Combinations Ex 17.3 Q9

In one round table the business man can accommodate the guests in $^{21}C_{15}$ ways. In the second round table he can accommodate the guests in $^{6}C_{6}$ ways. Keeping one guest as fixed in the first round table, the other 14 guests can be arrange in $14!$ ways. Keeping one guest as fixed in the second round table, the other 5 guests can be arrange in $5!$ ways.
Therefore the total number of ways in which the guests can be arrange is
$= {}^{21}C_{15} \times {}^{6}C_{6} \times 14! \times 5!$ ways

Combinations Ex 17.3 Q10

The word EXAMINATION has letters E,X,A,M,I,N,T,O where A,I,N repeat twice.

$\therefore$ The total number of letter = 11

The number of ways of selecting 4 letters.

$$\Rightarrow {}^{11}C_4 = \frac{11!}{4!\,7!} = \frac{11 \times 10 \times 9 \times 8}{4 \times 3 \times 2}$$

$= 330.$

The number of arranging 4 letters

a) All different $^{8}C_4 \times 4! = {}^{8}P_4 = \frac{8!}{4!}$

$$= 8 \times 7 \times 6 \times 5$$
$$= 56 \times 30$$
$$= 1680$$

b) 2 distinct and 2 alike

$$= {}^{3}C_1 \times {}^{7}C_2 = \frac{3 \times 7 \times 6}{2} = 63 \times \frac{4!}{2!}$$
$$= 378$$

c) 2 alike of one kind and 2 alike of other kind

$$^{3}C_2 \times \frac{4!}{2!\,2!} = 3 \times 6 = 18$$

d) 3 alike and 1 distinct letter

$$^{3}C_1 \times {}^{7}C_2 = \frac{3 \times 7 \times 6}{2} = 378$$

$\therefore$ Total number of ways in which 4 letter words are formed $= 1680 + 378 + 18 + 378$
$= 2454$ ways

Combinations Ex 17.3 Q11

$No\ of\ persons = 16$

$Condition\ on\ specific\ persons = 4\ and\ 2 = 6$

Remaining people=16-6=10

So lets fill 8 people on both sides first from these 10.

First side, we can select 4 out of 10.

$^{10}C_4 \times {}^{6}C_6$

Now we can arrange these 8 people on both sides in $8! \times 8!$ ways

Answer$= {}^{10}C_4 \times {}^{6}C_6 \times 8! \times 8!$

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