



Combinations Ex 17.2 Q9

Total number of officer = 4

Total number of jawans = 8

Total number of selection to be made = 6

(i) to include exactly one officer

This can be done is ${}^4C_1 \times {}^8C_5$ ways

$$= \frac{4!}{1! 3!} \times \frac{8!}{5! 3!}$$

$$= \frac{4 \times 8 \times 7 \times 6}{3 \times 2} = 224 \text{ ways}$$

(ii) to include at least one officer

This can be done is following ways

$${}^4C_1 \times {}^8C_5 + {}^4C_2 \times {}^8C_4 + {}^4C_3 \times {}^8C_3 + {}^4C_4 \times {}^8C_2$$

$$= \frac{4 \times 8!}{5! 3!} + \frac{4!}{2! 2!} \times \frac{8!}{4! 4!} + \frac{4!}{3! 1!} \times \frac{8!}{3! 5!} + \frac{1 \times 8!}{2! 6!}$$

$$= \left(\frac{4 \times 8 \times 7 \times 6}{3 \times 2} \right) + \left(\frac{4 \times 3 \times 8 \times 7 \times 6 \times 5}{2 \times 4 \times 3 \times 2} \right) + \left(\frac{4 \times 8 \times 7 \times 6}{3 \times 2} \right) + \left(\frac{8 \times 7}{2 \times 1} \right)$$

$$= (4 \times 8 \times 7) + (4 \times 3 \times 7 \times 5) + (4 \times 8 \times 7) + (4 \times 7)$$

$$= 224 + 420 + 224 + 28$$

$$= 896 \text{ ways}$$

Combinations Ex 17.2 Q10

Total number of students is XI = 20

Total number of students is XII = 20

Total number of students to be selected is a team = 11

(at least 5 from XI and 5 from XII)

this can be done is following ways

$${}^{20}C_5 \times {}^{20}C_6 + {}^{20}C_6 \times {}^{20}C_5$$

$$= 2 \left({}^{20}C_6 \times {}^{20}C_5 \right)$$

$$= 2 \left(\frac{20!}{6! 14!} \times \frac{20!}{5! 15!} \right)$$

$$\text{or} = \frac{2 \times 20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 20 \times 19 \times 18 \times 17 \times 16}{6 \times 5 \times 4 \times 3 \times 2 \times 5 \times 4 \times 3 \times 2 \times 1}$$

$$= 19 \times 17 \times 16 \times 15 \times 2 \times 19 \times 3 \times 17 \times 8$$

$$= 1201870080 \text{ ways}$$

Combinations Ex 17.2 Q11

Total number of questions = 10

Question in part A = 6

Question in part B = 7

Selecting to questions with at least 4 from each part A and part B.
can from done in following way.

$$\begin{aligned} & {}^6C_4 \times {}^7C_6 + {}^6C_5 \times {}^7C_5 + {}^6C_6 \times {}^7C_4 \\ &= \left(\frac{6!}{4!2!} \times \frac{7!}{6!1!} \right) + \left(\frac{6!}{5!1!} \times \frac{7!}{5!2!} \right) + \left(\frac{1 \times 7!}{4!3!} \right) \quad \left(\because {}^nC_r = \frac{n!}{r!(n-r)!} \right) \\ &= \left(\frac{6 \times 5 \times 7}{2} \right) + \left(\frac{6 \times 7 \times 6}{2} \right) + \left(\frac{7 \times 6 \times 5}{3 \times 2} \right) \\ &= (105) + (126) + (35) \\ &= 266 \text{ ways} \end{aligned}$$

Combinations Ex 17.2 Q12

Total number of question = 5

Total number of question to be answered = 4

Given that 1 and 2 question are compulsory, the number of ways in which a student
can choose the questions will follow the following way.

Total question = 5 - 2 = 3

Out of 3 remaining questions a student has to select any 2 for answering

$$\Rightarrow {}^3C_2 = 3 \text{ ways}$$

***** END *****