Ex 6.5.

① Total Elms = $n = 3$
To select = $r = 5$

$^{n}P_{r} = n^{r} \Rightarrow (3)^{5} \Rightarrow$ ____

② Same

③ Total letter = $n = 26$
We r take = $r = 6$

$n^{r} = (26)^{6} \Rightarrow$ ____

④ Total days = $n = 7$
Type of sandwich = $r = 6$

$n^{r} = (7)^{6} \Rightarrow$ ____

⑤ Total empolyees = $n = 5$
Total Jobs = $r = 3$

$n^{r} = (5)^{3} \Rightarrow$ ____.

⑥ Total Elms = $n = 3$
To select = $r = 5$.

$^{n+r-1}C_{r} = \binom{7}{5}$.

⑦ Total Elms = $n = 5$
To select = $r = 3$

$^{n+r-1}C_{r} = \binom{7}{3} \Rightarrow$ ____

⑧ Total donut vari— = $n = 21$
To select = $r = 12$.

$^{n+r-1}C_{r} \Rightarrow \binom{32}{12}$.

11.) Total coin type = $n = 2$.
To select = $r = 8$.

$^{n+r-1}C_{r} = \binom{9}{8}$.

⑫ Total type of coin = $n = 5$
To select = $r = 20$.

$^{n+r-1}C_{r} = \binom{24}{20}$

(13) Total warehouse = $r = 3$
Total copies = $n = 3000$

$$^{n+r-1}C_r = \binom{3002}{3000}.$$

(14) $x_1 + x_2 + x_3 + x_4 = 17.$

$r = 17$, $n = 4$.

$$^{n+r-1}C_r = \binom{20}{17}.$$

(15) $x_1 + x_2 + x_3 + x_4 + x_5 = 21$

a) $x_1 \geq 1$.

at least $x_1 = 1$.
so, $n = 5$, $r = 20$.
Bcz, at least one is already reserved by " x_1 " -

$$^{n+r-1}C_r = \binom{24}{20}.$$

(b) $x_i \geq 2$ for $i = 1, 2, 3, 4, 5$.
$21 - 10 \Rightarrow 11$.
$n = 5$, $r = 11$.

$$^{n+r-1}C_r = \binom{15}{11}.$$

(c) $0 \leq x_1 \leq 10$.

first, $n = 5$, $r = 21$,

$$^{n+r-1}C_r = \binom{25}{21} \Rightarrow \_\_\_\_.$$

second, $n = 5$, $r = 11$.

$$^{5+11-1}C_{11} = \binom{15}{11} \Rightarrow \_\_\_\_.$$

first - second $\Rightarrow$ solution.

(d) same.

(5) Total objects = $r = 12$
Total boxes = $n = 6$
at least object = 2 in each

for box 1 $n = 12$, $r = 2$

$$\cancel{\frac{12!}{(12-2)}} = {}^{n}C_{r} = \binom{12}{2}$$

box 2 $n = 10$, $r = 2$

$$ {}^{n}C_{r} = \binom{10}{2}$$

box 3 $n = 8$, $r = 2$

$$ {}^{n}C_{r} = \binom{8}{2}$$

box 6 $n = 2$, $r = 2$

$$ {}^{n}C_{r} = \binom{2}{2}$$

Sum all boxes

$$= \binom{12}{2}\binom{10}{2}\binom{8}{2}\binom{6}{2}\binom{4}{2}\binom{2}{2}$$

(86). Total object = 15.
Total boxes = 5.

box (1), $n = 15$, $r = 1$.

$${}^{n}C_{r} = \binom{15}{1}$$

box (2) $n = 14$, $r = 2$.

$${}^{n}C_{r} = \binom{14}{2}$$

box 3 $n = 12$, $r = 3$.

$${}^{n}C_{r} = \binom{12}{3}$$

box 4 $n = 9$, $r = 4$

$${}^{n}C_{r} = \binom{9}{4}$$

box 5 $n = 5$, $r = 5$

$${}^{n}C_{r} = \binom{5}{5}$$

sum all.

$$\binom{15}{1} \cdot \binom{14}{2}\binom{12}{3}\binom{9}{4}\binom{5}{5}$$

(89). Total question = 60.
Total score = 100.
at least 5 mark each

$r = 50$, $n = 60$.

$${}^{60+50-1}C_{50} = \binom{59}{50}$$

(82) MISSISSIPPI.

for M = 1, $n = 11$, $r = 1$.

$${}^{11}C_{1} = \binom{11}{1}$$

for $I = 4$, ~~$r = 4$~~, $n = 11$

AARDVARK

32 MISSISSIPPI

for I

$n = 11$, $r = 4$

$^{n}C_{r} = \binom{11}{4}$

for S

$n = 7$, $r = 4$

$^{n}C_{r} = \binom{7}{4}$

for P :

$n = 3$, $r = 2$

$^{n}C_{r} = \binom{3}{2}$

for M :-

$n = 1$, $r = 1$

$^{n}C_{r} = \binom{1}{1}$

sum all

$= \binom{11}{4}\binom{7}{4}\binom{3}{2}\binom{1}{1}$

34 $\Rightarrow$ AARDVARK.

if all 3A's are going to be consecutive then

for R

$n = 6$, $r = 2$

$= \binom{6}{2}$

for V

$n = 4$, $r = 1$

$= \binom{4}{1}$

for K

$n = 3$, $r = 1$

$= \binom{3}{1}$

for D : $n = 2$, $r = 1$

$= \binom{2}{1}$

for A

$n = 1$, $r = 1$

$= \binom{1}{1}$

sum all

$= \binom{6}{2} \cdot \binom{4}{1}\binom{3}{1}\binom{2}{1}\binom{1}{1}$

Assignment Question:

Ex 6.3

① $\{a, b, c\}$

$n = 3, \; r = 3$

$^{n}P_{r} = \dfrac{n!}{\boxed{(n-r)!}} \Rightarrow \dfrac{3!}{1!} \Rightarrow 6$

② Same

③ $\{a, b, c, d, e, f, g\}$ and $\{a\}$ will be at the end always so.

$n = 6$

$r = 6$

$^{n}P_{r} = 6!$

④ $S = \{1, 2, 3, 4, 5\}$

a-) 3-Per of S

$n = 5, \; r = 3$

$^{n}P_{r} = \dfrac{5!}{2!} \Rightarrow$ ____

b-) 3-Comb of S.

$n = 5, \; r = 3$

$^{n}C_{r} = \dfrac{5!}{2!\,3!}$

(5) $P(6,3)$

$n=6$, $r=3$

$$^{n}P_{r} = \frac{6!}{3!}$$

(7) $n=9$, $r=5$.

$$^{n}P_{r} = \frac{9!}{4!}$$

(8) $n=5$, $r=5$.

$$^{n}P_{r} = 5!$$

(9) $n=12$, $r=3$.

$$^{n}P_{r} = \frac{12!}{9!}$$

(10) $n=6$, $r=6$.

$$^{n}P_{r} = 6!$$

(6) $C(5,1)$

$$^{n}C_{r} = \frac{5!}{4!\,1!}$$

(11) $n=10$ (Total strings length)