Course - 5 (Sprint_2 (practice))

Task:-1-

Total 6 men and 4 women.

(a) There are to be 3 men and 2 women?

Here $n = 6, r = 3$ and Here $n = 4, r = 2$

$$nCr = \frac{n!}{r!(n-r)!} \qquad nCr = \frac{n!}{r!(n-r)!}$$

$$= \frac{6!}{3!(6-3)!} \qquad = \frac{4!}{2!(4-2)!}$$

$$= \frac{6\times5\times4\times3\times2\times1}{3\times2\times1\,(3\times2\times1)!} \qquad = \frac{4\times3\times2\times1}{2\times1\,(2\times1)!}$$

$$= 5\times4 \qquad = 2\times3$$

$$= 20 \qquad = 6$$

$$= 20\times6 = 120$$

(b) There are to be men only?

6

(c) There is to be majority of women?

Combination = 3, 2 & 4, 1

(i) ${}^4C_4 \times {}^6C_1$

Here, $n=4, r=6$ & $n=6, r=4$

$$\frac{4!}{4!(4-4)!} \times \frac{6!}{1!(6-1)!}$$

$$\frac{4\times3\times2\times1}{4\times3\times2\times1(0)!} \times \frac{6\times5\times4\times3\times2\times1}{1(5\times4\times3\times2\times1)}$$

$$1\times6$$

$$6$$

(ii) ${}^4C_3 \times {}^6C_2$

Here $n=4, r=3$, $n=6, r=3$

$$\frac{4!}{3!(4-3)!} \times \frac{6!}{2!(6-2)!}$$

$$\frac{4\times3\times2\times1}{3\times2\times1(1)!} \times \frac{6\times5\times4\times3\times2\times1}{2\times1\,(4\times3\times2\times1)}$$

$$4\times15$$

$$4\times15 = 6$$

Task-2 :-

Total ordinary Cards = 52 Cards

The players deals with 5 Cards

Here, $n = 52$

$r = 5$

$$52C_5 = \frac{n!}{r!(n-r)!}$$

$$= \frac{52!}{5!(52-5)!}$$

$$= \frac{52 \times 51 \times 50 \times 49 \times 48 \times 47 \times 46 \times \cdots}{5 \times 4 \times 3 \times 2 \times 1 \; (47)!}$$

$$= \frac{52 \times 51 \times 50 \times 49 \times 48 \times 47 \times 46 \times 45 \times 44 \times \cdots}{120 \; (47 \times 46 \times 45 \times 44 \times \cdots)}$$

$$= \frac{\overset{13}{\cancel{52}} \times 51 \times \overset{10}{\cancel{50}} \times 49 \times \overset{16}{\cancel{48}}}{\cancel{5} \times \cancel{4} \times \cancel{3} \times \cancel{2} \times 1}$$

$$= 13 \times 51 \times 5 \times 49 \times 16$$

$$= 2,598,960$$

Task-3 :-

There are total N's constants for a sport events.

Total 8 contestants there are got 3 awards

Here, $n = 8$, $r = 3$

Permutation Without Replace :- $nP_r = \frac{n!}{(n-r)!}$

$$\Rightarrow \frac{8!}{(8-3)!}$$

$$\Rightarrow \frac{8\times7\times6\times5\times4\times3\times2\times1}{5!}$$

$$\Rightarrow \frac{8\times7\times6\times\cancel{5\times4\times3\times2\times1}}{\cancel{5\times4\times3\times2\times1}}$$

$$\Rightarrow \underline{336}$$

Task-4 :-

Total no. of Students = 15

Two Students are there Jenny and David are not together.

$$15! = \frac{15\times14\times13\times12\times11\times10\times9\times8\times7\times6\times5\times}{4\times3\times2\times1}$$

$$14! = \frac{14\times13\times12\times11\times10\times9\times8\times7\times6\times5\times}{4\times3\times2\times1}$$

$\Rightarrow$ 15! - 14! × 2

$\Rightarrow$ 1307674368000 - 871782912000 × 2

$\Rightarrow$ 12,20,49,60,76,800 × 2

$\Rightarrow$ 24,40,99,21,53,600

Task-5 :-

The probability of rolling two dice and getting a number on one die that is twice the number on the other die.

$$P(A) = \frac{\text{The no. of favorable outcomes}}{\text{The no. of possible outcomes}}$$

$$= \frac{4}{36} = \frac{1}{9}$$

The probability = 1/9.

Task-6 :-

There are 7 consonants can be formed with 3 consonants and there 4 vowels can be formed with 2 vowels.

Combination = $^7C_3 \times {}^4C_2$

Here : $n=7, r=3$

$n=4, r=2$

$$ncr = \frac{n!}{r!(n-r)!} \times \frac{n!}{r!(n-r)!}$$

$$\frac{7!}{3!(7-3)!} \times \frac{4!}{2!(4-2)!}$$

$$\frac{7\times6\times5\times4\times3\times2\times1}{3\times2\times1\,(4\times3\times2\times1)!} \times \frac{4\times3\times2\times1}{2\times1\,(2)!}$$

$$\frac{7\times\cancel{6}^{2}\times5\times4\times3\times2\times1}{\cancel{3}_{1}\times2\times1\ (4\times3\times2\times1)!} \times \frac{\cancel{4}^{2}\times3\times2\times1}{\cancel{2}_{1}\times1\ (2\times1)!}$$

$$\frac{7\times5}{1}\times\frac{6}{1}$$

$$35\times6=210$$

Now, we are forming words $3+2=5$

To arrange 5 words $= 5!$

$$5! = 5\times4\times3\times2\times1$$
$$= 120$$

$\therefore 120\times210$

$\Rightarrow 25200.$

Task-7 :~

The pack 25 bulbs contains 25% defective bulbs.

defective bulbs = 25% of 24

non-defective bulbs =

A) 18/24