



MACHAKOS UNIVERSITY

University Examinations 2020/2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 191- INTRODUCTION TO STATISTICS FOR INFORMATION TECHNOLOGY

DATE: 16/6/2021

TIME: 8.30-10.30 AM

INSTRUCTIONS:

Answer question ONE and any other TWO questions

QUESTION ONE (30 MARKS) COMPULSORY

- a) Explain the meaning of the following terms as applied in Statistics
- i. Population
 - ii. Sample
 - iii. Variable (6 marks)
- b) Differentiate between EACH of the following terms:
- i. Discrete and continuous variable (2 marks)
 - ii. Point and interval estimation (2 marks)
- c) The table below shows goals scored by teams in a competition

Goals scored	1	3	4	5	6
Frequency	6	10	25	11	2

- Calculate the mean and standard deviation (6 marks)
- d) In a random sample of 64 customers in a computer service company, the mean waiting time for being served is 3 minutes with a standard deviation of 1.5 minutes. Construct a 99% confidence interval for the average waiting time in the company. (5 marks)

- e) A set of cards, identical in size and shape, is numbered 1 to 15 inclusive. A card is drawn at random from the pack and its number n is noted

A is the event: n is prime

B is the event: $n \leq 10$

Calculate

- i. $P(A)$
- ii. $P(B)$
- iii. $P(A \cap B)$ (4 marks)

- f) Determine the values of a, b, c, d, e from the following ANOVA Table (5 marks)

	Sum of Squares	Degrees of Freedom	Mean Squares	F-Ration
Factor	354.67	b	c	e
Error	a	9	d	
Total	676.67	11		

QUESTION TWO (20 MARKS)

- a) Explain the meaning of the following sampling techniques:-

- i. Simple Random sampling
- ii. Stratified sampling
- iii. Judgmental sampling
- iv. Cluster sampling (8 marks)

- b) The table below shows marks scored by students in a statistics examination

Class	40-44	45-49	50-54	55-59	60-64
Frequency	6	10	25	11	2

Calculate the quartile deviation (12 marks)

QUESTION THREE (20 MARKS)

- a) A company has a computer system that can process 1200 bills per hour. A new system is installed that can process an average of 1260 bills per hour with a standard deviation of 215 bills in a sample of 40 hour. Test if the new system is significantly better than the old one at the 5% level of significance. (8 marks)

- b) The following are the speeds, in miles per, of a group of cars on a high-way as measured with radar gun

58,62,59,53,61,55,57,54,59,53,66,60,58,60,61,58,56,60,58,62,57,55,53,55,61,57,52,58,49,54,52,55,57,60,64,67.

- i. Construct a frequency distribution table with class interval by 45-49,...etc
(6 marks)
- ii. use the table in b
 - I. above to calculate
 - II. the mode
(3 marks)
 - III. the median
(3 marks)

QUESTION FOUR (20 MARKS)

- a) A small company is interested in analyzing the effects of advertising on its sales. Over a 5-month period the results are as follows

Money spend on advertising (sh. 000')	Total sales (sh. '000')
5	6
8	15
10	20
15	30
22	39

Calculate the correlation coefficient between sales and advertising. (8 marks)

- b) Given the following set of data, construct the analysis of variance (ANOVA) table
(12 marks)

A	B	C
15	18	6
10	20	15
15	22	10

QUESTION FIVE (20 MARKS)

- a) Explain the meaning of each of the following terms as used in probability theory.
- i. Random experiment
 - ii. An event
 - iii. Mutually exclusive events
 - iv. Independent events.
(8 marks)

- b) A survey is conducted among workers in a certain city to determine if there is any difference between proportions of women, men who drive, take a bus, or take a train to work. The results are as shown below:

	Drive	Bus	Train
women	25	100	125
men	75	120	205

- i. Construct the corresponding cross-tabular contingency table for the expected frequencies. (6 marks)
- ii. Determine the value of the chi-square statistic (6 marks)