

KABARAK



UNIVERSITY

EXAMINATIONS

2008/2009 ACADEMIC YEAR

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN
ECONOMICS AND MATHEMATICS**

COURSE CODE: BMGT 220/ECON 222

COURSE TITLE: BUSINESS STATISTICS II

STREAM: Y2S2

DAY: FRIDAY

TIME: 2.00 – 4.00 P.M.

DATE: 20/03/2009

INSTRUCTIONS:

- Question ONE is compulsory. Answer three questions in total.
- Question one carries 30 marks while other questions carry 20 marks each.
- Illustrate where possible.

PLEASE TURN OVER

QUESTION ONE

- a) Explain the meaning of the following concepts
- i) Expected value (2mks)
 - ii) Hypothesis (2mks)
 - iii) Significance level (2mks)
 - iv) Type I error (2mks)
- b) A man wishes to insure his house against fire. The value of the house is assessed to be Ksh. 600,000. The annual premium which he must pay to insure this house is Ksh. 600. If the probability that fire will destroy his house is $\frac{1}{10,000}$;
- i) What is his expected value? (4mks)
 - ii) Is this a fair insurance contract? (2mks)
- c) i) What is combination? (2mks)
- ii) The marketing department has been given the assignment of designing colour codes for the 42 different lines of compact discs sold by MATATA records. Three colours are to be used on each CD. A combination of three colours used for the CD cannot be rearranged and used to identify a different CD. Would seven colours taken three at a time be adequate to colour code the 42 lines? (4mks)
- d) Given the following data on sales of cars by a salesman:
- | <u>No. of cars sold</u> | <u>Probability</u> |
|-------------------------|--------------------|
| 0 | 0.1 |
| 1 | 0.3 |
| 2 | 0.3 |
| 3 | 0.2 |
| 4 | 0.1 |
- i) What type of distribution is this? (2mks)
 - ii) On a typical day how many cars does this salesman expect to sell? (3mks)
 - iii) What is the variance of this distribution? (3mks)
- e) What is the role of a random/error term in a statistical model? (2mks)

QUESTION TWO

- a) i) Explain when the Z-statistic is applicable. (3mks)
- ii) The time taken by a number of typists to complete a certain assignment is normally distribution with mean of 300 minutes and standard deviation of 60 minutes. What is the probability that the selected typists take more than 180 minutes to complete the assignment? (4mks)
- b) Consider that you have five products to market. The new year approach is to market all products taking three at each promotional tour to minimize costs of marketing. Suppose you are provided with the following information.

<u>Product</u>	<u>Cost (Ksh.)</u>
A	2,000
B	3,000
C	3,000
D	4,000
E	1,000

- i) Generate the number of combinations (samples) (2mks)
- ii) Generate the samples and their corresponding means (4mks)
- iii) Generate the sampling distribution of the sample mean. (2mks)
- iv) Find the expected value (2mks)
- c) Explain the central Limit Theorem (3mks)

QUESTION THREE

- a) Explain the various steps involved in hypothesis testing (10mks)
- b) The manager of Barclays Bank in Nakuru thinks that customers who operate current accounts save on average as much as customers who operate savings accounts. He sets out to establish the validity of his belief. A first random sample of 200 customers who operate current accounts is taken and its mean is found to be 840. In another sample of 160 customers operating savings accounts had mean of 800. Assuming that the respective standard deviations were 70 and 70, determine if there is any difference between the two categories of account operators. (7mks)
- c) Explain the characteristics of the t-distribution (3mks)

QUESTION FOUR

- a) Explain the characteristics of the chi-square distribution (3mks)
- b) When is the chi-square statistic applicable in statistical analysis? (3mks)
- c) The proprietor of Ukwala supermarket in Nakuru town is concerned about the loss of customers to his store. He got underground information that most customers are preferring stagematt supermarket to his. He then contracted a private investigator who sent out 200 questionnaires to the customers and gathered the following information:

<u>Reasons for preference</u>	<u>Stagematt</u>	<u>Ukwala</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. (3mks)
- ii) Calculate the chi-square statistic (6mks)
- iii) Determine the degrees of freedom. (1mk)
- iv) Assuming that the researcher permits a 10% chance of error, test whether the reasons given do indeed affect preference. (4mks)

QUESTION FIVE

- a) i) What is correlation? (2mks)
- ii) A random sample of five college students is selected and their grades in theory and statistics are as follows:

<u>Theory</u>	<u>Statistics</u>
85	93
60	75
73	65
40	50
90	80

- Calculate and interpret the rank correlation coefficient (5mks)
- iii) Explain any three weaknesses of correlation analysis (3mks)
- b) i) What is regression? (2mks)
- ii) Suppose you are provided with the following information derived from the analysis of 27 consumers of a certain commodity,
- | | |
|---|--|
| $Y_t = 5 - 2.4X_1 + 2X_2$ $\text{Se } (4.201) (0.601) (1.980)$ $R^2 = 0.82$ | $Y_t =$ quantity demanded
$X_1 =$ price of the good
$X_2 =$ incomes of consumers
$\text{Se} =$ standard error |
|---|--|
- Interpret the coefficients and R^2 and test for the significance of the price coefficient following the law of demand (8mks)