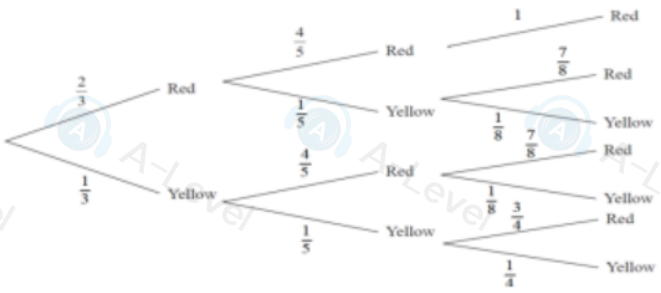
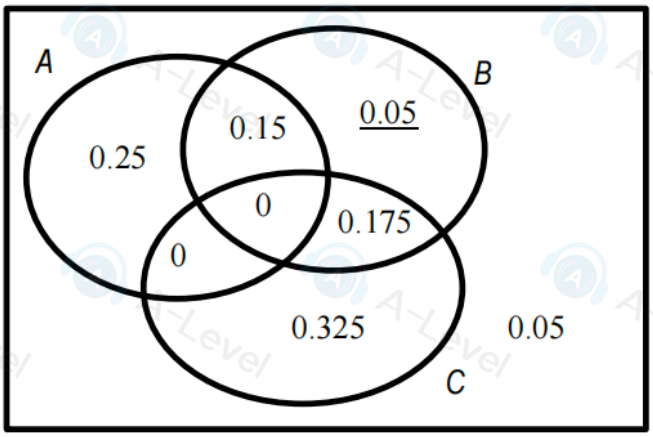
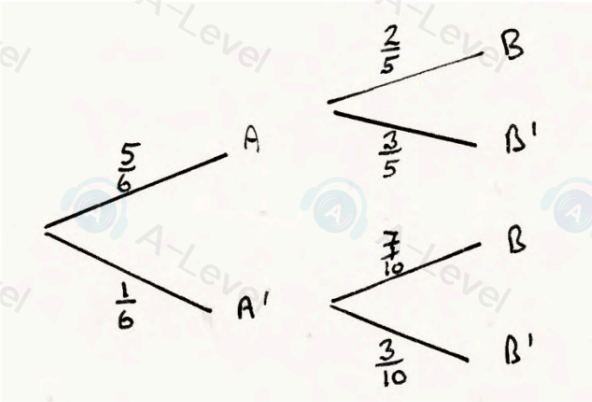
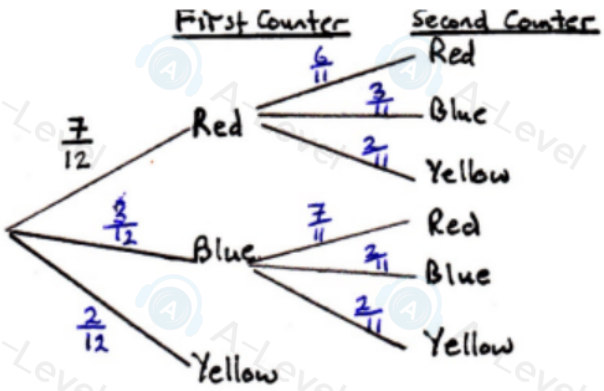
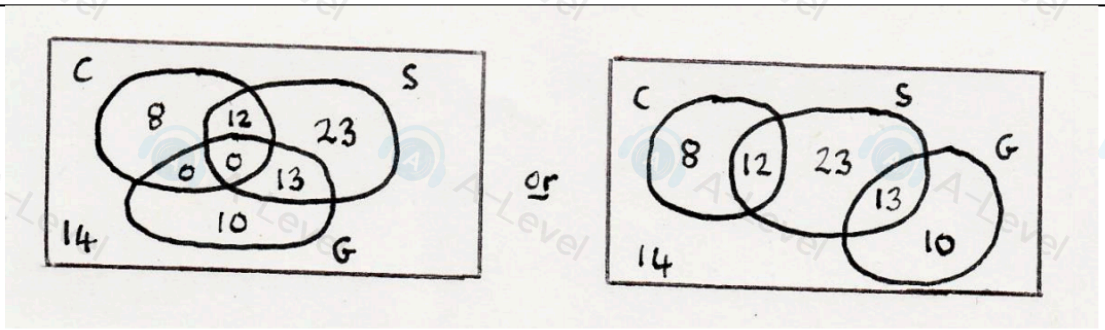
Question Number	Scheme	Marks
4. (a)		B1 B1 B1 (3)
(b)	[Cases *RYY* or *YRY* or *YYR*] Prob $= \frac{2}{3}\times\frac{1}{5}\times\frac{1}{8} + \frac{1}{3}\times\frac{4}{5}\times\frac{1}{8} + \frac{1}{3}\times\frac{1}{5}\times\frac{6}{8}$	M1 A1ft
	$[=\frac{1}{120}(2+4+6)$ or $(0.0166...+0.033...+0.05)] = \frac{12}{120}$ or $\underline{\underline{\frac{1}{10}}}$ (*)	A1*cso (3)
(c)	[P(*RYY* | *RYY* or *YRY* or *YYR*) =] $\frac{"\frac{2}{3}\times\frac{1}{5}\times\frac{1}{8}"}{\frac{1}{10}}$	M1
	$= \underline{\underline{\frac{1}{6}}}$	A1 (2)
(d)	x: 0 | 1 | 2 | 3 P($X=x$): $\frac{64}{120}$ or $\frac{8}{15}$ | $\frac{42}{120}$ or $\frac{7}{20}$ | $\left[\frac{1}{10}\right]$ | $\frac{2}{120}$ or $\frac{1}{60}$	B1 M1 A1 (3)
(e)	[E(X) =] $\frac{1}{120}(0 + "42" + "2\times12" + "3\times2")$	M1
	$= \frac{72}{120}$ or $\underline{\mathbf{0.6}}$	A1 (2) **[13]**

