Edexcel GCE
Statistics S1
Bronze Level B2
(Question Paper)

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Paper Reference(s)

6683/01

Edexcel GCE

Statistics S1

Bronze Level B2

Time: 1 hour 30 minutes

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

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulas stored in them.

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.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.
Full marks may be obtained for answers to ALL questions.
There are 7 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.

Suggested grade boundaries for this paper:

A*	A	B	C	D	E
73	67	61	53	47	42

1. A teacher asked a random sample of 10 students to record the number of hours of television, t, they watched in the week before their mock exam. She then calculated their grade, g, in their mock exam. The results are summarised as follows.

$$\sum t = 258 \qquad \sum t^2 = 8702 \qquad \sum g = 63.6 \qquad S_{gg} = 7.864 \qquad \sum gt = 1550.2$$

(*a*) Find S_{tt} and S_{gt}.

(3)

(*b*) Calculate, to 3 significant figures, the product moment correlation coefficient between t and g.

(2)

The teacher also recorded the number of hours of revision, v, these 10 students completed during the week before their mock exam. The correlation coefficient between t and v was –0.753.

(*c*) Describe, giving a reason, the nature of the correlation you would expect to find between v and g.

(2)

January 2013

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2. A bank reviews its customer records at the end of each month to find out how many customers have become unemployed, u, and how many have had their house repossessed, h, during that month. The bank codes the data using variables $x = \dfrac{u-100}{3}$ and $y = \dfrac{h-20}{7}$.

The results for the 12 months of 2009 are summarised below.

$$\sum x = 477 \qquad S_{xx} = 5606.25 \qquad \sum y = 480 \qquad S_{yy} = 4244 \qquad \sum xy = 23\,070$$

(*a*) Calculate the value of the product moment correlation coefficient for x and y.

(3)

(*b*) Write down the product moment correlation coefficient for u and h.

(1)

The bank claims that an increase in unemployment among its customers is associated with an increase in house repossessions.

(*c*) State, with a reason, whether or not the bank's claim is supported by these data.

(2)

May 2012

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3. A biologist is comparing the intervals (m seconds) between the mating calls of a certain species of tree frog and the surrounding temperature (t °C). The following results were obtained.

t °C	8	13	14	15	15	20	25	30
m secs	6.5	4.5	6	5	4	3	2	1

(You may use $\sum tm = 469.5$, $S_{tt} = 354$, $S_{mm} = 25.5$)

(a) Show that $S_{tm} = -90.5$.

(4)

(b) Find the equation of the regression line of m on t giving your answer in the form $m = a + bt$.

(4)

(c) Use your regression line to estimate the time interval between mating calls when the surrounding temperature is 10 °C.

(1)

(d) Comment on the reliability of this estimate, giving a reason for your answer.

(1)

January 2013

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4. A second hand car dealer has 10 cars for sale. She decides to investigate the link between the age of the cars, x years, and the mileage, y thousand miles. The data collected from the cars are shown in the table below.

Age, x (years)	2	2.5	3	4	4.5	4.5	5	3	6	6.5
Mileage, y (thousands)	22	34	33	37	40	45	49	30	58	58

[You may assume that $\sum x = 41$, $\sum y = 406$, $\sum x^2 = 188$, $\sum xy = 1818.5$]

(a) Find S_{xx} and S_{xy}.

(3)

(b) Find the equation of the least squares regression line in the form $y = a + bx$. Give the values of a and b to 2 decimal places.

(4)

(c) Give a practical interpretation of the slope b.

(1)

(d) Using your answer to part (b), find the mileage predicted by the regression line for a 5 year old car.

(2)

January 2008

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5. The probability function of a discrete random variable X is given by

$$p(x) = kx^2, \qquad x = 1, 2, 3.$$

where k is a positive constant.

(*a*) Show that $k = \frac{1}{14}$.

(2)

Find

(*b*) $P(X \geq 2)$,

(2)

(*c*) $E(X)$,

(2)

(*d*) $\text{Var}(1 - X)$.

(4)

January 2010

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6. The blood pressures, p mmHg, and the ages, t years, of 7 hospital patients are shown in the table below.

Patient	A	B	C	D	E	F	G
t	42	74	48	35	56	26	60
P	98	130	120	88	182	80	135

$[\ \sum t = 341,\ \sum p = 833,\ \sum t^2 = 18\,181,\ \sum p^2 = 106\,397,\ \sum tp = 42\,948\ ]$

(*a*) Find S_{pp}, S_{tp} and S_{tt} for these data.

(4)

(*b*) Calculate the product moment correlation coefficient for these data.

(3)

(*c*) Interpret the correlation coefficient.

(1)

(*d*) Draw the scatter diagram of blood pressure against age for these 7 patients.

(2)

(*e*) Find the equation of the regression line of p on t.

(4)

(*f*) Plot your regression line on your scatter diagram.

(2)

(*g*) Use your regression line to estimate the blood pressure of a 40 year old patient.

(2)

January 2010

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7. Tetrahedral dice have four faces. Two fair tetrahedral dice, one red and one blue, have faces numbered 0, 1, 2, and 3 respectively. The dice are rolled and the numbers face down on the two dice are recorded. The random variable R is the score on the red die and the random variable B is the score on the blue die.

(a) Find P($R = 3$ and $B = 0$).

(2)

The random variable T is R multiplied by B.

(b) Complete the diagram below to represent the sample space that shows all the possible values of T.

3				
2		2		
1	0			
0				
B / R	**0**	**1**	**2**	**3**

Sample space diagram of T

(3)

The table below represents the probability distribution of the random variable T.

t	0	1	2	3	4	6	9
P($T = t$)	a	b	$\frac{1}{8}$	$\frac{1}{8}$	c	$\frac{1}{8}$	d

(c) Find the values of a, b, c and d.

(3)

Find the values of

(d) E(T),

(2)

(e) Var(T).

(4)

January 2008

TOTAL FOR PAPER: 75 MARKS

END