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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR
SECOND YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(BUSINESS ADMINISTRATION)

Date: 1st August 2022
Time: 2.30pm –4.30pm

KBA 203 - STATISTICS FOR MANAGEMENT

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Briefly explain four components of time series. (4 marks)
- b) The data points are given by
17, 15, 28, 35, 27, 47, 55, 15, 22, 27, 11, 9, 20, 15
Estimate the
i) Mean. (1 mark)
ii) Mode. (1 mark)
iii) Median. (2 marks)
iv) 7th decile. (2 marks)
- c) There are 3 red, 5 black and 4 white marbles in a box. Two marbles are drawn, one at a time and without replacement. What is the probability of selecting marbles are of same colour. (3 marks)

- d) The probability distribution of a random variable X is given by

x	0	1	2	3	4
P(X = x)	0.1	0.3	0.4	0.15	0.05

Find

- i) Expected value of X. (3 marks)
ii) Variance of X. (3 marks)
- e) In ABC insurance company, any contracted person must bring in at least an average 30 new customers each month during a 12 months contract period for the contract to be renewed for another year. During this 12-month period, Jane managed to convince 25, 27, 35, 23, 40, 22, 20, 28, 15, 26, 32 and 27 customers to take any of the policy sold by the insurance firm. Can we say that Jane was significantly below the terms and thus her contract should not be renewed? Test the appropriate hypothesis at 5% level of significance.

(6 marks)

- f) The table below shows the prices of four items for the current and the base year.

items	Base year		Current year	
	Price	quantity	Price	quantity
Sugar	1	6	5	8
Salt	2	7	4	7
Flour	3	8	3	6
soap	4	9	2	5

Laspeyre's method to calculate the index for the current year.

(5 marks)

QUESTION TWO (20 MARKS)

- a) The price and the quantity demanded for a product for seven days are as shown in the following table.

Price (X)	50	55	65	57	45	70	60
Quantity (Y)	100	90	80	85	110	75	90

Determine;

- A simple regression model relating the quantity demanded to the price of the commodity. (6 marks)
 - Predict the quantity demanded when the price is 80. (2 marks)
 - The Pearson's correlation coefficient, hence interpret the results. (5 marks)
 - What percentage of quality demanded is determined by the price? (2 marks)
- b) The expenditure and income data for nine individuals are as follows:

Expenditure:	35	20	47	23	10	43	9	6	28
Income:	40	33	50	23	8	49	12	4	31

Compute the Spearman's correlation coefficient and comment on it.

(5 marks)

QUESTION THREE (20 MARKS)

- a) The data on a certain variable are given in the frequency distribution

Class	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89
Frequency	2	7	12	17	10	8	3	1

Estimate;

- Mode. (2 marks)
- Median. (3 marks)
- Interquartile range. (3 marks)
- Mean. (3 marks)
- Standard deviation. (3 marks)

- b) In a company, there are three Machines A, B and C in the production line. In each day's output, Machines A, and B produces 60% and 30% of items respectively, while Machine C produces the remaining percentage. Out of the output, the past experience has shown that 2%, 3% and 5% of the items produced by Machines A, B and C respectively do not meet the required standards. Suppose an item picked from the production line is defective, what is the probability that it was produced by Machine B? (6 marks)

QUESTION FOUR (20 MARKS)

- a) The number of emails received by an organization is said to have a Poisson distribution with parameter $\lambda = 3$ per hour. Determine the probability that:
- Two emails are received in an hour. (3 marks)
 - At least three emails are received in three hours. (3 marks)
- b) Suppose a Player play a game that she has 0.65 chances of winning. Let X be the number of games she wins out of 20 games played.
- Write the probability distribution of X. (2 marks)
 - What is the probability that she wins between 15 to 18 games inclusive? (3 marks)
- c) In a certain suburb, income of its residence is normally distributed with mean of \$5000 and standard deviation of \$2500. A person earning between \$4000 and \$7000 are regarded to be middle-income earners while those earning below \$2000 are regarded as under abject poverty. Of 10,000 members in the suburb, how many individuals would you expect to be;
- Middle-income earners. (3 marks)
 - Under abject poverty. (3 marks)
 - What is the minimum wage that one should get in order to be regarded as high-income earner if 3% of the population is in this category? (3 marks)

QUESTION FIVE (20 MARKS)

- a) Highlight four roles of time series? (4 marks)
- b) The table below shows sales of EFG company over a period of nine years

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sales (Millions)	57	60	75	80	100	130	120	140	170

- Use the method of least squares to obtain the trendline for the data. (6 marks)
 - Forecast the sales for the year 2022. (2 marks)
 - Plot the line graph for the data together with the trendline determined in (i). (3 marks)
- c) Income of a sample of 7 individuals of taken from a population are as follows; 10000, 15000, 7000, 45000, 20000, 3000, 5000. Compute 95% confidence interval for the true population mean. (5 marks)