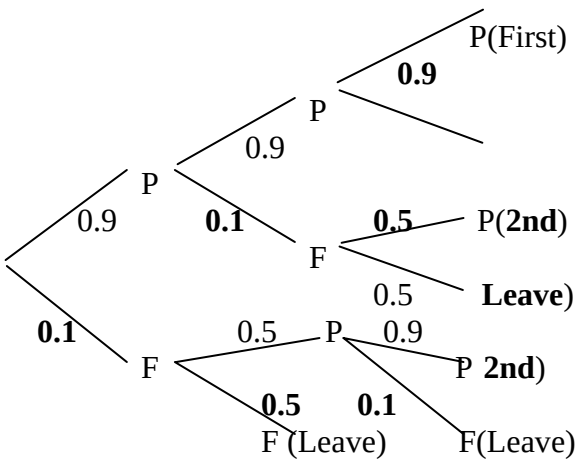
1 (i)	$P(A \cap B) = 0.4$	B1 CAO	**1**
(ii)	$P(C \cup D) = 0.6$	B1 CAO	**1**
(iii)	Events B and C are mutually exclusive.	B1 CAO	**1**
(iv)	$P(B) = 0.6$, $P(D) = 0.4$ and $P(B \cap D) = 0.2$ $0.6 \times 0.4 \neq 0.2$ (so B and D not independent)	B1 for $P(B \cap D) = 0.2$ soi E1	**2**
		TOTAL	**5**

2 **(i)**	P(all jam) $= \frac{5}{12} \times \frac{4}{11} \times \frac{3}{10}$ $= \frac{1}{22} = 0.04545$	M1 5 x 4 x 3 or $\binom{5}{3}$ in numerator M1 12 x 11 x 10 or $\binom{12}{3}$ in denominator A1 CAO	**3**
(ii)	P(all same) $= \frac{5}{12} \times \frac{4}{11} \times \frac{3}{10} + \frac{4}{12} \times \frac{3}{11} \times \frac{2}{10} + \frac{3}{12} \times \frac{2}{11} \times \frac{1}{10}$ $= \frac{1}{22} + \frac{1}{55} + \frac{1}{220} = \frac{3}{44} = 0.06818$	M1 Sum of 3 reasonable triples or combinations M1 Triples or combinations correct A1 CAO	**3**
(iii)	P(all different) $= 6 \times \frac{5}{12} \times \frac{4}{11} \times \frac{3}{10}$ $= \frac{3}{11} = 0.2727$	M1 5,4,3 M1 $6 \times$ three fractions or $\binom{12}{3}$ denom. A1 CAO	**3**
(iv)	P(all jam given all same) = $\frac{\frac{1}{22}}{\frac{3}{44}} = \frac{2}{3}$	M1 Their (i) in numerator M1 Their (ii) in denominator A1 CAO	**3**
(v)	P(all jam exactly twice) $= \binom{5}{2} \times \left(\frac{1}{22}\right)^2 \times \left(\frac{21}{22}\right)^3 = 0.01797$	M1 for $\binom{5}{2}$ x … M1 for their $p^2 q^3$ A1 CAO	**3**
(vi)	P(all jam at least once) $= 1 - \left(\frac{21}{22}\right)^5 = 0.2075$	M1 for their q^5 M1 indep for $1 - 5^{th}$ power A1 CAO	**3**
		TOTAL	**18**

3 (i)	<table><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr><tr><td>1</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>2</td><td>2</td><td>2</td><td>6</td><td>4</td><td>10</td><td>6</td></tr><tr><td>3</td><td>3</td><td>6</td><td>3</td><td>12</td><td>15</td><td>6</td></tr><tr><td>4</td><td>4</td><td>4</td><td>12</td><td>4</td><td>20</td><td>12</td></tr><tr><td>5</td><td>5</td><td>10</td><td>15</td><td>20</td><td>5</td><td>30</td></tr><tr><td>6</td><td>6</td><td>6</td><td>6</td><td>12</td><td>30</td><td>6</td></tr></table>	B1	All correct
(ii)	(*A*) P(LCM > 6) = 1/	B1	
	(*B*) P(LCM = 5n) = 11/3	B1	
	(*C*) P(LCM > 6 ∩ LCM = 5n) = 2/9	M1 A1 cao	Use of diagram
(iii)	$\frac{1}{3} \times \frac{11}{36} \neq \frac{2}{9}$ Hence events are not independent	M1 E1	Use of definition

4 (i)		G1 G1	Probabilities Outcomes
(ii)		M1	

4(*A*)	P(First team) = 0.9^3 = 0.729	A1	
(*B*)	P(Second team) = $0.9\times0.9\times0.1+0.9\times0.1\times0.5+0.1\times0.9\times0.5$	M1 M1	1 correct triple 3 correct triples added
	= 0.081 + 0.045 + 0.045 = 0.171	A1	
(iii)	P(asked to leave) = 1 -0.729 – 0.171		
	= 0.1	B1	
(iv)	P(Leave after two games given leaves)		
	$= \frac{0.1\times0.5}{0.1} = \frac{1}{2}$	M1 ft A1 cao	Denominator
(v)	P(at least one is asked to leave)		
	$=1-0.9^3 = 0.271$	M1 ft M1 A1 cao	Calc'n of 0.9 1 – ( )³
(vi)	P(Pass a total of 7 games)		
	=P(First, Second, Second) + P(First, First, Leave after three games)	M1 M1 ft	Attempts both 0.729(0.171)²
	$= 3\times0.729\times0.171^2 + 3\times0.729^2\times0.05$	M1 ft	0.05(0.729)²
	= 0.064 + 0.080 = 0.144	M1 A1 cao	multiply by 3

Qn	Answer	Mk	Comment
5	Let P(B) = x Using P(AUB) = P(A) + P(B) – P(A ∩ B) 0.9 = 2x + x – 0.3 x = 0.4 P(B) = 0.4	 M1 M1 A1	 Correct set of equations Correct solution