lesson:1

Permutation

1) combination (C) ① ② ③ (P) permutation

take 2 ball what are possible

① ②
② ③
① ③
} 3 possible

take 2 ball of all possible

① ②
② ①
② ③
③ ②
① ③
③ ①
} 6 all possible

Permutation (P)

formula

(X) $n > r$

n will always greater than r

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

n - Total

r - selection (how many balls taken)

$$3 P_2 = \frac{3!}{(3-2)!} = \frac{6}{1}$$

$= 6$ all possible

1! = 1
2! = 2
3! = 6
4! = 24
5! = 120
6! = 720
7! = 5040
8! = 40320

Lesson 1)

How many ways the words can be arranged

i) non-repeated letters

* machine

$7! = 5040$

* GAME

$4! = 24$

* CRYSTAL

$7!$

* EDUCATION

$9! = 362880$

ii) repeated ~~words~~ letters

① SISTER (6)

$$\frac{6!}{2!}$$

② LETTER

$$\frac{6!}{2! \times 2!}$$

③ CORPORATION

$$\frac{11!}{3! \times 2!} = \frac{1 \times 2 \times 3 \times 4 \times 5}{}$$

④ ENGINEERING

$$\frac{11!}{3!3!2!2!}$$

(Lesson 2) Vowels comes together (NON-repeated)

i) Vowels
ii) Con
iii) Some letter comes together

i) Vowels come together

How many ways the word can be arranged

i) Vowels always come together

1) JVGDE

UEJGD

$4! \times 2!$

EU } 2!
UE

_J_G_D_ → JGUED
means → UEJGD → JGDUE } 4!
JUEGD

ii) MÁCHÍNÉ

AIE → 3!

_M_C_H_N_ → 5!

3! × 5!

iii) Optical

OIC → 3!

PtCl → 5!

repeated ~~colored~~ vowels come together

① SÍSTÉR

IE → 2!

SSTR → 5!

2! × 5!

S S → 2!

$$\frac{2! \times 5!}{2!}$$

2) ANIMATION

A I A I O → 5!

N M T N → 5!

A A → 2!

N N → 2!

I I → 2!

$$\frac{5! \times 5!}{2! \times 2! \times 2!}$$

3) ~~PREPARATION~~ PREPARATION

P A A I O → 5!

P R P R T N → 7!

P P → 2!

R R → 2!

A A → 2!

$$\frac{5! \times 7!}{2! \times 2! \times 2!}$$

④ C O R P O R A T I O N

O O A I O → 5!

C R P R T N → 7!

repeated words

O O O → 3!

R R → 2!

$$\frac{5! \times 7!}{3! \times 2!}$$

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2) Consonents (Non-vowels) always comes together

① J U D G E

J D G → 3!

_ U E _ → 3!

3! × 3!

② B A N K E R

B N K R → 4!

A E → 3!

Repeated letter 4! × 3!

③ S I S T E R

Non-vowel comes together → S S T R → 4!

vowel I E → 3!

Repeated letter

S S → 2!

$$\frac{4! \times 3!}{2!}$$

④ ~~SISTER~~ C O R P O R A T I O N

C R P R T N → 6!

O O A I O → 6!

repeated

OOO - 3!

RR - 2!

$$\frac{6! \times 6!}{3! \times 2!}$$

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3) Some Letters come together

i) CRYSTAL → Ay comes together

yA → 2!

C R S T L → 6!

$$\boxed{2! \times 6!}$$

ii) #DUCATION → UET comes together

UET → 3!

D C A I O N → 7!

$$3! \times 7!$$

Lesson 3 vowel Never 2 comes together

Total → Fail → Pass

100 − 20 = 80

i) MACHINE

Total − Vowel cores together = ans

Total = 7! MACHINE

Vowel cores together = 3! AIE

= 5! _M_C_H_N_

7! − (3! × 5!)

ii) SISTER

Total = 6!

repeated SS = 2!

- IE = 2!
- SSTR = 5!
- SS = 2!

$\frac{2! \times 5!}{2!}$

$\frac{6!}{2!} - \frac{2! \times 5!}{2!}$

ii) Consonant Never come together

i) MACHINE

Total = 7!

consonant : MCHN - 4!

AIE - 4!

$= 7! - (4! \times 4!)$

ii) SISTER

Total = 6! SISTER $\frac{6!}{2!}$

repeated = 2! SS

SSTR → 4! $\frac{4! \times 3!}{2!}$

IE → 3!

