Strathmore
UNIVERSITY

STRATHMORE BUSINESS SCHOOL
BACHELOR OF SCIENCE IN SUPPLY CHAIN AND OPERATIONS MANAGEMENT
END OF SEMESTER EXAMINATION

MAT 2103: STATISTICS FOR MANAGEMENT

DATE: 1st August, 2022 **TIME:** 2 Hours

INSTRUCTIONS:

1. **Answer question 1 Compulsory and any other two questions.**
2. **Show all your workings clearly in the answer sheet**

QUESTION ONE – 30 MARKS

a. Define the following terms as used in Statistics for management **[2 marks]**
   i. Primary data
   ii. Caption
b. Distinguish between the following terms: **[8 marks]**
   i. Ordinal and nominal scale of measurement
   ii. Statistic and parameter
   iii. Cluster and stratified sampling methods
   iv. Seasonal and cyclic components of time series
c. Which measure of central tendency has the sum of deviations of individual observations from it as zero? **[1 mark]**
d. Determine the coefficient of skewness in a symmetrical distribution? **[1 mark]**
e. Estimate the geometric mean of 8 and 18? **[2 marks]**
f. What would be the coefficient of variation for a distribution whose mean is 79 and variance is 69. **[2 marks]**

g. Determine the coefficient of quartile deviation given that the lower quartile is 30 and the upper quartile is 50 for the distribution. **[2 marks]**

h. The standard deviation of a symmetrical distribution is 3. What must be the value of the fourth moment about the mean in order that the distribution is mesokurtic? **[2 marks]**

i. The mean age of a combined group of men and women is 30years. If the mean age of men is 32 and that of women is 25, find out the percentage of women in the group. **[3 marks]**

j. For a group of 20 items, $\sum X = 1452$, $\sum X^2 = 144280$ and mode $= 63.7$. Find the Pearsonian coefficient of skewness. **[3 marks]**

k. A petroleum company exploring for oil has decided to drill two wells, one after the other. The probability of striking oil in the first well is 0.2. Given that the first attempt is successful, the probability of striking oil on the second attempt is 0.8. What is the probability of striking oil in both wells? **[2 marks]**

l. Othuol travelled some distance by cycling at a speed of 15km. per hour. On return journey he travelled the same distance at a speed of 10km. per hour. What was his average speed per hour? **[2 marks]**

QUESTION TWO – 20 MARKS

a. Define and briefly discuss the main features of:
   i. Mean **[3 marks]**
   ii. Median and **[3 marks]**
   iii. Mode of a frequency distribution. **[3 marks]**

b. The mean of 5 observations is 4.4 and the variance is 8.24. If three of the five observations are 1, 2 and 6, find the other two. **[7 marks]**

c. In a study of job satisfaction, a series of tests was administered to 50 participants. The following data were obtained: higher scores represent greater dissatisfaction.

87	76	67	58	92	59	41	50	90	75
80	81	70	73	69	61	88	46	85	97
50	47	81	87	75	60	65	92	77	71
70	74	53	43	61	89	84	83	70	46
84	76	78	64	69	76	78	67	74	64

Construct a Stem-and-leaf diagram and comment on the shape of the distribution. **[4 marks]**

QUESTION THREE – 20 MARKS

a. Define coefficient of skewness and sketch simple diagrams to illustrate:
   i. Positive skewness
   ii. Negative skewness
   iii. Symmetric skewness.

   Showing clearly the positions of the mean, mode and the median in each case **[8 marks]**

b. The daily expenditure of 100 families is given below:

Daily Expenditure	$0-20$	$20-40$	$40-60$	$60-80$	$80-100$
No. of families	13	–	27	–	16

   If the mode of the distribution is 44, calculate Karl Pearson's coefficient of skewness.

[12 marks]

QUESTION FOUR – 20 MARKS

The manager of a company is preparing revenue plans for the last quarter of 2013/2014 and for the first three quarters of 2014/2015. The data below refer to one of the main products:

Revenue	**April – June**	**July – Sept**	**Oct – Dec**	**Jan – March**
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**
£'000	**£'000**	**£'000**	**£'000**	**£'000**
2010/2011	49	37	58	67
2011/2012	50	38	59	68
2012/2013	51	40	60	70
2013/2014	50	42	61	–

a. Calculate the four-quarterly moving average trend for this set of data. **[10 marks]**
b. Calculate the seasonal factors using either the additive model or the multiplicative model, but not both. **[7 marks]**
c. Explain, but do not calculate how you would use the results in parts (a) and (b) of this question to forecast the revenue for the last quarter of 2013/2014 and for the first three quarters of 2014/2015. **[3 marks]**

QUESTION FIVE – 20 MARKS

a. Define a measure of variation and state four relative measures of variation. **[3 marks]**

b. State six properties of a good average. **[3 marks]**

c. Compare the variability in the following two data sets using the coefficient variation

Data set 1	40	45	16	9	21	37	38	22	2
Data set 2	9	11	12	14	15	18	19	10	7

[14 marks]