1. ON/14/61/no.7

A committee of 6 people is to be chosen from 5 men and 8 women. In how many ways can this be done

(i) if there are more women than men in the committee, [4]

(ii) if the committee consists of 3 men and 3 women but two particular men refuse to be on the committee together? [4]

One particular committee consists of 5 women and 1 man.

(iii) In how many different ways can the committee members be arranged in a line if the man is not at either end? [3]

WM
42
5!
6 0

i) W 8 M 5

$\frac{8!}{4! \times 4!} \times \frac{5!}{2! \times 3!} = 700$

$\frac{8!}{5! \times 3!} \times \frac{5!}{1 \times 4!} = 280$

$\frac{8!}{6! \times 2!} \times \frac{5!}{0! \times 5!} = 28$

$700 + 280 + 28 = 1008$

ii) M_1 M_2 M_3 M_4 M_5 W_1 W_2 W_3 W_4 W_5 W_6 W_7 W_8

$\frac{M_1}{5} \quad \frac{M_3}{3} \quad \frac{M_4}{2} \quad \frac{W_2}{} \quad \frac{W_3}{} \quad \frac{W_5}{}$

$\frac{5 \times 3 \times 2}{3!} \times \frac{8!}{3!}$

iii) $\underline{W}^5$ $\underline{M}^1$ $\underline{W}^3$ $\underline{W}^2$ $\underline{W}^1$ $\underline{W}^4$

$5! \times 4$

2. ON/14/62/no.1

The 50 members of a club include both the club president and the club treasurer. All 50 members want to go on a coach tour, but the coach only has room for 45 people. In how many ways can 45 members be chosen if both the club president and the club treasurer must be included? [3]

$^{48}C_{43} = 1712304$

3. ON/14/62/no.2

Find the number of different ways that 6 boys and 4 girls can stand in a line if

(i) all 6 boys stand next to each other, [3]

(ii) no girl stands next to another girl. [3]

i) $6! \times 5! = 86400$

ii) $\cdot - \cdot - \cdot - \cdot - \cdot - \cdot - \cdot$

$^7P_4 \times 6! = 604800$

4. ON/14/63/no.6

(a) Seven fair dice each with faces marked 1, 2, 3, 4, 5, 6 are thrown and placed in a line. Find the number of possible arrangements where the sum of the numbers at each end of the line add up to 4. [3]

(b) Find the number of ways in which 9 different computer games can be shared out between Wainah, Jingyi and Hebe so that each person receives an odd number of computer games. [6]

a) $\frac{1}{3} - - \frac{6^5}{} - - \frac{3}{1} - \frac{}{2}$

$\therefore 6^5 \times 3 = 23328$

b) W T H

1 3 5 = $^9C_1 \times {}^8C_3 \times 1$ = 504 x6

2 1 1 = $^9C_2 \times {}^2C_1 \times 1$ = 72 x3

3 3 3 = $^9C_3 \times {}^6C_3 \times 1$ = 1680

3024
216
1680
4920

5. MJ/14/61/no.6

Find the number of different ways in which all 8 letters of the word TANZANIA can be arranged so that

(i) all the letters A are together, [2]

(ii) the first letter is a consonant, (T, N, Z), the second letter is a vowel, (A, I), the third letter is a consonant, the fourth letter is a vowel, and so on alternately. [3]

4 of the 8 letters of the word TANZANIA are selected. How many possible selections contain

(iii) exactly 1N and 1A, [2]

(iv) exactly 1N? [3]

i) $\frac{6!}{2!} = 360$ _ _ ! _ ------ T N N Z

AAAI 5!

ii) $\frac{4}{C} \times \frac{4}{V} \times \frac{3}{C} \times \frac{3}{V} \times \frac{2}{C} \times \frac{2}{V} \times \frac{1}{C} \times \frac{1}{V} = 48$

iii) TANZANIA $3! \times 2!$

N A _ _ $^3C_2 = 3$

iv) N _ _ _ _ _ _ _

N T A A I

T A A I

A A I

I A

A k

$^{7}C_{3}$

$^{7}C_{2} \times {}^{2}C_{1}$

$^{7}C_{1} \times {}^{2}C_{2}$

$^{7}C_{2} \times {}^{2}C_{1} \times {}^{2}C_{1}$

6. MJ/14/62/no.2

A school club has members from 3 different year-groups: Year 1, Year 2 and Year 3. There are 7 members from Year 1, 2 members from Year 2 and 2 members from Year 3. Five members of the club are selected. Find the number of possible selections that include at least one member from each year-group. [4]

Y_1 Y_2 Y_3

7 2 2

Y_1 Y_2 Y_3 Y_1 Y_1 3, 1, 1

Y_1 Y_2 Y_3 Y_1 Y_2 2, 2, 1

Y_3 Y_2