MACHAKOS UNIVERSITY

University Examinations 2020/2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST YEAR SPECIAL/SUPPLEMENTARY 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 is ≤ 10

Calculate

i. P(A)

ii. P(B)

iii. $P(A \wedge B)$ (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)