Permutations and combinations
Question Paper 5

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Permutations and combinations
Sub Topic	
Booklet	Question Paper 5

Time Allowed: **59 minutes**

Score: **/49**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1   Six men and three women are standing in a supermarket queue.

   (i) How many possible arrangements are there if there are no restrictions on order?   [2]

  (ii) How many possible arrangements are there if no two of the women are standing next to each other?   [4]

 (iii) Three of the people in the queue are chosen to take part in a customer survey. How many different choices are possible if at least one woman must be included?   [3]

2   A staff car park at a school has 13 parking spaces in a row. There are 9 cars to be parked.

   (i) How many different arrangements are there for parking the 9 cars and leaving 4 empty spaces?   [2]

  (ii) How many different arrangements are there if the 4 empty spaces are next to each other?   [3]

 (iii) If the parking is random, f nd the probability that there will **not** be 4 empty spaces next to each other.   [2]

3   The word ARGENTINA includes the four consonants R, G, N, T and the three vowels A, E, I.

   (i) Find the number of different arrangements using all nine letters.   [2]

  (ii) How many of these arrangements have a consonant at the beginning, then a vowel, then another consonant, and so on alternately?   [3]

4   **(a)**   A collection of 18 books contains one Harry Potter book. Linda is going to choose 6 of these books to take on holiday.

      (i)   In how many ways can she choose 6 books?   [1]

      (ii) How many of these choices will include the Harry Potter book?   [2]

  (b)   In how many ways can 5 boys and 3 girls stand in a straight line

      (i)   if there are no restrictions,   [1]

      (ii) if the boys stand next to each other?   [4]

5   **(a)**   Find how many different numbers can be made by arranging all nine digits of the number 223 677 888 if

      (i)   there are no restrictions,   [2]

      (ii) the number made is an even number.   [4]

  (b)   Sandra wishes to buy some applications (apps) for her smartphone but she only has enough money for 5 apps in total. There are 3 train apps, 6 social network apps and 14 games apps available. Sandra wants to have at least 1 of each type of app. Find the number of different possible selections of 5 apps that Sandra can choose.   [5]

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

      (i)   if the f rst letter is N and the last letter is B,   [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]