TAYLOR'S COLLEGE

Wisdom • Integrity • Excellence

CAMBRIDGE 'A' LEVEL PROGRAMME

FIRST SEMESTER EXAMINATION DECEMBER 2005

(June 2005 Intake)

Friday **9 December 2005** **8.30 am – 9.45 am**

MATHEMATICS 9709/6

PAPER 6 Probability & Statistics 1 (S1) 1 hour 15 minutes

Additional materials: Answer Paper
List of formulae (MF9)
Graph Paper

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 50.
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. The word CZECHOSLOVAKIA has 14 letters which includes 4 vowels and 7 consonances.

   i) Find the number of ways to arrange all 14 letters. [2]

   ii) In how many different ways can the word be arranged if all the vowels are together? [3]

2. The battery life of 128 u-pods is summarized in the following table:

Battery life(hrs)		frequency	
$8 \le x < 9$	8 - 8.9	21	21
$9 \le x < 10$	9 - 9.9	83	104
$10 \le x < 11$	10 - 10.9	17	121
$11 \le x < 12$	11 - 11.9	5	126
$12 \le x < 13$	12 - 12.9	2	128

   i) Draw a cumulative frequency curve on a graph paper to represent the data. [3]

   ii) Indicate the median and find the inter-quartile range on the graph. [3]

3. In a statistics book collectors club, there are 20 members. If the sum of all their books is 1010 ($\sum x = 1010$) and the squared sum of their books is 53542 ($\sum x^2 = 53542$).

   i) Find the mean, variance and standard deviation of the numbers of books. [4]

   ii) One more person joins the club and the mean number of the books of the 21 people is exactly 51. Find the number of books collected by the new member and the new standard deviation of the numbers of books collected. [4]

4. A show jumping tournament has 100 participants. In the first round, 60 riders clear the bar. In the second round 46 riders clear the bar after it has been raised. A rider must clear both rounds to qualify for the finals. Riders that do not clear the first round have half the chance of success to clear the bar in the second round, than riders who did.

   i) Draw a complete tree diagram for all possible outcomes. [2]

   ii) What is the probability of a rider making it to the final? [2]

   iii) Find the probability of a rider not clearing the first bar given that he did succeed in the second round. [3]

5. The table below gives the probability distribution of the random variable K.

k	1	2	3	4	5
P(K = k)	c	2c	2c	2c	c

   Find:
   i) The value of c.
   ii) E(K).
   iii) Var (K). [5]

6. Mary bought a basket of eggs from the market. The probability that any eggs will be found to be broken is 0.30, independents of all other items. If 20 eggs are examined, calculate the probability that

   i) more then 4 eggs were broken. [3]

   ii) not more then 2 eggs was broken. [2]

   iii) if 50 eggs were inspected. Use a suitable approximation model to find the probability that at least 25 eggs were broken. [4]

7. The length of cucumbers is normally distributed with mean 18.2 cm and standard deviation 2.3 cm.

   i) Find the probability of the length for a cucumber between 16 cm and 20 cm. [4]

   ii) 12% of the cucumbers are longer then x cm. 20% of the cucumbers are shorter then y cm. Find x and y. [4]

   iii) A particular store will only accept cucumbers longer then 15 cm. In a batch of 500 cucumbers estimate how many would be acceptable. [2]