Edexcel GCE
Statistics S1
Silver Level S2
(Question Paper)

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Paper Reference(s)

6683/01

Edexcel GCE

Statistics S1

Silver Level S2

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
67	60	52	44	36	30

1. A jar contains 2 red, 1 blue and 1 green bead. Two beads are drawn at random from the jar without replacement.

(*a*) Draw a tree diagram to illustrate all the possible outcomes and associated probabilities. State your probabilities clearly.

(3)

(*b*) Find the probability that a blue bead and a green bead are drawn from the jar.

(2)

January 2010

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2. Cotinine is a chemical that is made by the body from nicotine which is found in cigarette smoke. A doctor tested the blood of 12 patients, who claimed to smoke a packet of cigarettes a day, for cotinine. The results, in appropriate units, are shown below.

Patient	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*
Cotinine level, *x*	160	390	169	175	125	420	171	250	210	258	186	243

[You may use $\sum x^2 = 724\,961$]

(*a*) Find the mean and standard deviation of the level of cotinine in a patient's blood.

(4)

(*b*) Find the median, upper and lower quartiles of these data.

(3)

A doctor suspects that some of his patients have been smoking more than a packet of cigarettes per day. He decides to use $Q_3 + 1.5(Q_3 - Q_1)$ to determine if any of the cotinine results are far enough away from the upper quartile to be outliers.

(*c*) Identify which patient(s) may have been smoking more than a packet of cigarettes a day. Show your working clearly.

(4)

Research suggests that cotinine levels in the blood form a skewed distribution.

One measure of skewness is found using $\dfrac{(Q_1 - 2Q_2 + Q_3)}{(Q_3 - Q_1)}$.

(*d*) Evaluate this measure and describe the skewness of these data.

(3)

January 2008

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3. The discrete random variable Y has the probability distribution

y	1	2	3	4
$P(Y = y)$	a	b	0.3	c

where a, b and c are constants.

The cumulative distribution function $F(y)$ of Y is given in the following table.

y	1	2	3	4
$F(y)$	0.1	0.5	d	1.0

where d is a constant.

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

(5)

(b) Find $P(3Y + 2 \geq 8)$.

(2)

May 2011

4.

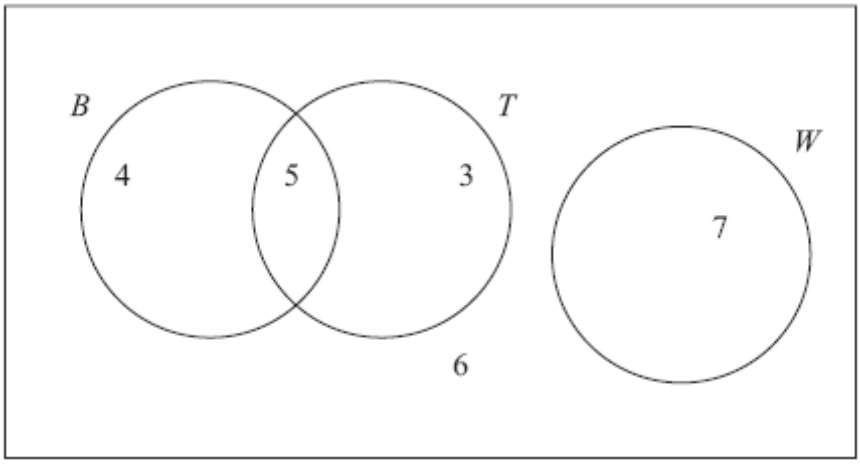

Figure 1

Figure 1 shows how 25 people travelled to work.

Their travel to work is represented by the events

B bicycle

T train

W walk

(a) Write down 2 of these events that are mutually exclusive. Give a reason for your answer.

(2)

(b) Determine whether or not B and T are independent events.

(3)

One person is chosen at random.

Find the probability that this person

(c) walks to work,

(1)

(d) travels to work by bicycle and train.

(1)

Given that this person travels to work by bicycle,

(e) find the probability that they will also take the train.

(2)

May 2012

5. The weight, w grams, and the length, l mm, of 10 randomly selected newborn turtles are given in the table below.

l	49.0	52.0	53.0	54.5	54.1	53.4	50.0	51.6	49.5	51.2
w	29	32	34	39	38	35	30	31	29	30

(You may use $S_{ll} = 33.381$ $S_{wl} = 59.99$ $S_{ww} = 120.1$)

(a) Find the equation of the regression line of w on l in the form $w = a + bl$.

