Diagrams

Question Paper 3

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Representation of data
Sub Topic	Diagrams
Booklet	Question Paper 3

Time Allowed: 56 minutes

Score: /46

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1   The weights in grams of a number of stones, measured correct to the nearest gram, are represented in the following table.

Weight (grams)	1 – 10	11 – 20	21 – 25	26 – 30	31 – 50	51 – 70
Frequency	$2x$	$4x$	$3x$	$5x$	$4x$	x

A histogram is drawn with a scale of 1 cm to 1 unit on the vertical axis, which represents frequency density. The 1 – 10 rectangle has height 3 cm.

  (i) Calculate the value of x and the height of the 51 – 70 rectangle.   [4]

  (ii) Calculate an estimate of the mean weight of the stones.   [3]

2   The weights in kilograms of 11 bags of sugar and 7 bags of f our are as follows.

  Sugar: 1.961   1.983   2.008   2.014   1.968   1.994   2.011   2.017   1.977   1.984   1.989

  Flour: 1.945   1.962   1.949   1.977   1.964   1.941   1.953

  (i) Represent this information on a back-to-back stem-and-leaf diagram with sugar on the left-hand side.   [4]

  (ii) Find the median and interquartile range of the weights of the bags of sugar.   [3]

3   The following histogram illustrates the distribution of times, in minutes, that some students spent taking a shower.
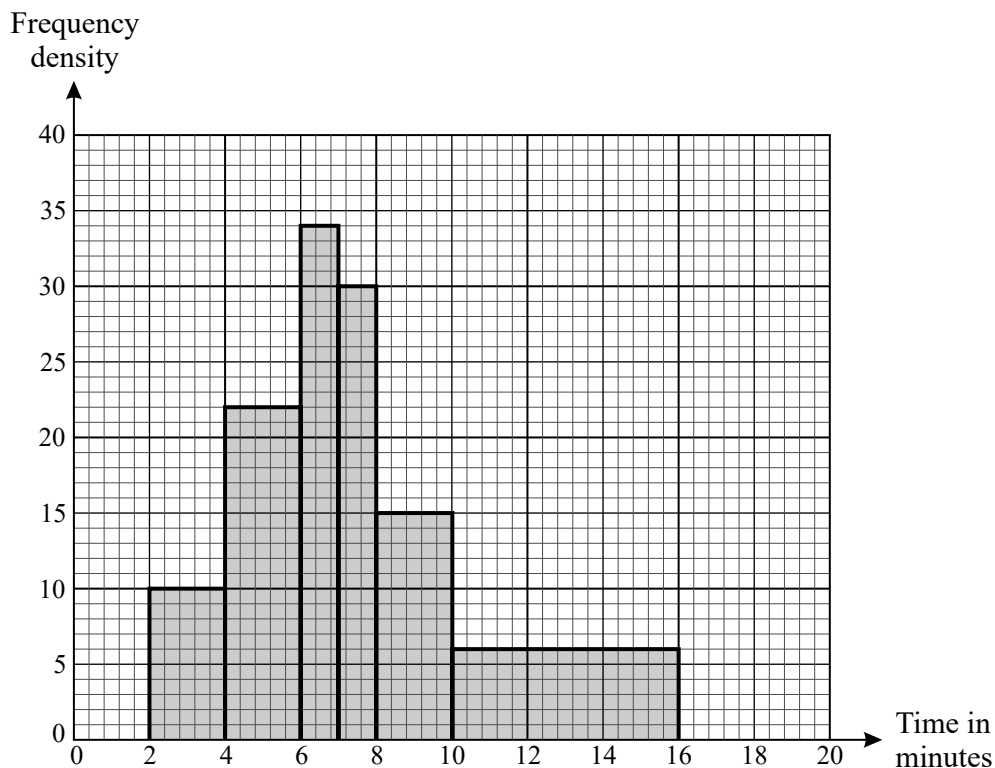
(i) Copy and complete the following frequency table for the data.   [3]

Time (t minutes)	$2 < t \leqslant 4$	$4 < t \leqslant 6$	$6 < t \leqslant 7$	$7 < t \leqslant 8$	$8 < t \leqslant 10$	$10 < t \leqslant 16$
Frequency						

(ii) Calculate an estimate of the mean time to take a shower.   [2]

(iii) Two of these students are chosen at random. Find the probability that exactly one takes between 7 and 10 minutes to take a shower.   [3]

4 A library has many identical shelves. All the shelves are full and the numbers of books on each shelf in a certain section are summarised by the following stem-and-leaf diagram.

```
3 | 3 6 9 9                              (4)
4 | 6 7                                  (2)
5 | 0 1 2 2                              (4)
6 | 0 0 1 1 2 3 4 4 4 4 5 5 6 6 6 7 8 8 9   (20)
7 | 1 1 3 3 3 5 6 6 7 8 9 9              (12)
8 | 0 2 4 5 5 6 8                        (7)
9 | 0 0 1 2 4 4 4 4 5 5 6 7 7 8 8 9 9 9    (18)
```

Key: 3 | 6   represents 36 books

(i) Find the number of shelves in this section of the library. [1]

(ii) Draw a box-and-whisker plot to represent the data. [5]

In another section all the shelves are full and the numbers of books on each shelf are summarised by the following stem-and-leaf diagram.

```
2 | 1 2 2 2 3 3 4 5 6 6 6 7 9       (13)
3 | 0 1 1 2 3 4 4 5 6 6 7 7 7 8 8   (15)
4 | 2 2 3 5 7 7 8 9                 (8)
```

Key: 3 | 6   represents 36 books

(iii) There are fewer books in this section than in the previous section. State one other difference between the books in this section and the books in the previous section. [1]

5 The following table gives the marks, out of 75, in a pure mathematics examination taken by 234 students.

Marks	1–20	21–30	31–40	41–50	51–60	61–75
Frequency	40	34	56	54	29	21

(i) Draw a histogram on graph paper to represent these results. [5]

(ii) Calculate estimates of the mean mark and the standard deviation. [4]

6   The pulse rates, in beats per minute, of a random sample of 15 small animals are shown in the following table.

115	120	158	132	125
104	142	160	145	104
162	117	109	124	134

  (i) Draw a stem-and-leaf diagram to represent the data. [3]

  (ii) Find the median and the quartiles. [2]

  (iii) On graph paper, using a scale of 2 cm to represent 10 beats per minute, draw a box-and-whisker plot of the data. [3]