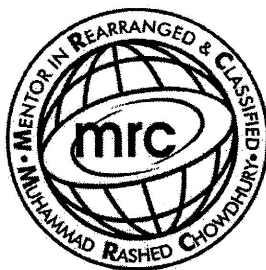# www.mrc-papers.com

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Probability & Statistics 1

TOPIC- Permutation and combination

[words]

Permutation and combination

01 **(a)** Find the number of different arrangements which can be made of all 10 letters of the word WALLFLOWER if $\quad$ 5-42-16

   (i) there are no restrictions, $\hspace{8cm}$ [1]

   (ii) there are exactly six letters between the two Ws. $\hspace{4.5cm}$ [4]

(b) A team of 6 people is to be chosen from 5 swimmers, 7 athletes and 4 cyclists. There must be at least 1 from each activity and there must be more athletes than cyclists. Find the number of different ways in which the team can be chosen. $\hspace{5cm}$ [4]

Q2 Find the number of ways all 9 letters of the word EVERGREEN can be arranged if

S– 6 3–16

(i)   there are no restrictions,   [1]

(ii) the first letter is R and the last letter is G,   [2]

(iii) the Es are all together.   [2]

Three letters from the 9 letters of the word EVERGREEN are selected.

(iv) Find the number of selections which contain no Es and exactly 1 R.   [1]

(v) Find the number of selections which contain no Es.   [3]

0 3 **(a)** Find the number of different ways of arranging all nine letters of the word PINEAPPLE if no vowel (A, E, I) is next to another vowel. *N-61-16* [4]

(b) A certain country has a cricket squad of 16 people, consisting of 7 batsmen, 5 bowlers, 2 all-rounders and 2 wicket-keepers. The manager chooses a team of 11 players consisting of 5 batsmen, 4 bowlers, 1 all-rounder and 1 wicket-keeper.

   (i) Find the number of different teams the manager can choose. [2]

   (ii) Find the number of different teams the manager can choose if one particular batsman refuses to be in the team when one particular bowler is in the team. [3]

Q4 Find the number of ways all 9 letters of the word EVERGREEN can be arranged if

  S-63-16

 (i) there are no restrictions,   [1]

 (ii) the first letter is R and the last letter is G,   [2]

 (iii) the Es are all together.   [2]

Three letters from the 9 letters of the word EVERGREEN are selected.

 (iv) Find the number of selections which contain no Es and exactly 1 R.   [1]

 (v) Find the number of selections which contain no Es.   [3]

              S-63-16

05 **(a)** Find the number of different arrangements which can be made of all 10 letters of the word WALLFLOWER if

S-62-16

    (i) there are no restrictions,   [1]

    (ii) there are exactly six letters between the two Ws.   [4]

(b) A team of 6 people is to be chosen from 5 swimmers, 7 athletes and 4 cyclists. There must be at least 1 from each activity and there must be more athletes than cyclists. Find the number of different ways in which the team can be chosen.   [4]

6 Find the number of ways all 10 letters of the word COPENHAGEN can be arranged so that

   (i) the vowels (A, E, O) are together and the consonants (C, G, H, N, P) are together,   [3]

   (ii) the Es are not next to each other.   [4]

Four letters are selected from the 10 letters of the word COPENHAGEN.

   (iii) Find the number of different selections if the four letters must contain the same number of Es and Ns with at least one of each.   [5]

Permutation and combination

07   **(a)**   Find the number of different ways the 7 letters of the word BANANAS can be arranged

       (i) if the first letter is N and the last letter is B,   S−6 2−15   [3]

       (ii) if all the letters A are next to each other.   [3]

   (b)   Find the number of ways of selecting a group of 9 people from 14 if two particular people cannot both be in the group together.   [3]

Permutation and combination

0 8 **(a)** Find the number of ways in which all nine letters of the word TENNESSEE can be arranged

  (i) if all the letters E are together, N-61-15

  [3]

  (ii) if the T is at one end and there is an S at the other end.

  [3]

(b) Four letters are selected from the nine letters of the word VENEZUELA. Find the number of possible selections which contain exactly one E.

  [3]

09 **(a)** Find the number of different ways that the 13 letters of the word ACCOMMODATION can be arranged in a line if all the vowels (A, I, O) are next to each other. *N-63-15* [3]

(b) There are 7 Chinese, 6 European and 4 American students at an international conference. Four of the students are to be chosen to take part in a television broadcast. Find the number of different ways the students can be chosen if at least one Chinese and at least one European student are included. [5]

10 The 11 letters of the word REMEMBRANCE are arranged in a line. *N-62-13*

    (i) Find the number of different arrangements if there are no restrictions. [1]

    (ii) Find the number of different arrangements which start and finish with the letter M. [2]

    (iii) Find the number of different arrangements which do not have all 4 vowels (E, E, A, E) next to each other. [3]

4 letters from the letters of the word REMEMBRANCE are chosen.

    (iv) Find the number of different selections which contain no Ms and no Rs and at least 2 Es. [3]

Permutation and combination

1 1 **(i)** Find the number of different ways that the 9 letters of the word AGGREGATE can be arranged in a line if the first letter is R. *N~ 63-13* **[2]**

(ii) Find the number of different ways that the 9 letters of the word AGGREGATE can be arranged in a line if the 3 letters G are together, both letters A are together and both letters E are together. **[2]**

(iii) The letters G, R and T are consonants and the letters A and E are vowels. Find the number of different ways that the 9 letters of the word AGGREGATE can be arranged in a line if consonants and vowels occur alternately. **[3]**

(iv) Find the number of different selections of 4 letters of the word AGGREGATE which contain exactly 2 Gs or exactly 3 Gs. **[3]**

12   **(i)** In how many ways can all 9 letters of the word TELEPHONE be arranged in a line if the letters P and L must be at the ends?   S– 63–12   [2]

How many different selections of 4 letters can be made from the 9 letters of the word TELEPHONE if

   (ii) there are no Es,

[1]

 (iii) there is exactly 1 E,

[2]

 (iv) there are no restrictions?

[4]

13 **(i)** Find the number of different ways that the 9 letters of the word HAPPINESS can be arranged in a line.

$5-62-11$ [1]

(ii) The 9 letters of the word HAPPINESS are arranged in random order in a line. Find the probability that the 3 vowels (A, E, I) are not all next to each other.

[4]

(iii) Find the number of different selections of 4 letters from the 9 letters of the word HAPPINESS which contain no Ps and either one or two Ss.

[3]

14 (a) Find the number of different ways in which the 12 letters of the word STRAWBERRIES can be arranged

N-61-11

(i) if there are no restrictions, [2]

(ii) if the 4 vowels A, E, E, I must all be together. [3]

(b) (i) 4 astronauts are chosen from a certain number of candidates. If order of choosing is not taken into account, the number of ways the astronauts can be chosen is 3876. How many ways are there if order of choosing is taken into account? [2]

(ii) 4 astronauts are chosen to go on a mission. Each of these astronauts can take 3 personal possessions with him. How many different ways can these 12 possessions be arranged in a row if each astronaut's possessions are kept together? [2]