(5)

(b) Use your regression line to estimate the weight of a newborn turtle of length 60 mm.

(2)

(c) Comment on the reliability of your estimate giving a reason for your answer.

(2)

May 2009

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6. The discrete random variable X has the probability distribution

x	1	2	3	4
$P(X = x)$	k	$2k$	$3k$	$4k$

(a) Show that $k = 0.1$

(1)

Find

(b) $E(X)$

(2)

(c) $E(X^2)$

(2)

(d) $\text{Var}(2 - 5X)$

(3)

Two independent observations X_1 and X_2 are made of X.

(e) Show that $P(X_1 + X_2 = 4) = 0.1$

(2)

(f) Complete the probability distribution table for $X_1 + X_2$.

(2)

y	2	3	4	5	6	7	8
$P(X_1 + X_2 = y)$	0.01	0.04	0.10		0.25	0.24	

(g) Find $P(1.5 < X_1 + X_2 \leq 3.5)$

(2)

January 2011

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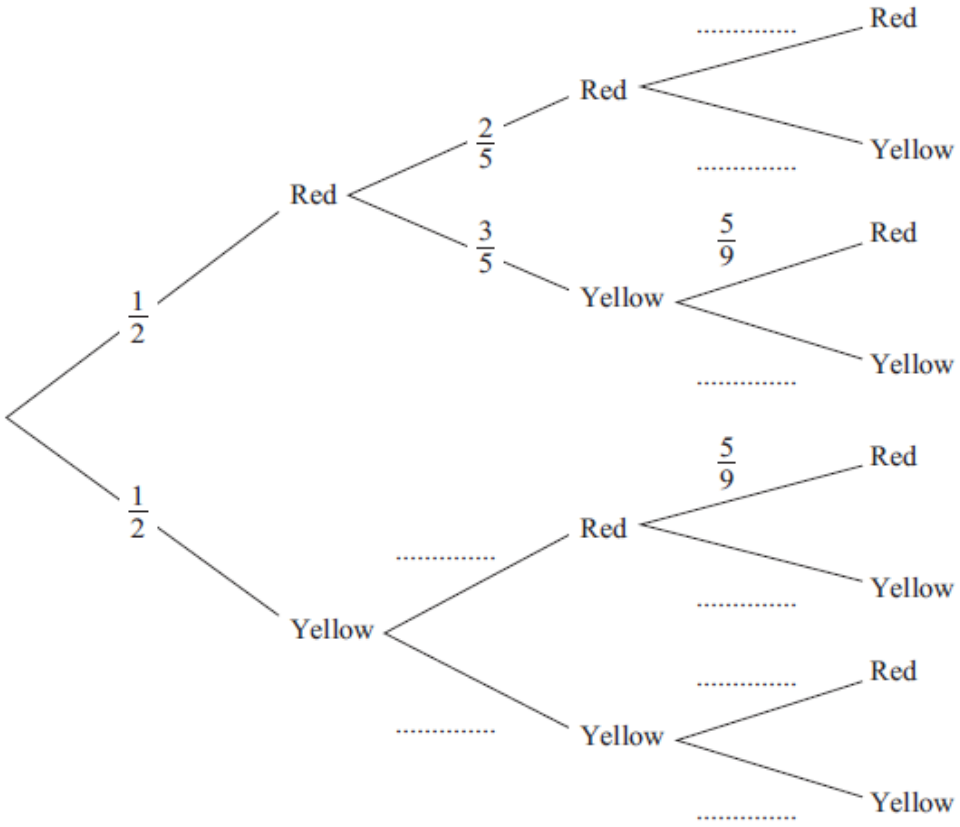
7. The bag P contains 6 balls of which 3 are red and 3 are yellow.
The bag Q contains 7 balls of which 4 are red and 3 are yellow.
A ball is drawn at random from bag P and placed in bag Q. A second ball is drawn at random from bag P and placed in bag Q.
A third ball is then drawn at random from the 9 balls in bag Q.

The event A occurs when the 2 balls drawn from bag P are of the same colour.
The event B occurs when the ball drawn from bag Q is red.

(a) Copy and complete the tree diagram shown below.



(4)

(b) Find P(A).

(3)

(c) Show that P(B) = $\frac{5}{9}$.

(3)

(d) Show that P($A \cap B$) = $\frac{2}{9}$.

(2)

(e) Hence find P($A \cup B$).

(2)

(f) Given that all three balls drawn are the same colour, find the probability that they are all red.

(3)

January 2011

TOTAL FOR PAPER: 75 MARKS

END