



### Combinations Ex 17.2 Q13

Total number of questions = 12

Total number of questions to be answered = 7

Each group has 6 questions (6 + 6) more than 5 question from either group is not permitted, therefore the number of ways a student can choose questions can be done in following ways.

$${}^6C_2 \times {}^6C_5 + {}^6C_4 \times {}^6C_4 + {}^6C_4 \times {}^6C_3 + {}^6C_5 \times {}^6C_2$$

$$= 2 \left\{ {}^6C_2 \times {}^6C_5 + {}^6C_3 \times {}^6C_4 \right\}$$

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

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

$$= \frac{2 \times 6 \times 5 \times 6}{2} \left( 1 + \frac{20}{6} \right)$$

$$= 180 \left( \frac{26}{6} \right)$$

$$= 30 \times 26 = 780$$

$$= 780 \text{ ways}$$

### Combinations Ex 17.2 Q14

Number of point = 10

Number of collinear points = 4

Since 4 out of 10 points are collinear, so the number of liner will be  $\left\{ {}^4C_2 - 1 \right\}$  lie from  ${}^{10}C_2$  (one is subtracted from  ${}^4C_2$  to count for the line on which 4 collinear points lie)

$$\therefore \text{number of liner} = {}^{10}C_2 - \left\{ {}^4C_2 - 1 \right\}$$

$$= {}^{10}C_2 - {}^4C_2 + 1$$

$$= \frac{10!}{2!8!} - \frac{4!}{2!2!} + 1$$

$$= \frac{10 \times 9}{2} - \frac{4 \times 3}{2} + 1$$

$$= 45 - 6 + 1$$

$$= 40$$

### Combinations Ex 17.2 Q15

(i) hexagon  $\rightarrow$  A hexagon has 6 angular points. By joining any two angular points we get a line which is either a side or a diagonal.

$$\therefore \text{Number of lines} = {}^6C_2 = \frac{6!}{2!4!}$$

$$= \frac{6 \times 5}{2} = 15$$

Number of sides = 6

$$\therefore \text{Number of diagonals} = 15 - 6 = 9$$

(ii) Polygon of 16 sides will have 16 angular points. By joining any 2 points we get a line which is either a side or a diagonal.

$$\therefore \text{number of lines} = {}^{16}C_2 = \frac{16!}{2!14!}$$

$$= \frac{16 \times 15}{2} = 120$$

$$\Rightarrow \text{number of sides} = 16$$

$$\therefore \text{number of diagonals} = 120 - 16 = 104$$

### Combinations Ex 17.2 Q16

Since 5 out of 12 points are collinear, so the number of triangles will be  ${}^5C_3$  less from  ${}^{12}C_3$

$$= {}^{12}C_3 - {}^5C_3$$

$$= \frac{12!}{3! 9!} - \frac{5!}{3! 2!}$$

$$= \frac{12 \times 11 \times 10}{3 \times 2} - \frac{5 \times 4}{2}$$

$$= 220 - 10$$

$$= 210$$

\*\*\*\*\* END \*\*\*\*\*