Question Number	Scheme		Marks
6. (a)	$[\mathrm{P}(A \cup C) =] \frac{9}{10}$ oe		B1
			(1)
(b)	$\mathrm{P}(A \cup B) = \mathrm{P}(A) + \mathrm{P}(B) - \mathrm{P}(A) \times \mathrm{P}(B)$		M1
	$\frac{5}{8} = \frac{2}{5} + \mathrm{P}(B) - \frac{2}{5}\mathrm{P}(B)$		M1 A1
	$\mathrm{P}(B) = \frac{3}{8}$ *		A1cso
			(4)
(c)	$[\mathrm{P}(A \mid B) = \mathrm{P}(A) =] \frac{2}{5}$ oe		B1
			(1)
(d)		Diagram 0.15 and 0.25 0.05 and 0.05 0.175 and 0.325	B1 M1 M1 M1 A1
			(5)
			Total 11

Question Number	Scheme	Marks
4. (a)	[Let P(A) = p]	
	$0.4p + 0.7(1-p) = 0.45$	M1A1
	$0.25 = 0.3p$	M1
	$p = \frac{5}{6}$	A1
		B1ft B1
		(6)
(b)	$[\mathrm{P}(A' \mid B')] = \frac{\frac{1}{6} \times 0.3}{0.55}$	M1
	$= \frac{1}{11}$	A1
		(2)
		[Total 8]

Question	Scheme	Marks
6. (a)	$\mathrm{P}(S) = 0.31 + p$, $\mathrm{P}(D) = 0.35$, $\mathrm{P}(S \cap D) = 0.14$	M1
	$(0.31 + p)(0.35) = 0.14$ oe	M1
	$\mathrm{P}(S) = 0.4$ or $0.31 + p = 0.4$ or $0.35p = 0.0315$	A1
	$p =$ **0.09**	A1
		(4)
(b)	$\mathrm{P}(S \cup M \cup D) = 1$ so $q = 1 - (0.17+0.10+0.15+0.06+0.04) - p$ or $0.48 - p$	M1
	$q =$ **0.39**	A1ft
		(2)
(c)(i)	$[\mathrm{P}(D \mid S \cap M =] \frac{\mathrm{P}(D \cap S \cap M)}{\mathrm{P}(S \cap M)} = \frac{0.10}{0.27}$	M1
	$= \frac{10}{27}$ or awrt **0.370**	A1
(ii)	$[\mathrm{P}(D \mid S' \cap M =] \frac{\mathrm{P}(D \cap S' \cap M)}{\mathrm{P}(S' \cap M)} = \frac{0.15}{0.54}$	M1
	$= \frac{5}{18}$ or awrt **0.278**	A1
		(4)
(d)	27 order $S \cap M$ so expect $27 \times \frac{10}{27} D$ or 36 order $S' \cap M$ so expect $36 \times \frac{5}{18} D$	M1
	So expect **20 (desserts)**	A1cao
		(2)
		[12]

