TAYLOR'S UNIVERSITY COLLEGE
Wisdom · Integrity · Excellence

CAMBRIDGE 'A' LEVEL PROGRAMME

SEMESTER ONE EXAMINATION JUNE 2007

(Jan 2007 Intake)

Monday **11 June 2007** **3.00 pm – 4.00 pm**

MATHEMATICS 9709/6

PAPER 6 Probability & Statistics (S1) 1 hour

Additional materials: Answer Paper
Graph paper
List of formulae (MF 9)

READ THESE INSTRUCTIONS FIRST

Write your name and class on all the work you hand in.
Write in dark blue or black pen on both sides of the paper.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** the questions.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total marks for this paper is 40.
Questions carrying smaller numbers of marks are printed earlier in the paper, and questions carrying larger numbers of marks later in the paper.
The use of an electronic calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

This document consists of **3** printed pages.

[Turn over

1. A railcar compartment has eight seats; four facing the engine of the train and four facing away from the engine. Of eight passengers, three prefer to face away from the engine, two prefer to face the engine, and the others have no preference. In how many ways can the passengers be seated if the order on each side of the car is disregarded? [2]

2. How many four-digit numbers, can be formed from the digits 0 to 7, if there must be at least a 4 in the number? Repetition of digit is allowed. [4]

3. How many different arrangements of the word SUCCESS are there if

i there are no restriction? [2]

ii the two vowels must be together? [3]

4. X is the random variable ' the number on a biased die', and the probability distribution of X is shown in the table below.

x	1	2	3	4	5	6
$P(X = x)$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{5}$	y	$\frac{1}{5}$	$\frac{1}{6}$

Find

i the value of y [1]

ii E(X) [2]

iii Var(X) [3]

5. The probability that a marksman will hit a target is $\frac{5}{6}$. He fires 9 shots.

Calculate, correct to three decimal places, the probability that he will hit the target

i at least 7 times [3]

ii If he hits the target exactly 6 times, calculate the probability that the three misses are with 3 successive shots. [4]

6. The table below is the frequency distribution of marks obtained in a test by 200 students.

Mark	10-	20-	30-	40-	50-	60-	70-	80-90
f	18	34	58	42	24	10	6	8

i Draw a cumulative frequency polygon to illustrate the data. [4]

ii Estimate the median from the graph. [1]

iii How many students would fail if the pass mark is 40? [1]

iv If the top 10% of students are to be given a grade I, what is the lowest mark which will achieve this? [2]

7. (a) An industrial process mass produces items which are normally distributed with mean 18.5 kg and standard deviation 1.5 kg. What is the probability that an item chosen at random weighs more than 21.5 kg? [4]

(b) An industrial process mass produces items which are normally distributed. 11.55% of them weigh over 20 kg and 5.89% weigh under10 kg. Calculate the mean weight and standard deviation for this distribution? [4]