## Question 1

## Higher Level Question

(Suggested maximum time: 5 minutes)
(a) Give an example of a data set where this statement is false:
"minimum < mean < maximum".

(b) Describe for what kind of data sets this statement is false:
"minimum $<$ mean $<$ maximum".


## Question 2

All of the students in a class took IQ Test 1 on the same day. A week later they all took IQ Test 2. Their scores on the two IQ tests are shown in the tables below.

| IQ Test 1 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 86 | 104 | 89 | 105 | 96 |
| 96 | 103 | 94 | 104 | 119 |
| 115 | 79 | 97 | 111 | 108 |


| IQ Test 2 |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 83 | 120 | 105 | 111 | 114 |
| 99 | 111 | 108 | 106 | 97 |
| 97 | 102 | 94 | 108 | 117 |

(i) Draw a back-to-back stem-and-leaf plot below to display the students' scores.
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Key:
(ii) Find the range of scores for each IQ test.

$$
\text { IQ Test } 1
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## IQ Test 2 :

(iii) Find the median score for each IQ test.

(iv) Find the mean score for each IQ test.

| IQ Test 1: |  |  |  |  |  |  |  |  |  |  |  | IQ Test 2 : |  |  |  |  |  |  |  |  |  |  |  |
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(v) Compare the scores on the two IQ tests. Refer to at least one measure of central tendency and at least one measure of variability (spread) in your answer.

(vi) Marshall says that every student in the class must have done better on IQ Test 2 than on IQ Test 1. Is Marshall correct? Explain your answer.

## Question 3

Students in a class are investigating spending in their local area. They each carry out a different survey, and display the results.
(a) John is investigating whether people pay for their weekly shopping with Credit Card, Debit Card, Cash, or Cheque. When people tell him which one of these they usually use, he writes it in a table. His results are shown below.


| Credit Card | Debit Card | Debit Card | Cash | Debit Card |
| :---: | :---: | :---: | :---: | :---: |
| Credit Card | Cash | Cash | Credit Card | Debit Card |
| Debit Card | Debit Card | Cheque | Cash | Cash |
| Cash | Cash | Debit Card | Cash | Credit Card |

(i) What type of data has John collected? Put a tick $(\checkmark)$ in the correct box below.

| Numerical | Numerical | Categorical | Categorical |
| :---: | :---: | :---: | :---: |
| Continuous | Discrete | Nominal | Ordinal |
| $\square$ | $\square$ | $\square$ | $\square$ |

(ii) Fill in the frequency table below.

| Method of <br> Payment | Credit Card | Debit Card | Cash | Cheque |
| :--- | :--- | :--- | :--- | :--- |
| Frequency |  |  |  |  |


(iii) What is the mode of John's data? Mode $=\square$
(iv) John says that he cannot find the mean of his data. Explain why this is the case.

(v) Display John's data in a pie chart. Show all of your calculations clearly.
(b) Margaret wants to examine if people prefer to do their weekly shopping in Tesco, Dunnes Stores, SuperValu, or Lidl. She stands outside her local Lidl shop for one day, and asks everyone as they leave the shop where they prefer to do their weekly shopping.
Give one reason why Margaret's data may be biased.

(c) Mary is interested in the amount of money people spend on their weekly shopping.

She surveys people as they leave the local supermarket on a Saturday morning, and displays her results in the two graphs below.

(i) Mary wants to show that about half of her sample spent less than $€ 40$ on their weekly shopping. Which graph do you think she should use? Give a reason for your answer.

Answer:
Reason:
(ii) Mary wants to show that there were more people in the 30-40 group than in any other. Which graph do you think she should use? Give a reason for your answer.

Answer:
Reason:

## Question 4

The ages of the 30 people who took part in an aerobics class are as follows:

| 18 | 24 | 32 | 37 | 9 | 13 | 22 | 41 | 51 | 49 |
| :--- | :--- | :--- | :--- | :---: | :--- | :--- | :--- | :--- | :--- |
| 15 | 42 | 37 | 58 | 48 | 53 | 27 | 54 | 42 | 24 |
| 33 | 48 | 56 | 17 | 61 | 37 | 63 | 45 | 20 | 39 |

The ages of the 30 people who took part in a swimming class are as follows:

| 16 | 22 | 29 | 7 | 36 | 45 | 12 | 38 | 52 | 13 |
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| 33 | 41 | 24 | 35 | 51 | 8 | 47 | 22 | 14 | 24 |
| 42 | 62 | 15 | 24 | 23 | 31 | 53 | 36 | 48 | 18 |

(a) Represent this data on a back-to-back stem-and-leaf diagram.

(b) Use your diagram to identify the median in each case.

(c) What other measure of central tendancy could have been used when examining this data?

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(d) Based on the data make one observation about the ages of the two groups.
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## Question 5

In total 7150 second level school students from 216 schools completed the 2011/2012 phase 11 CensusAtSchool questionnaire. The questionnaire contained a question relating to where students keep their mobile phones while sleeping.

(a) Given that this question was answered by 4171 girls and 2979 boys, calculate how many female students kept their mobile phones under their pillows.

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(b) Calculate the overall percentage of students who kept their mobile phones under their pillows.
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(c) A new pie chart is to be drawn showing the mobile phone location for all students. Calculate the measure of the angle that would represent the students who kept their mobile phones under their pillows.


## Question 6

The salaries, in $€$, of the different employees working in a call centre are listed below.

| 22000 | 16500 | 38000 | 26500 | 15000 | 21000 | 15500 | 46000 |
| :--- | ---: | :--- | :--- | :--- | :--- | :--- | :--- |
| 42000 | 9500 | 32000 | 27000 | 33000 | 36000 | 24000 | 37000 |
| 65000 | 37000 | 24500 | 23500 | 28000 | 52000 | 33000 | 25000 |
| 23000 | 16500 | 35000 | 25000 | 33000 | 20000 | 19500 | 16000 |

(a) Use this data to complete the grouped frequency table below.

| Salary <br> $(€ 1000)$ | $0-10$ | $10-20$ | $20-30$ | $30-40$ | $40-50$ | $50-60$ | $60-70$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| No. of <br> Employees |  |  |  |  |  |  |  |

[Note: $10-20$ means $€ 10000$ or more but less than $€ 20000$, etc.]
(b) Using mid-interval values find the mean salary of the employees.

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(c) (i) Outline another method which could have been used to calculate the mean salary.
(ii) Which method is more accurate? Explain your answer.

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| Answer |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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## Question 7

The ages of the Academy Award winners for best male actor and best female actor (at the time they won the award) from 1992 to 2011 are as follows:

Male actor


Female actor $\begin{array}{lllllllllllllllllllllllllllllll}42 & 29 & 33 & 36 & 45 & 49 & 39 & 26 & 25 & 33 & 35 & 35 & 28 & 30 & 29 & 61 & 32 & 33 & 45 & 29\end{array}$
(a) Represent the data on a back-to-back stem-and-leaf diagram.

|  | Male actors |  |  |  |  |  |  |  |  |  |  | male | e actors |  |  |
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(b) State one similarity and one difference that can be observed between the ages of the male and female winners.

(c) Mary says "The female winners were younger than the male winners." Investigate this statement in relation to:
(i) The mean age of the male winners and mean age of the female winners.

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(ii) The median age of the male winners and the median age of the female winners.

(d) Find the interquartile ranges of the ages of the male winners and of the female winners.


