



KABARAK UNIVERSITY

**UNIVERSITY EXAMINATIONS
2010/2011 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 - 11.00 A.M

DATE: 16/12/2010

INSTRUCTIONS:

- 1.) Question **ONE** is **COMPULSORY**. Answer **THREE** questions in total.
- 2.) Question one carries 30 marks while other questions carry 20 marks each.
- 3.) Illustrate where possible.

PLEASE TURNOVER

- Q1. (a) Explain the following distributions and indicate when each is applied
- i.) Z-distribution (5mks)
 - ii.) F-distribution (5mks)
- (b) (i) Distinguish between a mathematical model and a statistical model (2mks)
- (ii) Explain Literature review and give its importance in statistical research (3mks)
- (c) (i) Distinguish between Permutation and Combination (3mks)
- (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 three brands? (3mks)
- (d) Given letters ABC, find the probability of one ordering using a tree diagram (2mks)
- (e) (i) In a given business venture, a person is able to make a gain of ksh.300,000 with a probability of 0.7 or take a loss of ksh.100,000. What is the person's expected value if he/she gets involved in the venture? (3mks)
- (iii) Is it a fair venture? (1mks)
- (c) The weekly wages of 1500 workers are normally distributed with mean wage of ksh.6000 and wages standard deviation of ksh.300. Estimate the number of workers whose weekly wages are between 5900 and 6300 (3mks)

Q2. (a)What is regression? (1mk)

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

Consumption Expenditure '000'	Disposable Income '000'
5	5
6	7
6	10
13	15
10	20
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 (3mks)
 - ii.) Compute the least squares regression line for the variables (6mks)
 - iii.) Interpret the economic meaning to the estimates (3mks)
- (b) (i) What is meant by 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)

- Q3. (a) (i) Distinguish between significance level and confidence level (3mks)
- (ii) An agricultural scientist is comparing maize yields per acre for which a nitrate based fertilizer has been used to those from plots having a sulphur based fertilizer. A sample of 100 acres using nitrate has yielded an average of 56.2 bags per acre with a standard deviation of 12.5 bags. The sample of 150 acres with sulphur fertilizer has yielded an average of 52.6 bags per acre with a standard deviation of 13.8 bags. Test the relevant hypothesis to validate or invalidate whether nitrate based fertilizer is superior at 1 percent significance level (7mks)

- (b) A study carried out a few years ago on the rise in the cost of hourly training in management using 150 observations yielded the following confidence interval:

$$\text{Ksh. } 270 < \mu < \text{Ksh. } 310$$

Calculate the values of standard deviation, s , and mean, \bar{X} , used to construct this confidence interval. (5mks)

- (c) An advertising company estimates, historically, its monthly sales to have averaged Ksh. 36 million per depot with a standard deviation of Ksh. 10 million. As a result of a sharp rise in competition from similar firms, a random sample of 36 depots was taken this year and gave mean sales of Ksh. 32 million. Test if the reduction in the company sales is significant? (5mks)

Q4. (a) When is the chi-square statistic applicable in statistical analysis (4mks)

(b) The proprietor of Lowland hospital in Nakuru Town is concerned about the loss of customers to his hospital. He has clandestine information that most patients prefer Highland hospital as opposed to his. He decided to contract a private researcher who sent out 200 questionnaires to the patients and received the following information:

<u>Reasons for preference</u>	<u>highland hospital</u>	<u>lowland hospital</u>
Location	32	8
Quality of service	12	2
Cleanliness	13	3
Personal attention	56	35
Staff qualifications	11	13
Staff appearance	6	9

- (i) determine the expected sample results (4mks)
- (ii) calculate the chi-square statistic (4mks)
- (iii) determine the degrees of freedom (3mks)
- (iv) Assuming that the researcher permits a 5% chance of incorrectly concluding that the reasons given for hospital preference are related to the choice of the hospital when this is not the case, test the relevant hypothesis of independence (3mks)
- (c) Why do we find it necessary to incorporate the error term in a statistical model (2mks)

5. (a) Explain the following probability distributions

- (i) Binomial distribution (3mks)
- (ii) Sampling distribution of the mean (3mks)

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

No. of cars sold	Probability
0	0.10

1	0.30
2	0.30
3	0.15
4	0.15

- (i) What kind of distribution is this? Give reasons (3mks)
- (ii) How many cars does this sales lady sell on a typical day? (3mks)
- (iii) What is the variance and standard deviation of the sales? (4mks)
- (c) Write short notes on Poisson distribution (4mks)