THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

SEPTEMBER – DECEMBER 2019 TRIMESTER

SCHOOL OF BUSINESS

DEPARTMENT OF ACCOUNTING AND FINANCE

REGULAR PROGRAMME

CMS 311: BUSINESS STATISTICS

Date: DECEMBER 2019	Duration: 2 Hours
INSTRUCTIONS: Answer Question ONE and any other TWO Questions	

Q1   a)   Write brief notes on the following concepts in inferential statistical analysis:
   (i)   A random variable, x, and the probability distribution of a random variable, x.   **(2 marks)**
   (ii)   Two reasons where sampling is undertaken in statistical analysis   **(2 marks)**
   (iii)   A point versus an interval estimate of a population mean   **(2 marks)**
   (iv)   A hypothesis versus hypothesis testing   **(2 marks)**

   b)   The Tyre East Africa Ltd. shares were selling at about Sh. 35 per share at the end of January, 2019. An investor, Miss Muka plans to buy these shares and hold the stock for 1 year. From past records of over 100 stocks, the probability distribution indicating the price of the stock after 1 year is :

Price of stock (Sh.)	Probability distribution
35	0.35
36	0.25
37	0.25
38	0.10
39	0.05

Required:

(i) What are the chances that the Tyre share will be less and more than the expected price of the stock after 1 year?

(6 marks)

(ii) If the expected return on another investment is 5 percent, should Miss Muka go ahead and buy Tyre shares? **(3 marks)**

(iii) Another stock, National Commercial with a similar expected return has a variance of 1.5 units. On the basis of minimizing risk, which stock should Miss Muka invest in?

(3 marks)

c) Records kept by the Kenya Medical Association show that only 30 percent of adult males get an annual medical exam. Dr. Omari, the local cardiologist, consults the records of seven of his patients. What is the probability that he will find:

(i) between two and four inclusive have exams? **(2 marks)**

(ii) at least five have not had exams? **(3 marks)**

d) (i) A production line generates an average of 7.5 units per day. Lisa Lowe, the production supervisor, has contracted to deliver 16 units to an important customer today. What is the probability she can do so?

(2 marks)

(ii) What is the probability that Lisa can deliver the 16 units in two days' time? **(3 marks)**

Q2. a) (i) What two parameters determine the normal distribution's location and shape? **(2 marks)**

(ii) Monthly production costs for a small print shop that you own in Rongai Town have averaged K410 with a standard deviation of £87. The manager of the shop promises you to hold costs below K£300 this month. If costs are normally distributed can you believe the manager? Support your answer.

(4 marks)

(iii.) The manager of the Daily Doo Dry Cleaners that your family owns has learned that if clothes are pressed at temperatures under 115 degrees or above 135 degrees, they are not done properly. The dry cleaners Wrinkle-Free Pants Presser is found to be functioning

improperly. It maintains a mean temperature of 130 degrees, with a standard deviation of 12 degrees. Assuming the temperatures are normally distributed, if 1,000 pants have been pressed, how many will have to be redone? **(4 marks)**

(iv) Happy Hair Saloon that is owned by your aunt will hire only hairdressers in the top 20 percent based on the amount of time taken to perform the task. If the mean time taken to perform this task is 67.5 minutes with a standard deviation of 12.5 minutes, how quickly must Magdalene do the job in order to be hired?
(4 marks)

b) (i) A sampling distribution with $n = 10$ has a mean of $\bar{x} = 105$ and a standard error ($\sigma_{\bar{x}}$) of 10.2. What are the mean and the standard deviation of the population?

(3 marks)

(ii) The manager of a mutual fund claims that his fund has averaged a return of 10.2 percent per year, with a standard deviation of 3.5 percent for his clients over the past several years. If a sample of 90 investors reported a mean rate of return of 9.6 percent, are you inclined to believe the fund manager? Support your answer
(3 marks)

Q3. a) Make a distinction between the following concepts in statistical analysis:
(i) Committing a sampling error versus committing a non-sampling error
(2 marks)
(ii) A n interval estimate of the population means versus the confidence level of the interval estimate **(2 marks)**
(iii) The appropriate distribution to use when estimating the population mean when the population standard deviation is available versus when the sample standard deviation is available **(2 marks)**

b) An accountant wishes to estimate the population mean of accounts receivable. He takes a random sample of 10 accounts receivable and gets the following results in millions of shillings:

6.7, 4.2, 5.7, 8.6, 9.9, 7.0, 7.3, 8.1, 6.8, 5.2.

Required:
(i) Construct a 95% confidence interval estimate of the true (population) mean of the accounts receivable. (Assume the accounts are normally distributed). **(10 marks)**
(ii) If the accountant wants to estimate the population mean to within 0.01 million, with a 95% confidence, how large a sample size should be taken.? (NB. For this part assume that the standard deviation of the sample in part (i) above approximates the population standard deviation) **.**
(4 marks)

Q4 a) Make a distinction between the following terminologies as used as used in the statistical concept of hypothesis testing:
(i) A Null versus an Alternate hypothesis statement
(2 marks)
(ii) Committing a Type I error versus committing a Type II error in hypothesis testing. **(2 marks)**
(iii) A One-Tailed versus a Two-Tailed test of hypothesis
(2 marks)

b) Listed below is the rate of return for one year (reported in percent) for a sample of 12 mutual funds that are classified as taxable money market funds.
4.63, 4.15, 4.76, 4.70, 4.65, 4.52, 4.70, 5.06, 4.42, 4.51. 4.24, 4.52

Required:
Using the .05 significance level, is it reasonable to conclude that the mean rate of return is more than 4.50 percent? Conduct an appropriate and systematic test of hypothesis to answer this question. **(14 marks)**

END