UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION PAPER 2011

TITLE OF PAPER : DESCRIPTIVE STATISTICS

COURSE CODE : ST 132

TIME ALLOWED : TWO (2) HOURS

REQUIREMENTS : CALCULATOR

INSTRUCTIONS : THIS PAPER HAS SIX (6) QUESTIONS AND TWO SECTIONS. ANSWER ALL QUESTIONS IN SECTION ONE, ANY THREE (3) QUESTIONS IN SECTION TWO

SECTION ONE

(ANSWER ALL QUESTIONS)

Question 1   [10 marks, 1 mark each]

Choose the correct answer from the alternatives provided.

1. Data collected at the same, or approximately the same, point in time are

    (a) time series data

    (b) approximate time series data

    (c) cross-sectional data

    (d) approximate data

2. The fitted regression equation for variables sales (in millions of Emalangeni) and the year of sales (1987-2005) is given by $y=10+0.8x$. Assume $1987=1$, then the estimated sales in 2006 will be

    (a) E16 million

    (b) E10.16 million

    (c) E20 million

    (d) E26 million

3. A portion of the population selected to represent the population is called

    (a) statistical inference

    (b) descriptive statistics

    (c) a census

    (d) a sample

4. Which of the following is NOT a scale of measurement?

    (a) nominal

    (b) ordinal

    (c) interval

    (d) All of these are scales of measurement.

5. The summaries of data, which may be tabular, graphical, or numerical, are referred to as

    (a) inferential statistics

    (b) descriptive statistics

    (c) statistical inference

    (d) report generation

6. In a sample of 800 students in a university, 160, or 20%, are Business majors. Based on the above information, the school's paper reported that "20% of all the students at the university are Business majors." This report is an example of

   (a) a sample

   (b) a population

   (c) statistical inference

   (d) descriptive statistics

7. Since a sample is a subset of the population, a percentage that is calculated from the sample data

   (a) is always smaller than the corresponding percentage from the population

   (b) is always larger than the corresponding percentage from the population

   (c) must be equal to the corresponding percentage from the population

   (d) can be larger, smaller, or equal to the corresponding percentage from the population

8. The last time I went to Manzini, I decided to catch a Wanderers game. As I looked throughout the stands, I wondered what proportion of attendees were Wanderers fans. To answer this question, I asked 10 people in the row in front of me if, in fact, they were Wanderers fans. What type of sampling design did I use?

   (a) a probability sample

   (b) simple random sample

   (c) cluster sample

   (d) convenience sample

9. Qualitative data

   (a) are always nonnumeric

   (b) may be either numeric or nonnumeric

   (c) are always numeric

   (d) indicate either how much or how many

10. I read an advertisement recently in which a credit card company promised that I could reduce my debt by 150 percent. Which of the following statements is (are) true?

    (a) This is possible if my debt is more than 150 dollars.

    (b) This is possible if my debt has recently increased by at least 150 percent.

    (c) The company's claim makes no sense.

    (d) Both (a) and (b).

Question 2   [5 marks, 1 mark each]

State whether each of these statements is true or false, giving brief reasons why this is so (*Note that no marks will be awarded for a simple true/false reply*)

1. The Poisson probability distribution deals with experiments that have only two possible outcomes, a success and a failure.

2. A probability distribution is a listing of the outcomes of an experiment and the probability associated with each outcome.

3. To construct a binomial probability distribution, either the number of trials or the probability of success must be known.

4. Quota sampling is objective.

5. If A and B denote two events $P(A) + P(B) \geq (AUB)$.

SECTION TWO

(ANSWER ANY THREE QUESTIONS)

Question 3 [20 marks, 6+10+4]

The following data represent the net worth (in millions of Emalangeni) of 45 companies:

Class limits	Frequency
10-20	1
21-31	5
32-42	15
43-53	14
54-64	8
65-75	2

(a) Find the median and mode.

(b) Compute the coefficient of variation.

(c) Compute the coefficient of skewness.

Question 4 [20 marks, 14+6]

The quarterly electricity account for Nyakatfo LTD is tabulated as follows

	Electricity Account in SZL			
Year	Q1	Q2	Q3	Q4
1997		662	712	790
1998	686	718	821	846
1999	743	782	827	876
2000	805	842	876	

(a) Use the method of moving averages to construct a deseasonalised series.

(b) Using the rate of change of the entire trend, forecast expenditure on electricity for the last quarter of 2000.

Question 5 [20 marks, 4+4+4+4+4]

(a) Calculate the

(i) the value index.

(ii) Laspeyres quantity index;

(iii) Paasche price index;

using the data in the following table.

Commodity	Value in base period 0	Value in current period t	Price relative
Knives	20	25	1.10
Forks	20	20	1.15
Tablespoons	20	15	1.24
Teaspoons	15	10	1.07

(b) A sample of households that subscribe to the United Bell phone company revealed the following numbers of calls received last week: 52, 43, 30, 38, 30, 42, 12, 46, 39, 37, 34, 46, 32, 18, 41, 5.

  (i) Compute the mean, median, mode and range.

  (ii) Compute the semi-interquartile range.

Question 6 [20 marks, 4+4+6+2+4]

(a) A woman wants to open a small fashion boutique business. Before selecting a location, she would like to be able to predict the profit in Emalangeni that the store may be expected to earn per square metre of selling space. She gathers the following information:

Store size (square metres)	Profit (thousand of Emalangeni)
35	20
22	15
27	17
16	9
28	16
12	7
40	22
32	23

  (i) Find the best fitting regression equation of the form $y = a + bx$ ($\sum x^2 = 6246$, $\sum xy = 3781$ and $\sum y^2 = 2313$).

  (ii) Estimate profit for a store which is 30 square metres.

  (iii) Compute the value of the coefficient of determination and interpret its value.

(b) Find the average price paid per share in an equity portfolio consisting of: 40 shares bought for SZL15 each; 10 shares bought for SZL20 each; 5 shares bought for SZL40 each; and 50 shares bought for SZL10 each.

(c) Office rental agreements contain escalation clauses. For a particular office complex in Manzini, the escalation rates based on the previous year rentals over 4 years were 16%, 14%, 10% and 8% respectively. What was the *average annual escalation rate* in office rentals for this office complex over this 4-year period?