9	**(a)**		$\frac{5}{9}\times\frac{4}{8}\times\frac{3}{7}\times\frac{4}{6}$ **oe** $\times 4$	**M1** **M1**	**1.1** **1.1**	**M0** if binomial distribution or sampling with replacement used dependent on award of first **M1**	
			Alternative ${}_9C_4$ [= 126] **soi**	**M1**	**1.1**		
			${}_5C_3\times{}_4C_1$ [= 10×4] **soi**	**M1**	**1.1**		
			$\frac{40}{126}$ *or* $\frac{20}{63}$ or 0.317460…isw or rounded to 2 sf or better	**A1**	**1.1**		
				[3]			

Question			Answer	Marks	AOs	Guidance	
9	(b)		$\frac{4}{9}\times\frac{3}{8}\times\frac{2}{7}\times\frac{5}{6}\times 4$ **oe** *or* $\frac{4}{9}\times\frac{3}{8}\times\frac{2}{7}\times\frac{1}{6}$ **oe**	**M1** **M1**	**3.1b** **1.1**	condone omission of $\times 4$ in first term; **M0** if binomial distribution or sampling with replacement used for addition of their terms; dependent on award of first **M1**	
			Alternative ${}_4C_4 + {}_4C_3 \times {}_5C_1$	**M1** **M1**		for ${}_4C_3 \times {}_5C_1$ for addition of their terms; dependent on award of first **M1**	**NB** $1 + 4\times5 = 21$
			Alternative $\frac{5}{9}\times\frac{4}{8}\times\frac{3}{7}\times\frac{2}{6} + 4\times\frac{4}{9}\times\frac{5}{8}\times\frac{4}{7}\times\frac{3}{6} + 6\times\frac{4}{9}\times\frac{5}{8}\times\frac{4}{7}\times\frac{3}{6}$ **oe** $1 -$ their $\frac{2520}{3024}$	**M1** **M1**		for two of these terms for 1 – the sum of their 3 terms	**NB** $\frac{2520}{3024} = \frac{5}{6}$
			$\frac{1}{6}$ or 0.166666….to 2 sf or better	**A1**	**1.1**		
				[3]			
9	(c)		(3 BF, 1M) + (2BF, 1NBF, 1BM) attempted	**M1**	**3.1b**	**M0** if binomial distribution or sampling with replacement used	
			$\frac{3}{9}\times\frac{2}{8}\times\frac{1}{7}\times\frac{4}{6}\times 4 + \frac{3}{9}\times\frac{2}{8}\times\frac{2}{7}\times\frac{1}{6}\times 12 \left[=\frac{5}{63}\right]$ **oe**	**A1**	**1.1**		
			Alternative ${}_3C_3 \times {}_4C_1 + {}_3C_2 \times {}_2C_1 \times {}_1C_1$ 10	**M1** **A1**		for either term	
			$\frac{10}{21}$ or 0.476190476…to 2 sf or better	**A1**	**1.1**		
				[3]			

Question			Answer	Marks	AOs	Guidance	
9	(d)		not independent since $\frac{10}{21} \neq \frac{20}{63}$ **oe**	**B1**	**2.4**	FT their probabilities	no FT if binomial distribution or sampling with replacement used
			Alternatively not independent since $\frac{20}{63} \times \frac{1}{6} \neq \frac{5}{63}$			FT their calculated probabilities from first three parts	
				[1]			