Question Number	Scheme	Marks
1. (a)		B1 B1 (2)
(b)	$P(Y) = \frac{7}{12}\times\frac{2}{11} + \frac{3}{12}\times\frac{2}{11} + \frac{2}{12} = \left\{\frac{42}{132} \text{ or } \frac{7}{22}\right\}$ **or**	
	$P(\text{Yellow and two counters}) = \frac{7}{12}\times\frac{2}{11} + \frac{3}{12}\times\frac{2}{11} = \left\{\frac{20}{132} \text{ or } \frac{5}{33}\right\}$	M1
	$\frac{P([Y\cap R]\cup[Y\cap B])}{P(Y)} = \frac{"\frac{20}{132}"}{"\frac{42}{132}"}$	M1
	$= \frac{20}{42}$ or $\frac{10}{21}$ oe	A1 (3) **[5 marks]**

Question Number	Scheme	Marks
3. (a)		B1 B1 B1 B1 (4)
(b)(i)	$P(S) = \left[\frac{12+23+13}{80}\right] = \frac{48}{80}$ or $\frac{3}{5}$ or 0.6	B1ft (1)
(ii)	$P(S \mid C) = \frac{P(S \cap C)}{P(C)} = \frac{\frac{12}{80}}{\frac{20}{80}}$	M1
	$= \frac{12}{20}$ or 0.6	A1cso (2)
(iii)	$P(S) = P(S\|C)$ or $P(C) = 0.25$, $P(C \cap S) = 0.15$ and $P(C) \times P(S) = 0.6 \times 0.25$ so S and C are independent	B1ft dB1ft (2)
(c)	Need $P(S \mid G) = \frac{13}{23}$	M1A1
	$P(S \mid C) = 0.6 > 0.565$ so assistant selling coats has the better performance	A1 (3)
		[Total 12]

Question Number	Scheme	Marks
2. (a)	B and C (only)	B1 (1)
(b)	$P(A \cap C) = 0.6 \times 0.35$ so $[w =]$ **0.21**	B1cso (1)
(c)	$x = P(C) - w$ = **0.14**	B1
	$y = P(A) - w - P(B)$,= **0.24**	M1,A1
	$z = 1 - P(A \cup C)$ = **0.26**	B1ft (4)
(d)	$[x + y =]$ **0.38**	B1ft (1)
(e)	$[P(B \cup C) = 0.15 + 0.35] =$ **0.5**	B1cao (1)
(f)	$\left[P\left(A \mid [B \cup C]\right)\right] = \frac{P(A \cap [B \cup C])}{P(B \cup C)} = \frac{0.15+0.21}{"0.5"}$	M1A1ft
	= **0.72**	A1 (3)
		[Total 11]

Question Number	Scheme	Marks
4.(a)	0.13	B1 (1)
(b)	$P(A)\times P(C)=P(A\cap C)$	
	$0.2\times(0.08+p)=0.05$ **or** $P(C)=\dfrac{0.05}{0.10+0.05+0.01+0.04}$ or $\dfrac{0.05}{0.2}$ or 0.25	M1
	$p=0.17$	A1
	P(no faults) $=1-(0.1+0.05+0.01+0.04+0.08+0.03+"0.17")$	M1
	or $1-$ ["P(C)" + 0.10 + 0.05 + 0.08]	
	q = **0.52**	A1
Ans only	They can get q without finding p so a correct answer to q scores 4/4	(4)
(c)	P(Fault B but not fault C | Has fault A) $=\dfrac{0.05}{0.2}$	M1
	$=0.25$	A1 (2)
(d)	P(exactly 2 defects) = 0.12 or $\frac{3}{25}$	B1
	P(both have 2 defects) = 0.12^2	M1
	= **0.0144** or $\frac{9}{625}$	A1 (3)
		Total 10

Question Number	Scheme	Marks
3 (a)	$1-p$, $\dfrac{7}{8}$ and $\dfrac{9}{10}$ in the correct place on tree diagram	B1 (1)
(b)	$\dfrac{1}{8}p+\dfrac{1}{10}(1-p)=0.11$	M1 A1ft
	$p=\dfrac{2}{5}$	A1 (3)
(c)	$'\dfrac{2}{5}'\times\dfrac{1}{8}=\dfrac{1}{20}$	M1 A1ft (2)
(d)	$P(Y12\mid R)=\dfrac{'\frac{2}{5}'\times\frac{7}{8}}{1-0.11}$ or $P(Y12\mid R)=\dfrac{'\frac{2}{5}'\times\frac{7}{8}}{'\frac{2}{5}'\times\frac{7}{8}+'\frac{3}{5}'\times\frac{9}{10}}$	M1
	$=\dfrac{35}{89}$	A1 (2)
	Notes	**Total 8**