

1. (i)	0.3x0.37 0.111	M1 A1	2	Multiplying probs
(ii)	0.7x0.23+0.3x0.63 0.35	M1 A1	2	Both HM and MH
2. (i)	${}^{22}C_{11}$ seen or attempt with factorials 705432	M1 A1	2	
(ii)	${}^{11}C_6$ and ${}^{11}C_5$ seen Multiplied 213444/705432 0.3025... 0.3025...  ALITER 2(ii) $\frac{11}{65!} \times \left( \frac{11}{22} \times \frac{10}{21} \times \frac{9}{20} \times \frac{8}{19} \times \frac{7}{18} \times \frac{6}{17} \right) \times \left( \frac{11}{16} \times \frac{10}{15} \times \frac{9}{14} \times \frac{8}{13} \times \frac{7}{12} \right)$	M1 M1 M1  A1  M1 M1  M1 A1	4	(Their ${}^{11}C_6 \times {}^{11}C_5$ )/their (i) allow 2541k/8398k  Both 5 and 6 term probabilities seen. Both 5 and 6 term probabilities multiplied Fully correct method including $11!/(6!5!)$ 0.303 or equiv.
3. (i)	Use B(18,0.35) table 0.9788-0.3550 0.6238, 0.624	M1 M1 A1	3	Or probs, at least one correct. fully correct method
(ii)	${}^{22}C_{10}(0.35)^{10}(0.65)^{13}$  0.11668, 0.117	M1 M1 A1	3	allow p,q middle fully correct method
(iii)	e.g. May be biased sample, Residences may not be indep.	B1	1	any relevant reason
4. (i)	Student 1 2 3 4 5 6 Rank mean 2 3 5 4 6 1 Rank grade 2 4 3 5 6 1  $\sum d^2 = 6$  $r = 1 - (6 \times 6) / (6 \times (36 - 1))$  29/35 or 0.829	B1  M1  M1  A1	4	correct ranks (or reversed)  from ranked data. fully correct method (their sum of $d^2$ )
(ii)	Use Mathematics grade Greater correlation	B1ft B1	2	
(iii)	e.g. Sample too small to generalise	B1	1	any relevant reason
5.(i)	t 0.5 1.5 3 5 8 f 8 20 50 24 18 mean=448/120 3.73(33....)	B1 B1 M1 A1	4	from their f,t

(ii)	Evaluate 2249/120 subtract mean <sup>2</sup> and sq.rt. 2.19  ALITER 5(ii) e.g. $(0.5-3.733)^2 \times 8$  Fully correct method 2.19	M1 M1 A1  M1  M1 A1	3	from their f,t   any correct term from their f,t from their f,t
6.(i)	$P(HH)\text{matchings}=(1/4)^2$ , $P(HT)\text{matchings}=(1/2)^2$ , $P(TT)\text{matchings}=(1/4)^2$ $(1/4)^2+(1/2)^2+(1/4)^2$ 3/8  A.G.	B1 M1 A1	3	allow even if errors in HT matchings
(ii)	Geometric distribution stated or implied. $q^2$ or $1-p-qp$ with $q=5/8$ ( and $p=3/8$ , if used ) 25/64 or 0.391	M1 M1 M1 A1	4	fully correct method
(iii)	8/3 aef Refer to average number of matchings.	B1 B1	2	allow 2.67
7(i)	median= $(4.8+5.2)/2=5.0$ Find LQ(3.75),UQ(5.65)subtract 1.9	B1 M1 A1ft	3	allow slight variation
(ii)	show 1.6,6.1,median and quartiles.  NB Graph paper not used	M1 A1ft A1ft M1(max)	3	recognisable attempt at box-plot allow one error on diagram fully correct (f.t.)
(iii)	Shivani's is positive skew Emma's is negative skew Emma's IQR=1.5 Shivani's is more variable	B1ft B1 B1ft	3	for either can be implied
8(i)	Lines cross at mean x,mean y e.g. $y=18.5+0.1(16.6+0.4y)$  mean y=21 , mean x=25	M1 M1  A1	3	stated or implied reasonable attempt at sim. equns.(to find both)
(ii)	$5 \times 25 = 125$ and $5 \times 21 = 105$	B1	1	from correctly obtained means.
(iii)	$\frac{9}{\sqrt{22.5 \times 90}}$  0.2	M1  M1 A1	3	any of $S_{xx}, S_{xy}, S_{yy}$ correct.  fully correct method
(iv)	use y on x because x given, y needed. $y=18.5+0.1 \times 26$ $y=21(.1)$	B1 M1 A1	3	allow 2sf answer.
(v)	unreliable,r small	B1	1	any relevant reason