KABARAK   **UNIVERSITY**

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

COURSE CODE: **BMGT 220**

COURSE TITLE: **BUSINESS STATISTIC II**

STREAM: **Y2S2**

DAY: **TUESDAY**

TIME: **2:00 – 4:00 P.M.**

DATE: **16/03/2010**

INSTRUCTIONS:
1.) Question <u>ONE</u> is compulsory. Answer THREE questions in total.
2.) Question one carries 30 marks while other questions carry 20 marks each.
3.) Illustrate where possible.
4.) Time allowed 2 hours

PLEASE TURNOVER

QUESTION 1

(a) Distinguish between the following:
    i.) Standard normal distribution and t-distribution (3 marks).
    ii.) Chi-square distribution and F-distribution (3 marks).
    iii.) Null hypothesis and alternative hypothesis (3 marks).

(b) Suppose we have a firm that is engaged in two lines of production. Factory X produces regular margarine and factory Y produces premium margarine. Past performance shows that mean monthly production of X is 130,000kgs with a standard deviation of 10,000kgs while Y has mean of 50,000kgs and a standard deviation of 5,000kgs. Assuming in June 2007, the production manager reports 150,000kgs production in X and 62,500kgs production in Y, which factory was managed more efficiently? (5 marks)

(c) The daily wages of 1500 workers are normally distributed with mean wage of ksh.600 and wages standard deviation of ksh.30. Estimate the number of workers whose weekly wages are:-
    (i) Between 590 and 630 (3 marks)
    (ii) Less than 550 (3 marks)

(d) Kenya Pharmacy limited has been selling a drug in the Kenyan market and claims that the drug relieves fever for 64% cases. A test on a random sample of 400 patients showed that the fever was relieved in 260 cases. By testing the hypothesis, check if the company's claim can be validated at 1% level of significance?(6 marks)

(e) Distinguish between a mathematical model and a statistical model (4 marks)

QUESTION 2

(a) Describe the various steps involved in testing hypothesis (5 marks)

(b) (i) Distinguish between significance level and confidence level (4 marks)

    (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. (7 marks).

(c) Explain what you understand by the following concepts
    i.) Permutation (2 marks)
    ii.) Combination (2 marks)

QUESTION 3

(a) (i) What do you understand by the sampling distribution of the mean? (2 marks)

  (ii) A manager has six workers whose job experiences are: 2, 4, 6, 6, 7 and 8. Four of the workers are chosen randomly for different shifts and their averages of experience taken. Determine the sampling distribution of the mean (9 marks).

(b) (i) What do you understand by the Poisson distribution? (2 marks)

  (ii) Customers arrive randomly at a department store at an average rate of 3.4 per minute. Assuming the customer arrivals form a Poisson distribution, calculate the probability that:

     i)   No customers arrive in any particulate minute (3 marks)

     ii)   Exactly one customer arrives in any particular minute (2 marks).

     iii)   Two or more customers arrive in any particular minute (2 marks).

QUESTION 4

a) (i) When is the chi-square statistic applicable in statistical analysis (4 marks)

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

Reasons for preference	Highland hospital	Lowland hospital
Location	32	8
Quality of service	12	2
Personal attention	56	35

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. (9 marks).

(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:

    Ksh. $135 < \mu < $ Ksh. 155

Calculate the values of standard deviation, s, and mean, $\bar{X}$, used to construct this confidence interval. (7 marks).

QUESTION 5

(a) Distinguish between correlation and regression. (3 marks)

(b) The managers of a company with ten operating plants of similar size producing small components have observed the following pattern of expenditure on inspection and defective parts delivered to the customer:

Inspection expenditure Per 1000 units (Ksh.)	Defective parts per 1000 units delivered
25	50
30	35
15	60
75	15
40	46
65	20
45	28
24	45
35	42
70	22

    (i)   Calculate and interpret the Pearson's (product moment) correlation coefficient (r) for this relationship. (6 marks)

    (ii)   Explain the weaknesses of this measure. (3 marks)

(c) A demand function of the form below is estimated from a sample of size 27.

$$Q_{dx} = 20.00 + 2.00Y + 1.20A - 3.00P_o - 5.75P_x$$

  S.e. (19.20) (0.60)   (1.10) (1.02) (1.50)

    where,

        Q_{dx} = Quantity demanded of good X

        Y = Incomes of the consumers P_o = Price of a substitute/complement

        P_x = Price of good X   A = Advertising expenditure

    (i)   Interpret the coefficients of the model (4 marks)

    (ii)   Are the results consistent with theory? (4 marks)