Qu	Scheme	Mark	AO
5. (a)(i)	Require $R = 3$ and $G = 4$ so probability is $\frac{3}{4}\times\frac{1}{3}$	M1	2.1
	$= \underline{\frac{1}{4}}$ or **<u>0.25</u>**	A1	1.1b
(ii)	[R must be 2 and $G = 1$so $\frac{1}{4}\times\frac{2}{3}$] $= \underline{\frac{1}{6}}$	A1	1.1b
		(3)	
(b)	P($X = 50$) = 0.25 must mean $R = 3$ and $G = 4$	M1	3.1a
	so $3m + 4n = 50$	A1	1.1b
	P($X = 20$) = $\frac{1}{6}$ $\Rightarrow$ $R = 2$, $G = 1$ so $2m + n = 20$	A1	2.1
	Solving: $3m + 4(20 - 2m) = 50$ (o.e.)	M1	1.1b
	<u>m = 6</u> and ***<u>n = 8</u>***	A1	3.2a
		(5)	
		(8 marks)	

Notes

(a)(i)

M1 for sight of $\frac{3}{4}\times\frac{1}{3}$ or $\frac{1}{4}\times\frac{2}{3}$ as a single product BUT allow e.g. $\frac{3}{4}\times\frac{1}{3}+\frac{1}{3}\times\frac{3}{4}$ to score M1

However if the products are later added e.g. $\frac{3}{4}\times\frac{1}{3}+\frac{1}{4}\times\frac{2}{3}$ it is M0

May be implied by one correct answer to (i) or (ii)

A1 for $\frac{1}{4}$ or 0.25 or exact equivalent (allow 25%)

(ii)

A1 for $\frac{1}{6}$ or exact equivalent

(b)

For the 1st 4 marks condone incorrect labelling e.g. *R* for *m* or *G* for *n* if intention is clear

1st M1 for identifying either set of cases ($R = 2$, $G = 1$, $X = 20$) or ($R = 3$, $G = 4$, $X = 50$)

Allow 1st M1 for P($X = 20$) = $\frac{1}{4}\times\frac{2}{3}$ **or** P($X = 50$) = $\frac{3}{4}\times\frac{1}{3}$ **NOT** just P($X = 20$) = $\frac{1}{6}$ etc

<u>or</u> $\frac{1}{4}m+\frac{2}{3}n=20$ **or** $\frac{3}{4}m+\frac{1}{3}n=50$ and might score 2nd M1 (answer is $m = 64$, $n = 6$)

<u>or</u> $\frac{1}{4}m+\frac{2}{3}n=\frac{1}{6}$ **or** $\frac{3}{4}m+\frac{1}{3}n=\frac{1}{4}$ and might score 2nd M1 (answer is $m = \frac{4}{15}$, $n = \frac{3}{20}$)

<u>or</u> $2m+n=\frac{1}{6}$ **or** $3m+4n=\frac{1}{4}$ and might score 2nd M1 (answer is $m = \frac{1}{12}$, $n = 0$)

<u>or</u> $2m+n=50$ **and** $3m+4n=20$ and might score 2nd M1 (answer is $m = 36$, $n = -22$)

1st A1 for one correct equation

2nd A1 for **both** correct equations and no incorrect equations, unless they attempt to solve the correct 2 equations only

2nd M1 for attempt to solve <u>their</u> two linear equations in m and n (reduce to an equation in one variable, condone one sign error). May be implied by $m = 6$ and $n = 8$.

Calc If they use one of the 4 sets of equations for 1st M1 and use a calculator to write down the answer, we will allow this mark for sight of the correct answers to those equations as given above.

3rd A1 $m = 6$ and $n = 8$ only (no incorrect labelling here)

Correct answer by trial can score 5/5 if no incorrect working seen.