UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER 2006

TITLE OF PAPER : DESCRIPTIVE STATISTICS

COURSE CODE : ST 132

TIME ALLOWED : TWO (2) HOURS

REQUIREMENTS : CALCULATOR AND GRAPH PAPER

INSTRUCTIONS : ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

Question 1

a)

In the year 2000, the National Center for Health Statistics estimated that the numbers (in millions) of older people in the USA who suffered from Alzheimer's Disease, by age group, were

Age 65–74	Age 75–84	Age 85+
0.3	2.4	1.8

The Center's projections for 2050 (in millions) are

Age 65–74	Age 75–84	Age 85+
0.4	4.8	8.0

(i)   Draw separate bar charts, using the same scale, to represent the data.

(6)

(ii)   Comment on what these charts show.

(2)

(iii)   Give one advantage and one disadvantage of pie charts as opposed to bar charts in representing data.

(2)

b)

The manager of a busy supermarket carried out a survey and recorded the lengths of time that a sample of 520 customers had to wait at the checkout before being served. The results are shown in the table.

Waiting time (minutes)	Number of customers
Less than 0.5	16
0.5 but less than 1	22
1 but less than 2	74
2 but less than 3	76
3 but less than 4	68
4 but less than 5	60
5 but less than 7.5	56
7.5 but less than 10	54
10 but less than 15	42
15 but less than 20	36
20 or more	16

(i)   Draw a cumulative frequency polygon (ogive) of the data.

(6)

(ii)   Use your graph to estimate the median and quartiles of the distribution.

(4)

Question 2

The table shows the quarterly number of reported major road accidents within the boundaries of a large town from 2002 to 2004.

Year	Quarter	Accidents (y)
2002	1	42
	2	38
	3	36
	4	46
2003	1	48
	2	43
	3	42
	4	47
2004	1	52
	2	47
	3	45
	4	49

a) Explain why it is appropriate to calculate a four-quarterly centred moving average to estimate the trend of accidents. (2)

b) Estimate the trend of accidents in this way and plot it on your chart. (6)

c) Numbering the quarters from 2002 Qtr 1 to 2004 Qtr 4 in order from 1 to 12 and using these as x values, calculate the least squares regression line of Accidents (y) on Quarter number. (8)

d) Plot this line on your chart and compare it with the moving average trend. (4)

Question 3

A family carefully monitors its expenditure on food and has noted that the amount spent on fresh fruit, in particular, has risen from September 1999 to September 2002. Details of prices and weekly consumption are given in the table.

Fruit price and consumption data

Fruit	September 1999		September 2002	
Fruit	*Price*	*Consumption*	*Price*	*Consumption*
Apples	60p per kg	1.5kg	75p per kg	2kg
Oranges	12p each	15	15p each	20
Bananas	80p per kg	1.5kg	75p per kg	1kg
Grapefruit	25p each	8	35p each	10

They have asked a neighbour, who is studying statistics, to estimate by how much the price of fruit has risen over the three-year period and the neighbour decides to calculate a weighted index of prices, based on September 1999.

a) Explain why a weighted index number is preferable to an unweighted number in this situation? (2)

b) Calculate a Lasperyres aggregate index and Paasche aggregate index of fruit prices. Comment on the results you get. (12)

c) Calculate an index that can harmonize the differences between P_L and P_P. (6)

Question 4

a) Explain what is wrong with the conclusions in **bold type** in each of the following statements.

  i) In Town M, the correlation coefficient between the ages of men and women at marriage is 0.94. **Hence a man is likely to marry a woman of his own age.**

  ii) Company N is a company employing 500 people, a few of whom are highly paid specialists. The mean annual salary of employees in the company is £15,355. **Hence half the employees earn less than £15,355 per year.**

  iii) "Migraines affect approximately 14% of women and 6% of men, **that is one fifth of the population**, assuming that there are equal numbers of men and women in the population."

  iv) "The medical insurance premium is reduced by 70% for five years without claims, a further reduction of 10% of the reduced premium is given for buying on the internet, **that's a total reduction of 80%.**"

b) Explain what the terms *quantitative* and *qualitative* mean when referring to variables in a set of data. (2)

c) Suggest two categories into which qualitative variables can be sub-divided and give an example of a variable of each category. (4)

d) Quantitative variables may be divided into the categories *discrete* and *continuous*. Give one example of each of these categories. (2)