MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS
MAIN EXAMINATION

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATIONS FOR BACHELOR OF SCIENCE ECONOMICS

COURSE CODE: ECO 203

COURSE TITLE: ECONOMIC STATISTICS II

DATE: **WEDNESDAY-14-12-2022**   **TIME: 3:00 -5:00 NOON**

INSTRUCTIONS TO CANDIDATES

Attempt **QUESTION ONE** and **ANY OTHER TWO QUESTIONS**

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

QUESTION ONE

a) Distinguish between the following paired concepts

i) Binomial probability distribution and Poission probability distribution

ii) Regression analysis and Correlation analysis

iii) Chi-square test and F distribution test

iv) General addition rule and General multiplication rule

v) Standard deviation and Standard error   (10 marks @ 2 marks each)

b) The results of a particular examination are given below in a summary form.

Results	percentage of candidates
Passed with distinction	10
Passed without distinction	60
Failed	30

It is known that candidates failed if he obtains less than marks (out of 100), while he must obtain at least 75 marks in order to pass with distinction. Determine the mean and standard deviation of the distribution of marks, assuming this to be normal.   (10 marks)

c) There are 50 firms in the sugar Industry. A Sample of 25 firms is picked at random and 10 of them found to be profitable. Construct a 90 percent confidence interval for the true proportion of profitable firms.   (10 marks)

QUESTION TWO

a) The monthly income of support staff at Sunset Hotel is normally distributed with a mean of Ksh. 500 and standard deviation of Ksh. 20.
   Find:

   i)   The amount of income above which 5% of the support staff fall

   ii) The amount of income below which 40% of the support staff fall

   iii) The amount of income above which 75% of the support staff fall   (10 marks)

b) Forty percent of those persons who retired from an industrial job before the age of 60 would return to work if a suitable job were available. Seventy four (74) persons out of the 200 samples said they would return to work. Investigate this claim at 0.02 level.

   i)   Can the z test be used? Why or why not?

   ii) State the null and alternative hypothesis

   iii) Show the decision rule graphically

   iv) Test the null hypothesis and arrive at a decision   (10 marks)

QUESTION THREE

What is an estimator? Explain the properties of good estimator with the aid of diagrams.
   (20 marks)

QUESTION FOUR

Due to the variability of trade –in- allowances, the profit per new car sold by an automobile dealer ranks from car to car. The profit sale tabulated for the past week was 2.1,3.0,1.2,6.2,4.5, and 5.1 (in hundreds of dollars).

   i)   Find a 90% and 95% confidence interval fro the average profit per sale.

   ii) Using $\alpha = 5\%$, test $\mu = 5\%$ against $\mu \neq 5\%$ (20 marks)

QUESTION FIVE

a) Cellulon a manufacturer of new type of home insulation, wants to develop guidelines for buildersand consumers regarding the effects (1) of the thickness of the insulation in the attic of a home and (2) of the out door temperatures on the natural gas consumption. In the laboratory they varied the insulation thickness and temperatures. Based on the sample results, the regression equation is:

$$Y' = 62.65 - 1.86X_1 - 0.52X_2$$

(i) How much natural gas can homeowners expect to use per month if (1) they install 6 inches of insulation and (2) the outdoor temperature is 40 degree F? (4 marks)

(ii) What effect would installing 7 inches of insulation instead of 6 have on the monthly natural gas consumption (assuming the outdoor temperature remains at 40 degrees F) (4 marks)

(iii) Why are the regression coefficients β_1 and β_2 negative? Is this logical? (4 marks)

b) Outline the procedure of chi-square goodness of fit test   (4 marks)

c) State the assumption underlying ANOVA test   (4 marks)