Foundation Certificate in Marketing - Stage 1

MARKETING INFORMATION ANALYSIS I

FRIDAY, AUGUST 19, 2005. TIME: 2.00 pm - 5.00 pm

Please attempt **FIVE** questions.
(If more than the specified number of questions are attempted, delete those you do not wish to have marked. Otherwise the Examiner will mark the **FIRST** five questions in your Answer Book).

All questions carry equal marks.
Do **NOT** repeat question in answer, but show clearly the number of the question attempted on the appropriate page of the Answer Book.

1. (a) The Irish Quarterly National Household Survey for September 2004, which is based on a national sample of 39,000, reported that 52% of all persons in employment had pension coverage. Calculate the lower limit of a 99% confidence interval if the actual number of employed people is 1.8 million.
(10 marks)

   (b) A researcher is investigating consumer behaviour and wishes to establish the percentage of people who have been on a diet within the past year. If this figure is unknown and the answer is required with a precision of $\pm 2\%$ at a confidence level of 95%, what size of simple random sample is required?(10 marks)

2. The following data relate to a random sample of customer accounts:

189	221	237	255	263	285	249	303	428	335
255	273	251	241	317	257	327	403	417	267
227	261	291	307	211	313	233	251	309	319
217	261	349	271	247	265	255	307	387	249
283	221	257	277	237	225	291	259	215	299
245	213	279	285	385	289	271	225	181	285
239	247	305	227	391	281	259	195	239	255
251	261	279	389	447	335	283	309	275	269

   (a) Show this distribution by means of a histogram.   (5 marks)
   (b) Calculate the median for the sample.   (5 marks)
   (c) Calculate the mean and the standard deviation.   (10 marks)

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3. (a) The Consumer Price Index (Base Nov. 1975=100) shows values as follows:

Nov 1997	Nov 1998	Nov 1999	Nov 2000	Nov 2001
456.8	466.4	472.8	494.7	512.9

The Consumer Price Index was reorganised so that November 1996 = 100. and Nov 2001 was found to be 116 using this new index. Furthermore, Nov 2002, Nov 2003 and Nov 2004 were found to have values 121.5, 126.3 and 129.2 respectively, using this new index.

What would the value for November 2004 be if the old index Base 1975 = 100 had been continued? (10 marks)

(b)
Prices (All prices in €)	1990	2004
Coal (per tonne)	200	250
Oil (per tonne)	90	118
Gas (per therm)	0.9	1.15
Electricity (per Mkw)	25	32

The quantity of coal used was 45 million tonnes in 1990 and was down by 20% in 2004. Oil consumption was unchanged at a level of 16 million tonnes. Consumption of gas increased by 40% from a level of 600 million therms in 1990, while electricity increased by 25% from a level of 80 million Mkw's.

Calculate a Paasche Price Index for Energy for 2004 given the data above.
(10 marks)

4. The value of annual sales of a particular product (€000) are shown below.

Sales (€000)

YEAR	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
TOTAL	7,090	7,841	10,750	12,787	14,299	15,790	17,424	18,884	20,342	21,155

(a) Calculate the trend. (10 marks)
(b) By assuming that past patterns continue, calculate a forecast of sales for 2006 and 2007. (5 marks)
(c) Chart the original data and the trend on the same graph. (5 marks)

5. (a) The size of invoices (€000) and the number of days taken to pay are as follows:

Size of Invoice (€000)	100	150	160	250	40	60	180	120
Number of days to pay	35	40	50	90	30	25	65	35

Use a least squares regression line to estimate the number of days to pay an invoice which is €200,000. (10 marks)

(b) Draw a scatter diagram of about 10 points to illustrate the following degrees of linear association :-
(i) negative correlation with r= -0.8
(ii) weak positive correlation (4 marks)

(c) Explain the meaning of the term "multiple regression".
Why do statisticians use it? (6 marks)

6. (a) A delegation of four students is to be chosen from a group of 6 female and 4 male class representatives in a college. How many different delegations can be selected if gender balance is not an issue? (5 marks)

(b) Suppose that the probability of getting through to an agent within a half minute is 0.4 when using a particular customer help-line. If a customer makes 5 random calls to the help-line, what is the probability that the call is never answered within half a minute? (5 marks)

(c) Data relating to the customer orders showed that the mean value was €180 with a standard deviation of €50. What percentage of orders are less than €100? (5 marks)

(d) Use of emergency equipment followed a Poisson distribution with a mean of 1 incident per month. What is the probability that there will be less than 1 incident in any month? (5 marks)

7.   (a)   In a sample of 15 distributors in City A, expenses averaged €5,000 per month with a standard deviation of €1,500.   In another sample of 10 distributors from City B, the expenses were €6000 with a standard deviation of €2,000. Use a suitable hypothesis test at the 5% level to determine whether or not this difference is statistically significant.   (10 marks)

   (b)   Suppose that an investigation regarding civil servants willingness to move to locations outside Dublin contains the following data.

Willing to relocate out of Dublin

Age Group	Yes	No
15-24	261	339
25-54	447	1053
55 and over	242	658

   (i)   Calculate a 95% confidence interval for the overall percentage willing to relocate.   (2 marks)
   (ii) Conduct a formal hypothesis test to determine whether or not these figures indicate a statistically significant difference in willingness to relocate across the various age groups   (8 marks)

8.   Design a research programme to investigate the behaviour and attitudes of Irish adults to charity collections.   (20 marks)