49) $[4C_2] \times [5C_2] \times [3C_2]$

$= 6 \times 10 \times 3$

$= \boxed{180}$

52) 3-T, 4-P, 6-R

[4P & 1R] OR [3T & 2P]

$(4C_4 \times 6C_1) + (3C_3 \times 4C_2) = 6 + 6 = \boxed{12}$

55) Select = 4

	2m	2w
I) ✓	2	2
II) ✓	3	1
III) ✓	4	–

$\Rightarrow (6C_2 \times 4C_2) + (6C_3 \times 4C_1) + (6C_4)$

$= (15 \times 6) + (20 \times 4) + (15)$

$\Rightarrow \boxed{185}$

5) 8M & 9W

Select - 12

5W	7M
6W	6M
7W	5M
8W	4M
9W	3M

$[{}^{9}C_5 \times {}^{8}C_1] + [{}^{9}C_3 \times {}^{8}C_2] + ({}^{9}C_2 \times {}^{8}C_3) + ({}^{9}C_1 \times {}^{8}C_4) + [{}^{9}C_0 \times {}^{8}C_3]$

5)

$\Rightarrow [{}^{8}C_1 \times {}^{9}C_4] + [{}^{8}C_8 \times {}^{9}C_4]$

$\Rightarrow [8 \times 126] + (1 \times 126]$

$\Rightarrow 126 \times 9$

$\Rightarrow 1134$

5) 12

7M	5W
8M	4W

(63-66)	Teq	Doct	BU	Req	SOC
10M	5	3	2	—	—
8W	3	2	—	2	1

$\Rightarrow$ (65) select = 5 (2M-T, 2W-T, 1-Doct) ✓

$[{}^5C_2 \times {}^3C_2 \times {}^5C_1] = 10 \times 3 \times 5 = 150$

$\Rightarrow$ (63) select 5 (3M & 2W)

$\Rightarrow {}^{10}C_3 \times {}^8C_2$

61) 6-B 4-G

Select - 5 (At most - 2G)

3B	2G
4B	1G
5B	0G

$$\Rightarrow [{}^{6}C_3 \times {}^{4}C_2] + [{}^{6}C_4 \times {}^{4}C_1] + [{}^{6}C_5]$$

$$\Rightarrow [20 \times 6] + [15 \times 4] + [6]$$

$$\Rightarrow 120 + 60 + 6 = 186$$

Probability $0 \leq P \geq 100$

Probability = $\frac{\text{favourable outcome}}{\text{Total outcome}}$

1) Coin Based
2) Dice based
3) Cards based
4) Marbles based

Total outcome = 4

favourable = 1

$P = \frac{1}{4}$ = 25% = 0.25

Coin Based

1-coin (Total-outcome-2)

[H, T]

1) Head = $\frac{1}{2}$

2) Tail = $\frac{1}{2}$

2 coins :- (Total-4)

[HH, HT, TH, TT]

1) Both (H) = $\frac{1}{4}$

2) At least 1 [H] = $\frac{3}{4}$

3) At most 1 [T] = $\frac{3}{4}$

3 coins (Total-8)

[HHH, HHT, HTT, TTT, TTH, THH, THT, HTH]

1) At least 2 Tail = $\frac{4}{8} = \frac{1}{2}$

2) At most - 2 [H] = $\frac{7}{8}$

3) Exactly 2 (H) = $\frac{3}{8}$

4) At least 2 (H) = $\frac{4}{8} = \frac{1}{2}$

Dice based

1 Dice — Total-6

[1, 2, 3, 4, 5, 6]

1) Prime NO $= \frac{3}{6} = \frac{1}{2}$

2) odd NO $= \frac{3}{6} = \frac{1}{2}$

3) multiple of 3 $= \frac{2}{6} = \frac{1}{3}$

4) composite NO $= \frac{2}{6} = \frac{1}{3}$

5) Even NO $= \frac{3}{6} = \frac{1}{2}$

2 Dice :→ 36

(1,1) (1,2) (1,3) (1,4) (1,5) (1,6)

(2,1) (2,2) (2,3) (2,4) (2,5) (2,6)

(3,1) (3,2) (3,3) (3,4) (3,5) (3,6)

(4,1) (4,2) (4,3) (4,4) (4,5) (4,6)

(5,1) (5,2) (5,3) (5,4) (5,5) (5,6)

(6,1) (6,2) (6,3) (6,4) (6,5) (6,6)

1) Sum Prime NO = $\frac{15}{36} = \boxed{\frac{5}{12}}$

2) Sum multiple of 4 = $\frac{9}{36} = \boxed{\frac{1}{4}}$

3) Product multiple of 6 = $\frac{15}{36} = \boxed{\frac{5}{12}}$

4) Product Prime NO : $\frac{6}{36} = \boxed{\frac{1}{6}}$

5) Sum multiple of 5 = $\boxed{\frac{7}{36}}$

1 — 36

(1,2/2,1) ← 2

(1,3)(3,1) ← 3

(1,5)(5,1) 5

9 —— 12

(1,4/4,1)(2,3/3,2) ← 5

(4,6/6,4)(5,5) ← 10