SS → 2!

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

iii) EDUCATION

Total = EDUCATION = 9!

rep = 1

Con DCNT → 4!

EUAION → 6!

9! − (4! × 6!)

Lesson 4 No Two vowels comes together

formula

Total A B C D

selection - - - -

$^{N}P_{r} = \frac{N!}{(N-r)!}$

$= \frac{4!}{(4-4)!}$

$= \frac{4!}{0!}$

$= \frac{24}{1}$

A B C D

selector - - 2

$^{N}P_{r}$

$^{4}P_{2} = \frac{4!}{(4-2)!}$

$= \frac{4!}{2!}$

$= \frac{24}{2}$

$= 12$

'SP' → Two letter

select - C - K - G

select greater

$^{4}P_{2}$ lesser

=

3) MACHINE

(AIE) ↦ vowel

A M C I H N E

How many ways the word can be arranged?

i) No two Vowels comes together

1) BANKER

BNKR → changer 4!

AE

- B - N - K - R -

$^5P_2$ ~~$\frac{5!}{2!}$~~ × 4!

ii) COMPUTER

OUE → 3

CMPTR → 5!

_C_M_P_T_R_ → 6

$6P_3 \times 5!$

Repeated

1) SISTER

IE → 2

_S_S_T_R_ 5

$\frac{5P_2 \times 4!}{2!}$

ii) PERMUTATION

EUAIO → 5

PRMTTN - 7!

$\frac{7P_5 \times 6!}{2!}$

Lesson 5

Vowels comes in ODD places / Even places

(1) DETAIL

1 2 3 4 5 6

vowels comes odd place

vowels E A I - 3

Total odd place - 3

3!

DTL - 3

Total even - 3

3!

con

= 3! × 3!

(2) MAchine

1 2 3 4 5 6 7

Total vowel odd place

i) Vowel = A I E) 13

Position of odd = 4

$^4P_3$ 1 position

ii) MCHN 4

place =

Lesson 6

i) Repetition allowed

repetation not allowed

CAT $3!$

i) CAT
ii) ACT
iii) ATC
iv) TAC
v) TCA
vi) CTA

ii) Repetition not allowed

repetation allowed

3^3

CAT CLT CAC C C C
ACT AAT
ATC
TAC
TCA
CTA

---

repetation Not allow

Crystal - $7!$

Pirates - $7!$

Book = $\frac{4!}{2!}$

OFFICERS = $\frac{8!}{2!}$

repetation allow

7^7

7^7

$\frac{4^4}{2!}$ 00-2!

$\frac{8^8}{2!}$

Lesson 7

ABC — = 3!

ABC — = 3

1) How many ways the word "PlayGround" can be arranged

PLAYGROUND = 10!

i) If the word start with 'Y'

Y _ _ _ _ _ _ _ _ = 9!

ii) If the word start with 'y' & end with 'G'

Y _ _ _ _ _ _ _ G = 8!

iii) end with vowel

A O U = 3

_ _ _ _ _ _ _ _ A = 3

9!

9!

iv) The word start with vowel & end with a consonent.

3 _ _ _ _ _ _ _ _ 7

8! × 3 × 7

Lesson 8 Problem on number

How many ways 3 digit / 4 digit / 5 digit can be formed

① 1, 2, 8, 7 (4 digit number form

1 2 8 7 = 4!

② 2, 1, 4, 6, 9 (5 digit number form)

= 5!

3) 2 3 1 2 (4 digit number form)

= $\frac{4!}{2!}$

2 2

4) 1 3 2 4 9 1 (6 digit numba for

= $\frac{6!}{2!}$ → repeated

1 1

different

(5) 9, 3, 7, 4, 1 — 3 digit numb

$${}^5P_3 = \frac{5!}{5-3} = \frac{5!}{2!}$$

4 digit numb

$${}^5P_4 = \frac{5!}{(5-4)!} = \frac{5!}{1}$$

if 0 is there be careful

Non-zero (4 digit

4 2 9 6 = 4! = 24

$\frac{2}{1} \cdot \frac{3!}{-} = 6$

$\frac{4}{1} \cdot \frac{3!}{-} = 6$

$\frac{6}{1} \cdot \frac{3!}{-} = 6$

$\frac{9}{1} \cdot \frac{3!}{-} = 6$

zero — 4 digit number

2 0 4 9 = 4! ✗ wrong

2 — 3! — = 6

4 — 3! — = 6

9 — — — = 6

18