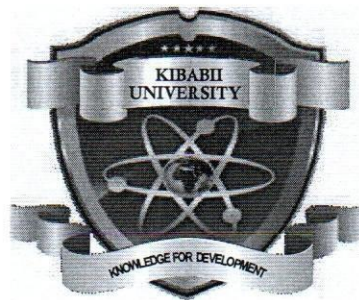


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UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: BCO 323

COURSE TITLE: MANAGERIAL STATISTICS

DATE: 18TH MAY, 2022

TIME: 9.00AM – 11.00AM

1. Answer Question One in Section A and Any other TWO (2) Questions in Section B
2. Question one carries 30marks and each of the other two questions carry 20 marks each.

QUESTION ONE (COMPULSORY)

- a) Find the area under the normal curve of the following. Using the z-table, sketch the graph of each item below.
- a. between $z=0$ and $z=2.25$
 - b. to the right of $z=2.64$ 4 marks
- b) i) According to a study, the mean salary of workers in a factory is shs. 250 per day with standard deviation of shs.10. Assuming that the distribution of salaries is normally distributed, what is the probability that the workers received a salary between shs.245 and shs.275 per day?
- 4 marks
- ii) Assuming that there are 500 workers in the certain company, how many of them received a salary between shs.245 and shs.275 per day? 4 marks
- c) Explain the common features of a normal distribution curve. 5 marks
- d) The record of RL Company showed that the mean lifetime of the light bulbs it manufactures is 600 hours with a standard deviation of 210 hours. Assuming that the lifetime of light bulbs is normally distributed, find the probability that:
A light bulb will have a lifetime between 620 hours and 660 hours 4 marks
- e) Differentiate between type I and type II error 4 marks
- f) State and explain the basic conditions that must be met in order for chi-square analysis to be applied (5 Marks)
- d) KIKO Ltd claims that the boxes of detergent it makes contain more than 500g of detergent. From past experience Management of KIKO Ltd knows that the amount of detergent in the boxes is normally distributed. The firm takes a random sample of $n=25$ and finds that $\bar{x}=520g$ and $s=75g$. Test the firm's claim at the 95% significance level.

QUESTION TWO

Management statistics For a certain joint company, the prices of preference shares (x) and debentures (y) are given below
 X 73.2 85.8 78.9 75.8 77.2 81.2 83.8 y 97.8 99.2 98.8 98.3 98.3 96.7 97.1
Use the method of rank correlation to determine the relationship between preference prices and debentures prices (20 Marks)

QUESTION THREE

The table below shows the results on a hypothetical survey the students' preference to the type of instructional methods used in Kibabii University.

Instructional Preference	Educational Level			
		Undergraduate	Graduate	Total
Online	Observed	20	35	55 (55%)
	Expected	33	22	
Face to face	Observed	40	5	45 (45%)
	Expected	27	18	
Total		60 (60%)	40 (40%)	100 (100%)

- a) Test the hypothesis at 0.05 significance level that students' preference for instructional methods differ with educational level. (12 marks)
- b) Explain the following terms using a normal distribution curve.
- Null hypothesis
 - Critical value
 - Acceptance region
 - Standard error
- (8 marks)

QUESTION FOUR

Suppose that a firm wants to test whether it can claim that the light bulbs it manufactures last 1000 burning hours. The firm takes a random sample $n=100$ of its light bulbs and finds that the sample mean $\bar{x} = 980$ hours and the sample standard deviation is 80 hours at 95% significant level.

Required:

- State the null and the alternative hypotheses. 2 marks
- Test the claim at the 95% level of significance 14 marks
- Explain the difference between a one tailed and a two tailed test. 4 marks

QUESTION FIVE

The following two-sample t -test was generated for the AUTO83B.DAT data set. The data set contains miles per gallon for U.S. cars (sample 1) and for Japanese cars (sample 2); the summary statistics for each sample are shown below.

SAMPLE 1:

NUMBER OF OBSERVATIONS = 249
 MEAN = 20.14458
 STANDARD DEVIATION = 6.41470
 STANDARD ERROR OF THE MEAN = 0.40652

SAMPLE 2:

NUMBER OF OBSERVATIONS = 79
 MEAN = 30.48101
 STANDARD DEVIATION = 6.10771
 STANDARD ERROR OF THE MEAN = 0.68717

- a) Using the t -test statistic below, test the hypothesis that the population means are different for the two types of cars. (10 marks)

$$T = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

- b) Using examples explain why statisticians prefer using samples to study the population. (10 marks)