* Discrete Mathematics (DM) - Assignment Number - 3.

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Q-1. The company has 10 members on its board of directors. In how many ways can they elect a president, a vice president, a secretary and a treasurer

→ One person cannot hold more than 1 position, So, there are 10 member eligible for president, similarly 9 member eligible for vice president, 8 member eligible for a secretary and 7

We have to chose 4 member out of 10,

∴ Total number of ways $= {}^{10}P_4$

$= \frac{10!}{4!} = 10 \times 9 \times 8 \times 7 = \boxed{5040.}$

∴ There are total 5040 ways in which one can elect a president, a vice president, a secretary, and a t

Q-2. A box contain 6 white and 5 black balls. Find number of ways 4 balls can be drawn from the box if : i) Two must be white.
ii) All of them have same colour.

→ Given :- 6 white ball and 5 black balls
∴ Total 11 balls in box.

i) 2 out of 4 must be white,

∴ Numbers of ways 2 white ball can be drawn from 6 white balls = ${}^6C_2$.

Now 2 white are drawn, 9 balls are remaing in box

∴ Number of ways to select 2 remaining balls are = ${}^9C_2$.

∴ Total number of ways to draw atleast 2 white balls = ${}^6C_2 \cdot {}^9C_2$

$$= \frac{6!}{4!2!} \cdot \frac{9!}{7!2!}$$

$$= 15 \times 36$$

$$= \boxed{540}$$

∴ There are total 540 ways of selecting 4 balls such that 2 must be white.

ii) All 4 have same colour.

There are 2 cases :- 1) All 4 black balls
2) All 4 white balls.

Number of ways for selecting 4 black balls from 5 = ${}^5C_4 = 5$

Number of ways for selecting 4 white balls from 6 = ${}^6C_4 = 15$.

∴ Total number of ways = 15 + 5 = 20

There are total 20 ways of selecting 4 balls such that all have same colour.