Combinations Ex 17.2 Q29

There are total 9 courses are available and out of these 2 subjects are compulsory. So,

Number of ways to select 2 compulsory and 3 option out of $9-2=7$ subjects

$= {}^2C_2 \times {}^7C_3$

$= 1 \times \frac{7\times 6\times 5}{3\times 2}$

$= 35$

Required number of ways = 35

Combinations Ex 17.2 Q30

i) The committee consists of exactly 3 girls.

$\therefore$ We have to select 4 boys from 9 boys.

This can be done in ${}^9C_4$ ways and 3 girls out of 4 girls can be selected in ${}^4C_3$ ways.

$\therefore$ The required number ways $= {}^9C_4 \times {}^4C_3$

$$= \frac{9\times 8\times 7\times 6}{4\times 3\times 2\times 1}\times 4$$

$$= 504$$

ii) At least 3 girls are there.

$\therefore$ There are 3 or more than i.e. 3 or 4 girls

$\therefore$ a) 3 girls and 4 boys i.e. ${}^4C_3 \times {}^9C_3$ ways

b) 4 girls and 3 boys i.e. ${}^4C_4 \times {}^9C_3$ ways

$\therefore$ The required number of ways

$= {}^4C_3 \times {}^9C_4 + {}^4C_4 \times {}^9C_3$

$= 504 + 84$

$= 588$

iii) For at most 3 girls there are 3,2,1 or 0 girls

i.e. a) 0 girls and 7 boys $= {}^4C_0 \times {}^9C_7$

b) 1 girls and 6 boys $= {}^4C_1 \times {}^9C_6$

c) 2 girls and 5 boys $= {}^4C_2 \times {}^9C_5$.

d) 3 girls and 4 boys $= {}^4C_3 \times {}^9C_4$.

$\therefore$ Total number of required ways

$\Rightarrow \quad {}^4C_0 \times {}^9C_7 + {}^4C_1 \times {}^9C_6 + {}^9C_2 \times {}^9C_5 + {}^4C_3 \times {}^9C_4$

$\Rightarrow \quad 0 \times \frac{9\times 8}{2} + 4 \times \frac{9\times 8\times 7}{3\times 2} + \frac{4\times 3}{2} \times \frac{9\times 8\times 7\times 6}{4\times 3\times 2} + 504$

$\Rightarrow \quad 36 + 48\times 7 + 18\times 42 + 504$

$\Rightarrow \quad 1632$

Combinations Ex 17.2 Q31

Here, part I has 5 questions and part II has 7 questions.

Student has to attempt 8 questions selecting at least 3 from each section.
So,
Number of ways to select at least 3 from each section and a total of 8 questions.

$$= (3 \text{ from part I and } 5 \text{ from part II}) \text{ or}$$
$$(4 \text{ from part I and } 4 \text{ from part II}) \text{ or}$$
$$(5 \text{ from part I and } 3 \text{ from part II})$$

$$= \left({}^5C_3 \times {}^7C_5\right) + \left({}^5C_4 \times {}^7C_5\right) + \left({}^5C_3 \times {}^7C_3\right)$$

$$= \left(\frac{5\times 4}{2\times 1} \times \frac{7\times 6}{2\times 1}\right) + \left(5 \times \frac{7\times 6\times 5}{3\times 2}\right) + \left(1\times 7 \frac{5\times 6\times 5}{3\times 2}\right)$$

$$= 210 + 175 + 35$$
$$= 420$$

Required number of ways = 420

Combinations Ex 17.2 Q32

In a parallelgram, there are 2 sets of parallel lines. Each set of parallel lines consists of $(m+2)$ lines and, each parallelogram is formed by choosing two lines from the first set and two straight lines from the second set.

Hence, the total number of parallelogram $= {}^{m+2}C_2 \times {}^{m+2}C_2$

$$= \left({}^{m+2}C_2\right)^2$$

Combinations Ex 17.2 Q33

There are 18 points in a plane out of which 5 points are collinear.

Then number of striaght lines joining these points are

$$\Rightarrow \quad {}^nC_2 - \left({}^pC_2 - 1\right)$$

$$\Rightarrow \quad {}^nC_2 - {}^pC_2 + 1 \begin{pmatrix} \text{where } n = 18 \\ p = 5 \end{pmatrix}$$

$$\Rightarrow \quad {}^{18}C_2 - {}^5C_2 + 1$$

$$\Rightarrow \quad \frac{18\times 17}{2} - \frac{5\times 4}{2} + 1$$

$$\Rightarrow \quad 144$$

number of triangle $= {}^{13}C_3$

$$= \frac{13!}{3!\ 10!} = \frac{13\times 12\times 11}{3\times 2}$$

$$= 13\times 2\times 11$$

$$= 13\times 22$$
$$= 806$$

*********** END **********