KABARAK   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR
FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: BMGT 220

COURSE TITLE: BUSINESS STATISTICS II

STREAM: **Y2S2**

DAY: **THURSDAY**

TIME: **9:00 A.M.– 11:00A.M.**

DATE: **10/12/2009**

<u>Instructions</u>
Answer question ONE and any other TWO questions.

1. (a) Explain the following distributions and explain the application of each
   - (i)   t-distribution   (5mks)
   - (ii) Chi-square distribution   (5mks)

   (b) (i) Distinguish between a mathematical model and a statistical model

   (3mks)

   (ii) Explain Literature Review and give its importance in statistical research.

   (3mks)

   (c) (i) Distinguish between Permutation and Combination   (4mks)

   (ii) A consumer is requested to rank in order of preference the taste of five brands. If she is indifferent among these brands, what is the probability that an individual who is truly indifferent will select a specific ordering for the first three places?   (3mks)

   (d) Given letters ABC, show in how many ways these letters can be permutated using a tree diagram.   (2mks)

   (e) (i) What is an expected value   (2mks)

   (ii) In a given business venture, a person is able to make a gain of Kshs. 300 with a probability of 0.6 or take a loss of Kshs. 100 . What is the persons expected value if he/she gets involved in the venture?

   (3mks)

2. (a) Suppose Kabarak University has bought 4000 bulbs. The lifetime of the bulbs has historically been realized to be normally distributed with mean of 700 hours and a standard deviation of 130 hours. How many bulbs are expected to fail in the first 550 hours.   (5mks)

   (b) Explain the following probability distributions
   - (i)   Binomial distribution   (3mks)
   - (ii) Sampling distribution of the mean   (3mks)

   (c) Given the following information on sales of cars by a given saleslady per day:

No. of cars sold	Probability
0	0.10
1	0.15
2	0.30
3	0.30
4	0.15

   - (i)   What kind of distribution is this? Give reasons   (3mks)
   - (ii) How many cars does this saleslady sell on a typical day?   (3mks)
   - (iii) What is the variance of the sales?   (3mks)

3. (a) Mr. X, a salesman in industrial chemicals, has sales of Kshs. 200,000. The industrial chemical department had mean sales of Kshs. 120,000 and a standard deviation of Kshs. 40,000. On the other hand, Kamau, a sales person in office supplies department had mean sales of Kshs. 100,000. The office supplies department had sales of Kshs. 40,000 and a standard deviation of Kshs. 20,000. Compare their performance.

(5mks)

b) (i) What are the desirable properties of confidence intervals? (3mks)

(ii) A random sample of 16 observations from a normal population with standard deviation of 6 had a mean of 25. Find a 90 percent confidence interval for the population mean. (5mks)

c) A researcher wishes to determine whether salaries of clerks employed by the private sector are higher than those employed by the government. She collects a sample of clerks from each sector and calculates the means and standard deviations of their salaries as:

Private   Government

$\overline{X}_1 = 36,800$ $\overline{X}_2 = 35,400$

$S_1 = 600$ $S_2 = 450$

$n_1 = 10$ $n_2 = 8$

At 1% level, can she conclude that the private sector pays more than the government? (7mks)

4. (a) Explain the classical assumptions of the least squares estimators (6mks)

(b) Given the following data on consumption expenditure and monthly earnings;

Consumption Expenditure Kshs. '000'	Disposable Income Kshs. '000'
5	5
6	7
13	10
10	15
17	20
22	25
15	25
20	30
25	30

i) Develop a graphical plot of the data and explain the nature of the relationship.

(4mks)

ii) Compute the least squares regression line for the variables. (7mks)

iii) Interpret the economic meaning of the estimates (3mks)

5. (a) (i) What is degrees of freedom? (2mks)

(ii) A random variable is distributed about a mean μ with a variance of 96. A random sample of 16 observations taken in the past gives a sample variance of 104. Is this outcome attributable to chance or can it be taken as evidence that variability of the population, as measured by δ^2, has risen? (5mks)

b) Cash and Carry supermarkets sales director intends to establish if there are any significant differences between regions in terms of the degree of acceptance of a new product. Using a sample and questionnaire technique, he obtained the following data:

Degree of acceptance	Region	
	East	West
Poor	21	36
Moderate	83	56
Strong	24	17

i) Determine the expected sample results. (3mks)
ii) Calculate the Chi – square statistic (4mks)
iii) Establish the degrees of freedom. (3mks)
iv) Test the null hypothesis that the degree of acceptance does not differ from region to region at 5 percent significance level. (3mks)