						
	0	1	1	2						
	2	3	3	4						
	x		-1	0	1	2	3	4		
	Probat	oility	$\frac{1}{12}$	$\frac{3}{12}$	$\frac{3}{12}$	$\frac{2}{12}$	$\frac{2}{12}$	$\frac{1}{12}$		
	Probability distribution table with correct scores with at least one probability								B1	
	At least 4 probabilities correct								<b>B</b> 1	
	All prob	oabilities	s correct							B1
										3
4(b)	$E(X) = \frac{-1+0+3+4+6+4}{12} = \frac{16}{12} = \frac{4}{3}$							B1		
	$Var(X) = \frac{1+0+3+8+18+16}{12} - \left(\frac{4}{3}\right)^2$								M1	
	$\frac{37}{18}$ (= 2.06)								A1	
										3

Question	Answer	Marks
5(a)	$\frac{1}{1} = 4$	B1
	4	
		1
5(b)	$\frac{9}{64}$ (= 0.141)	B1
		1
5(c)	$P(X < 6) = 1 - \left(\frac{3}{4}\right)^5$	M1
	(FT <i>their</i> probability/mean from part (a))	
	0.763	A1
		2
5(d)	Mean = $80 \times 0.25 = 20$ Var = $80 \times 0.25 \times 0.75 = 15$	M1
	P(more than 25) = P $\left(z > \frac{25.5 - 20}{\sqrt{15}}\right)$	M1
	P(z > 1.42)	M1
	1-0.9222	M1
	0.0778	A1
		5

Question	Answer								
6(a)	AB								
	2 6								
	5 2 0 3 0 1 5 8								
	9 7 2 1 1 4 1 2 2 7 9								
	3 2 5 2								
	4 6								
	KEY 1   4   2 means \$41 000 for A and \$42 000 for B								
	Correct stem	B1							
	Correct A on LHS	B1							
	Correct B on same diagram	B1							
	Correct key for <i>their</i> diagram, both companies identified and correct units	B1							
		4							
6(b)	Median = [\$]42 000	B1							
	$LQ = [\$]35\ 000$ $UQ = [\$]52\ 000$	B1							
	$IQR = [\$]17\ 000 (FT if 49000 \le UQ \le 53000 - 32000 \le LQ \le 41000)$								
		3							

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Question	Answer	Marks
6(c)	Sum of given 11 numbers is 433 000	M1
	Sum of 12 numbers, including new = $38500 \times 12 = 462000$	M1
	Difference = new salary = [\$]29 000	A1
		3

Question	Answer	Marks
7(a)	$\frac{9!}{2!2!} = 90\ 720$	B1
		1
7(b)	$\frac{6!}{2!}$	M1
	360	A1
		2

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Question	Answer	Marks				
7(c)	2 Es together = $\frac{8!}{2!}$ (= 20160)	M1				
	Es not together = $90720 - 20160 = 70560$	M1				
	$Probability = \frac{70560}{90720}$	M1				
	$\frac{7}{9}$ or 0.778	A1				
	Alternative method for question 7(c)					
	$\frac{7!}{2!} \times \frac{8 \times 7}{2} = 70560$					
	7! × <i>k</i> in numerator, <i>k</i> integer $\ge$ 1, denominator $\ge$ 1	M1				
	Multiplying by <sup>8</sup> C <sub>2</sub> OE	M1				
	$Probability = \frac{70560}{90720}$	M1				
	$\frac{7}{9}$ or 0.778	A1				
		4				

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Question	Answer	Marks
7(d)	Scenarios are: $E L_{}$ ${}^{5}C_{3}$ 10 $E E L_{}$ ${}^{5}C_{2}$ 10 $E_{}$ ${}^{5}C_{4}$ 5 $E E_{}$ ${}^{5}C_{3}$ 10	M1
	Summing the number of ways for 3 or 4 correct scenarios	M1
	Total = 35	A1
		3