7(a)	$\left[\dfrac{10!}{2!2!3!}=\right]151200$

7(b)	**Method 1**[SC_ S _ _ _ _ _ _]
	$\frac{7!}{2!3!}\times 2\times 7$
	= 5880
	Method 2 Considering each case separately [SC-S, S-CS]
	With Y $\frac{6!}{2!3!}\times 2\times 7=840$ With H $\frac{6!}{2!3!}\times 2\times 7=840$ With E $\frac{6!}{2!2!}\times 2\times 7$ = 2520 With L $\frac{6!}{3!}\times 2\times 7$ = 1680
	840 + 840 + 2520 + 1680
	= 5880

7(b)	**Method 3** Considering each case separately [SC-S, S-CS]
	SCYS $\frac{7!}{2!3!}\times 2=840$ SCHS $\frac{7!}{2!3!}\times 2=840$ SCES $\frac{7!}{2!2!}\times 2 = 2520$ SCLS $\frac{7!}{3!}\times 2 = 1680$
	840 + 840 + 2520 + 1680
	= 5880
7(c)	**Method 1** Total arrangements with Ss at ends – arrangements with
	$\frac{8!}{2!3!}-\frac{6!}{2!}$ [= 3360 – 360]
	= 3000

7(d)	**Method 1**
	[Number of ways with 3 Es =] $^7C_2$ (= 21)
	[Total number of ways is] $^{10}C_5$ (= 252)
	[Probability =] $\dfrac{21}{252}, \dfrac{1}{12}$
	Method 2
	$\dfrac{3}{11} \times \dfrac{2}{6} \times \dfrac{3}{11} \times {}^5C_2$
	[Probability =] $\dfrac{21}{252}, \dfrac{1}{12}$

7(a)	**Method 1** Total arrangements with 3 Os together – total arrangem
	$\frac{8!}{2!}-7!$
	= 15120
	Method 2 ^ ^ OOO ^ ^ ^ , Arrangements with OOOs together an
	$6!\times\frac{7\times 6}{2}$
	= 15120

7(b)	**Method 1** L _ _ _ _ _ L _ _ _
	$\frac{8!}{3!}\times 4$
	26880
	Method 2
	${}^{8}P_{5} \times \frac{4!}{3!}$
	26880

7(c)	**Method 1** 1 – P(2 letters the same)
	$1-\left(\frac{3}{10}\times\frac{2}{9}+\frac{2}{10}\times\frac{1}{9}\right)$
	$=\frac{41}{45}$, 0.911
	Method 2 $\mathrm{P}(\mathrm{O}\,\overline{\mathrm{O}}) + \mathrm{P}(\mathrm{L}\,\overline{\mathrm{L}}) + \mathrm{P}(\overline{\mathrm{O}}\,\overline{\mathrm{L}})$
	$\frac{3}{10}\times\frac{7}{9}+\frac{2}{10}\times\frac{8}{9}+\frac{5}{10}\times\frac{9}{9}$
	$=\frac{41}{45}$, 0.911

7(c)

Method 3 Combination approach using OO and LL

[Probability =] $1-\dfrac{{}^{3}C_{2}+{}^{2}C_{2}}{{}^{10}C_{2}}$

$=\dfrac{41}{45}$, 0.911

Method 4 Combinations with scenarios $OL,\ O\bar{L},\ \bar{O}L,\ \bar{O}\bar{L}$

O and L	${}^{3}C_{1}\times{}^{2}C_{1}$	[6]
O and not L	${}^{3}C_{1}\times{}^{5}C_{1}$	[15]
Not O and L	${}^{5}C_{1}\times{}^{2}C_{1}$	[10]
Not O and not L	${}^{5}C_{2}$	[10]

[Probability =] $\dfrac{6+15+10+10}{{}^{10}C_{2}}$

$=\dfrac{41}{45}$, 0.911

2(a)	**Method 1** total arrangements with As together – arrangements with
	$\frac{7!}{2!} - 6!$
	$n - 6!$
	1800
	Method 2 arrangements of other 6 letters with the As together and t
	$5! \times \frac{6 \times 5}{2}$
	1800

2(b)	**Method 1**
	$[\mathrm{P}(X < 6) =]\ 1 - \left(\frac{3}{4}\right)^5\ \ ]$
	$= 0.763,\ \frac{781}{1024}$
	Method 2
	$[\ \mathrm{P}(X < 6) =]\ \frac{1}{4} + \left(\frac{1}{4}\right)\left(\frac{3}{4}\right) + \left(\frac{1}{4}\right)\left(\frac{3}{4}\right)^2 + \left(\frac{1}{4}\right)\left(\frac{3}{4}\right)^3 + \left(\frac{1}{4}\right)\left(\frac{3}{4}\right)^4$
	$= 0.763,\ \frac{781}{1024}$
2(c)	$\left(\frac{1}{4}\right)^2\left(\frac{3}{4}\right)^4 \times 5 = \frac{405}{4096}$
	$= 0.0989$

5(a)	3G 2P 1D: ${}^9C_3 \times {}^6C_2 \times {}^5C_1 = 6300$ 4G 1P 1D: ${}^9C_4 \times {}^6C_1 \times {}^5C_1 = 3780$ 5G 0P 1D: ${}^9C_5\ [\times {}^6C_0] \times {}^5C_1 = 630$ Condone ${}^5C_1 = 5$ and ${}^6C_1 = 6$
	Total: 10710
5(b)	Ways of selecting 1st band: ${}^9C_3 \times {}^6C_1 \times {}^5C_1 = 2520$ Ways of selecting 2nd band: ${}^6C_3 \times {}^5C_1 \times {}^4C_1 = 400$ Ways of selecting 3rd band: $1 \times {}^4C_1 \times {}^3C_1 = 12$ [Total number of ways =] $2520 \times 400 \times 12 =$
	12096000