MATHEMATICS

STATISTICS

9709/06

0390/06

Paper 6 Probability & Statistics 1 **(S1)**

May/June 2004

1 hour 15 minutes

Additional materials: Answer Booklet/Paper
Graph paper
List of Formulae (MF9)

READ THESE INSTRUCTIONS FIRST

If you have been given an Answer Booklet, follow the instructions on the front cover of the Booklet.
Write your Centre number, candidate number and name 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 number of 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 **4** printed pages.

UNIVERSITY *of* CAMBRIDGE
International Examinations

[Turn over

1 Two cricket teams kept records of the number of runs scored by their teams in 8 matches. The scores are shown in the following table.

Team *A*	150	220	77	30	298	118	160	57
Team *B*	166	142	170	93	111	130	148	86

    (i) Find the mean and standard deviation of the scores for team *A*.   [2]

The mean and standard deviation for team *B* are 130.75 and 29.63 respectively.

    (ii) State with a reason which team has the more consistent scores.   [2]

2 In a recent survey, 640 people were asked about the length of time each week that they spent watching television. The median time was found to be 20 hours, and the lower and upper quartiles were 15 hours and 35 hours respectively. The least amount of time that anyone spent was 3 hours, and the greatest amount was 60 hours.

    (i) On graph paper, show these results using a fully labelled cumulative frequency graph.   [3]

    (ii) Use your graph to estimate how many people watched more than 50 hours of television each week.   [2]

3 Two fair dice are thrown. Let the random variable *X* be the smaller of the two scores if the scores are different, or the score on one of the dice if the scores are the same.

    (i) Copy and complete the following table to show the probability distribution of *X*.   [3]

x	1	2	3	4	5	6
$P(X = x)$						

    (ii) Find $E(X)$.   [2]

4 Melons are sold in three sizes: small, medium and large. The weights follow a normal distribution with mean 450 grams and standard deviation 120 grams. Melons weighing less than 350 grams are classified as small.

    (i) Find the proportion of melons which are classified as small.   [3]

    (ii) The rest of the melons are divided in equal proportions between medium and large. Find the weight above which melons are classified as large.   [5]

5 **(a)** The menu for a meal in a restaurant is as follows.

Starter Course

Melon
or
Soup
or
Smoked Salmon

Main Course

Chicken
or
Steak
or
Lamb Cutlets
or
Vegetable Curry
or
Fish

Dessert Course

Cheesecake
or
Ice Cream
or
Apple Pie

All the main courses are served with salad and either
new potatoes or french fries.

    (i) How many different three-course meals are there? [2]

    (ii) How many different choices are there if customers may choose only two of the three courses? [3]

(b) In how many ways can a group of 14 people eating at the restaurant be divided between three tables seating 5, 5 and 4? [3]

6 When Don plays tennis, 65% of his first serves go into the correct area of the court. If the first serve goes into the correct area, his chance of winning the point is 90%. If his first serve does not go into the correct area, Don is allowed a second serve, and of these, 80% go into the correct area. If the second serve goes into the correct area, his chance of winning the point is 60%. If neither serve goes into the correct area, Don loses the point.

  (i) Draw a tree diagram to represent this information. [4]

  (ii) Using your tree diagram, find the probability that Don loses the point. [3]

  (iii) Find the conditional probability that Don's first serve went into the correct area, given that he loses the point. [2]

7 A shop sells old video tapes, of which 1 in 5 on average are known to be damaged.

    (i) A random sample of 15 tapes is taken. Find the probability that at most 2 are damaged.   [3]

   (ii) Find the smallest value of n if there is a probability of at least 0.85 that a random sample of n tapes contains at least one damaged tape.   [3]

  (iii) A random sample of 1600 tapes is taken. Use a suitable approximation to find the probability that there are at least 290 damaged tapes.   [5]