Paper Reference(s)

6683/01

Edexcel GCE

Statistics S1

Advanced/Advanced Subsidiary

Wednesday 24 May 2006 – Afternoon

Time: 1 hour 30 minutes

Materials required for examination	**Items included with question papers**
Mathematical Formulae (Green)	Nil

Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration. Thus candidates may NOT use calculators such as the Texas Instruments TI 89, TI 92, Casio CFX 9970G, Hewlett Packard HP 48G.

Instructions to Candidates

Write the name of the examining body (Edexcel), your centre number, candidate number, the unit title (Statistics S1), the paper reference (6683), your surname, initials and signature.
Values from the statistical tables should be quoted in full. When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
There are 6 questions in this question paper. The total mark for this paper is 75.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.
You must show sufficient working to make your methods clear to the Examiner. Answers without working may gain no credit.

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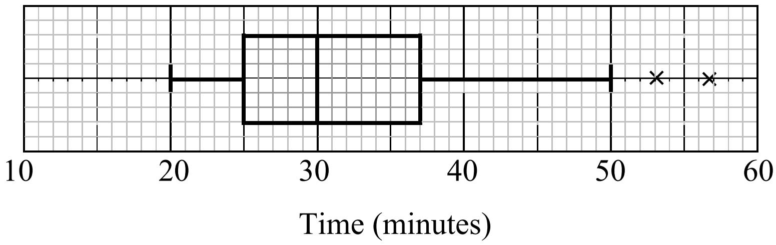
1. (*a*) Describe the main features and uses of a box plot.

(3)

Children from schools *A* and *B* took part in a fun run for charity. The times, to the nearest minute, taken by the children from school *A* are summarised in Figure 1.

Figure 1

School *A*



(*b*) (i) Write down the time by which 75% of the children in school *A* had completed the run.

(ii) State the name given to this value.

(2)

(*c*) Explain what you understand by the two crosses (×) on Figure 1.

(2)

For school *B* the least time taken by any of the children was 25 minutes and the longest time was 55 minutes. The three quartiles were 30, 37 and 50 respectively.

(*d*) On graph paper, draw a box plot to represent the data from school *B*.

(4)

(*e*) Compare and contrast these two box plots.

(4)

2. Sunita and Shelley talk to each other once a week on the telephone. Over many weeks they recorded, to the nearest minute, the number of minutes spent in conversation on each occasion. The following table summarises their results.

Time (to the nearest minute)	Number of conversations
5–9	2
10–14	9
15–19	20
20–24	13
25–29	8
30–34	3

Two of the conversations were chosen at random.

(*a*) Find the probability that both of them were longer than 24.5 minutes.
(2)

The mid-point of each class was represented by x and its corresponding frequency by f, giving $\sum fx = 1060$.

(*b*) Calculate an estimate of the mean time spent on their conversations.
(2)

During the following 25 weeks they monitored their weekly conversation and found that at the end of the 80 weeks their overall mean length of conversation was 21 minutes.

(*c*) Find the mean time spent in conversation during these 25 weeks.
(4)

(*d*) Comment on these two mean values.
(2)

3. A metallurgist measured the length, l mm, of a copper rod at various temperatures, t °C, and recorded the following results.

t	l
20.4	2461.12
27.3	2461.41
32.1	2461.73
39.0	2461.88
42.9	2462.03
49.7	2462.37
58.3	2462.69
67.4	2463.05

The results were then coded such that $x = t$ and $y = l - 2460.00$.

(*a*) Calculate S_{xy} and S_{xx}.

(You may use $\Sigma x^2 = 15965.01$ and $\Sigma xy = 757.467$)

(5)

(*b*) Find the equation of the regression line of y on x in the form $y = a + bx$.

(5)

(*c*) Estimate the length of the rod at 40 °C.

(3)

(*d*) Find the equation of the regression line of l on t.

(2)

(*e*) Estimate the length of the rod at 90 °C.

(1)

(*f*) Comment on the reliability of your estimate in part (*e*).

(2)

4. The random variable X has the discrete uniform distribution

$$P(X = x) = \frac{1}{5}, \qquad x = 1, 2, 3, 4, 5.$$

(a) Write down the value of E(X) and show that Var(X) = 2.

(3)

Find

(b) E($3X - 2$),

(2)

(c) Var($4 - 3X$)

(2)

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5. From experience a high jumper knows that he can clear a height of at least 1.78 m once in 5 attempts. He also knows that he can clear a height of at least 1.65 m on 7 out of 10 attempts.

Assuming that the heights the high jumper can reach follow a Normal distribution,

(a) draw a sketch to illustrate the above information,

(3)

(b) find, to 3 decimal places, the mean and the standard deviation of the heights the high jumper can reach,

(6)

(c) calculate the probability that he can jump at least 1.74 m.

(3)

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6. A group of 100 people produced the following information relating to three attributes. The attributes were wearing glasses, being left-handed and having dark hair.

Glasses were worn by 36 people, 28 were left-handed and 36 had dark hair. There were 17 who wore glasses and were left-handed, 19 who wore glasses and had dark hair and 15 who were left-handed and had dark hair. Only 10 people wore glasses, were left-handed and had dark hair.

(*a*) Represent these data on a Venn diagram.

(6)

A person was selected at random from this group.

Find the probability that this person

(*b*) wore glasses but was not left-handed and did not have dark hair,

(1)

(*c*) did not wear glasses, was not left-handed and did not have dark hair,

(1)

(*d*) had only two of the attributes,

(2)

(*e*) wore glasses, given they were left-handed and had dark hair.

(3)

TOTAL FOR PAPER: 75 MARKS

END