1) sol.

$$\boxed{P(A \cup B) = p(A) + p(B) - p(A \cap B)}$$

$$p(A \cap B) = 0.5 + 0.6 - 0.7$$

$$\boxed{p(A \cap B) = 0.4}$$ //

2) sol.

p(exactly one odd number turns up among three)

$$= {}^3C_1 \left(\frac{1}{2}\right)^1 \left(\frac{1}{2}\right)^{3-1}$$

$$= 3/8$$

(Binomial distribution)

p(success) = $3/6 = 1/2$

p(failure) = $1 - 1/2 = 1/2$

3) sol. Sample space = {1, 2, 3, 4, 5}

event = { 5 before 4, 4 before 3, 3 before 2, 2 before

$$\text{prob.} = \frac{n(\text{events})}{\text{total}} = \frac{4}{{}^5P_2}$$

$$= 4/20 = 1/5$$ //

4) sol:

prob. (randomly picked child belong to family of two child)

$$= \frac{\left(\frac{3\cancel{0}}{10\cancel{0}} \times 2 \times \cancel{N}\right)}{\left(\frac{5\cancel{0}}{10\cancel{0}} \times 3 \times \cancel{N} + \frac{3\cancel{0}}{10\cancel{0}} \times 2 \times \cancel{N} + \frac{2\cancel{0}}{10\cancel{0}} \times 1 \times \cancel{N}\right)}$$

$$= \frac{6}{15+6+2} = 6/23 \,//$$

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5) sol:

bag = (10 B, 20 G, 30 R) = $\underline{\text{60 Balls}}$

total chances = 3! = 6 (three places arrangement)

prob(no two colours are same) $= \cancel{6} \times \left(\frac{1\cancel{0}}{6\cancel{0}}\right) \times \left(\frac{\cancel{20}}{\cancel{60}_{3}}\right) \times \left(\frac{\cancel{30}}{\cancel{60}_{2}}\right)$

$= 1/6 \,//$

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6) sol:

prob $(C_W) = p(M_T \cap C_W) + p(C_T \cap C_W)$

$= [p(M_T) \times p(C_W)] + [p(C_T) \times p(C_W)]$

$[\because$ Independent Events$]$

$= (0.6 \times 0.4) + (0.4 \times 0.4)$

$= 0.4 \,//$

7) Sol:

Given $\boxed{p(odd) = 0.9 \times p(even)} \rightarrow ①$

& $p(even) = p(2) + p(4) + p(6)$

here $\boxed{p(2) = p(4) = p(6)}$ ($\because$ given)

$\Rightarrow p(odd) + p(even) = 1$

$\Rightarrow 0.9\, p(even) + p(even) = 1$ ($\because$ from eq ①)

$\Rightarrow p(even) = \frac{1}{1.9}$

$\Rightarrow p(2) + p(4) + p(6) = \frac{1}{1.9}$

[Let $p(2) = p(4) = p(6) = K$]

$\Rightarrow K + K + K = 1/1.9$

$\Rightarrow 3K = 1/1.9$

$\boxed{K = 1/5.7}$

[$\therefore p(2) = 1/5.7$
$p(4) = 1/5.7$
$p(6) = 1/5.7$]

Given $\boxed{p(even/A) = 0.75}$

[$\because$ event 'A' represent greater than '3' values]

[finding 'A']

[$\because$ From bayes theorem]

$p(even/A) = \frac{p(even \cap A)}{p(A)}$

$\Rightarrow p(A) = \frac{p(4) + p(6)}{p(even/A)} = \frac{(2/5.7)}{(0.75)}$

$\therefore \boxed{p(A) = 0.46}$ //

8) sol: Given $P(LED\,1) = 0.5$

$P(LED\,2) = 0.5$

& $P(L/LED1) = 0.7$

$P(L/LED2) = 0.4$

we need to find $P(L) = ?$

$$P(L) = P(LED1) \times P(L/LED1) + P(LED2) \times P(L/LED2)$$

$$= (0.5 \times 0.7) + (0.5 \times 0.4)$$

$$\therefore \boxed{P(L) = 0.55}$$

9) sol: Given prob. density function is exponentially dist. with $\boxed{\lambda = 2}$

exp. dist. fnx is $\boxed{f(x) = \lambda e^{-\lambda x}}$ for $x \geq 0$

$$\boxed{E(x) = \text{mean} = 1/\lambda = 1/2 = 0.5}$$

we need to find $P(x > \text{mean}) = ?$

$$P(x > 0.5) = \int_{0.5}^{\infty} \lambda e^{-\lambda x}\, dx = \int_{0.5}^{\infty} 2e^{-2x}\, dx$$

$$= \cancel{2}\left[\frac{e^{-2x}}{\cancel{2}}\right]_{0.5}^{\infty} = e^{-2 \times 1/2} = e^{-1} = 1/e$$

$$\therefore \boxed{P(x > \text{mean}) = 1/e = 0.367}$$

10) sol: Given $p(x) = 0.8 \Rightarrow p(\bar{x}) = 0.2$

$p(Y) = 0.5 \Rightarrow p(\bar{Y}) = 0.5$

$p(z) = 0.3 \Rightarrow p(\bar{z}) = 0.7$

p (All event does not occur) = $0.2 \times 0.5 \times 0.7 = 0.07$

p (Atleast one event occur) = 1 − p (All event doent not occur)

$= 1 - 0.07$

$= 0.93$ //