AL-EMRAN
A20MJ9003
Assignment 2a

Ans to the Qus No. 1

Given that:
In a sightseeing group
- 8 singaporeans.
- 5 Indonesians.
- 6 malaysians.

(i) The no. of ways to select a pair from singaporeans

$$= {}^8C_2 = \frac{8!}{(8-2)!\,2!} = \frac{8!}{6!2!} = \frac{8\times7\times6!}{6!\times2\times1} = 28$$

The no of ways to select a pair from indoneseans.

$$= {}^5C_2 = \frac{5!}{(5-2)!\,2!} = \frac{5!}{3!2!} = \frac{5\times4\times3!}{3!\,2\times1} = 10$$

The no of ways to select a pair from 6 Malaysians

$$= {}^6C_2 = \frac{6!}{(6-2)!\,2!} = \frac{6!}{4!2!} = \frac{6\times5\times4!}{4!\times2\times1} = 15$$

The total number of ways to select a pair from the group of tourist $= 28+10+15 = 53$ Ans.

(ii) The number of ways to select a team of 3 tourists from different nationalities are –

$$= \underbrace{{}^8C_1}_{\text{Singaporeans}} + \underbrace{{}^5C_1}_{\text{Indonesians}} + \underbrace{{}^6C_1}_{\text{malaysians}}$$

$$= \frac{8!}{(8-1)!\,1!} + \frac{5!}{(5-1)!\,1!} + \frac{6!}{(6-1)!\,1!} = \frac{8!}{7!1!} + \frac{5!}{4!1!} + \frac{6!}{5!1!}$$

$$= \frac{8\times7!}{7!\times1} + \frac{5!}{4!\times1} + \frac{6!}{5!1!} = 8+5+6 = 19 \text{ Ans.}$$

(iii) The total people (tourist) in the group = 8+5+6 = 19

We have to select 1 representative from this 19 people group.

So, the no of ways to select a representative from the tourist group = $^{19}C_1$

$= \frac{19!}{(19-1)!(1)!} = \frac{19!}{18!1!} = \frac{19 \times 18!}{18! \times 1} = 19$ Ans.

Ans to the Qus No. 2

(i) Total persons = 10

Let a person be selected to sit between brothers = $^{8}C_1$

$= 8$

The total arrangements around the circle = 8!

The brother can be interchanged in 2! ways.

∴ The total arrangement = 2! × 8!

(ii)

The number of ways to arrange all of them around the circle = $\frac{^{n}P_n}{n}$

∴ where = n = 10

$= \frac{^{10}P_{10}}{10} = \frac{10!}{10} = \frac{10 \times 9!}{10} = 9!$ Ans.

(iii) Total persons = 10. So, let a person be selected to sit between brothers = $^{8}C_1 = 8$

∴ let the brothers and selected person to be set.

total arrangements around the circle = $(n-1)! = (8-1)! = 7!$

~~total~~ the brothers can be interchanged in 2! ways.

therefore total arrangemets = 2! × 7!

Ans.

Ans to the Qus No. 3

5 = A

10 = B

3 = C

2 = F

$$^{20}C_5 + {}^{20}C_{10} + {}^{20}C_3 + {}^{20}C_2$$

$$= 201590 \text{ Ans.}$$