



INSTITUTE OF HUMAN RESOURCE ADVANCEMENT
UNIVERSITY OF COLOMBO, SRI LANKA
Masters Degree in Business Management - Course No.01
2nd Semester Examination
(Held in July, 2013)
MBM 08 – Statistics for Management

Instructions to the Candidates

- (1) Total number of pages – Four (04)
- (2) Total number of questions - Six (06)
- (3) Answer any Five (05) questions.
- (4) If a page or a part of this question paper is not printed, please inform the Supervisor immediately.
- (5) Time allocated for the examination is three (03) hours.
- (6) Write your index number in all pages of answer script.
- (7) Tie up all answer sheets at the end of the examination.
- (8) Standard Normal Table and student table and formula sheet are provided at the end of the Question Paper.

1. Statistics is a scientific subject with tools and techniques used in decision making in business.

- i. Describe the difference between Descriptive and Inferential Statistics? (02 Marks)
 - ii. Briefly explain Continuous and Discrete variables with examples. (04 Marks)
 - iii. What approaches are used in decision making? (02 Marks)
 - iv. Why samples are important in management studies?. (04 Marks)
 - v. Describe the basic sources of data. (04 Marks)
 - vi. Briefly explain the stratified sampling and Random sampling with examples. (04 Marks)
- (Total 20 marks)**

2. Number of complaints brought to the management by customers during the last fifty days has been provided in the following frequency Distribution.

Complaints	No. of days
20-29	5
30-39	8
40-49	15
50-59	7
60-69	8
70-79	<u>7</u>
	50

Calculate and interpret the

- i. Mean
- ii. Median
- iii. Mode
- iv. Variance and Standard deviation
- v. Coefficient of variance

(Total 05 x 04 = 20 marks)

3. i. How can you use Regression Models and Correlation in business decisions making?

(04 Marks)

- ii. "Sisiraand Company" expects to estimate an equation for the number of units produced per hour. The company provides annual information on the wage per hour, number of employees and the number of units produced per hour for the last 10 years.

Wage per hour (Rs.)	No. of Employees	Number of units per hour
40	20	20
42	22	25
39	18	19
38	18	18
40	19	20
41	20	20
43	22	22
40	21	20
37	18	18
42	21	20

- a. Construct a Multiple Regression Model to represent the given data.

(06 Marks)

- b. What would be the expected number of units produced per hour, if the wage per hour is Rs.50 and No. of employees are 20?

(02 Marks)

- c. Identify and interpret the relationship between wage per hour and number of units produced per hour.

(04 Marks)

- d. Is there a Multicollinearity problem?

(04 Marks)

(Total 20 marks)

4. i. Briefly describe the Components of Time Series. (04 Marks)
- ii. Explain the difference between Additive and Multiplicative Time Series Models. (02 Marks)
- iii. The profit of a business has been provided for three years on quarterly basis.

Year	Quarter	Income (Rs. Mn)
1	Q1	11
	Q2	13
	Q3	15
	Q4	09
2	Q1	12
	Q2	15
	Q3	18
	Q4	11
3	Q1	13
	Q2	16
	Q3	17
	Q4	12

- a. Calculate the trend line using Least Square Method (LSM). (06 Marks)
- b. Derive Seasonal Indices for quarters. (04 Marks)
- c. Obtain deseasonalized data. (04 Marks)

(Total 20 marks)

5. i. Describe expected and sample estimators with examples in business. (02 Marks)
- ii. Why Law of Statistical Regularity and Law of Inertia are important in decision making. (04 Marks)
- iii. Briefly describe the acceptance and rejection regions in hypothesis testing. (02 Marks)

iv. What is meant by Significance of a test?

(02 Marks)

v. It is expected that minimum weight of a product is 60kg. When a sample of size 80 is tested the average weight is 58.5kg with a standard deviation of 5kg. Using 95% level of confidence, test the expectation.

(04 Marks)

vi. Two companies say that there is no difference between the weights of their products. A sample of size 12 selected from the first company has an average weight of 40kg with a standard deviation of 4kg while a sample of size 16 selected from the second company has an average weight of 36kg with a standard deviation of 2kg. Test the above statement at 5% level of significance.

(06 Marks)

(Total 20 marks)

6. Write short notes on the followings.

- i. Dichotomous and Multi options questions.
- ii. Random and Non random sampling.
- iii. Multicollinearity.
- iv. Qualitative and quantitative variables.
- v. Statistics in Business.

(Total 04×05=20)

Formula sheet

$$\text{Mean} = A + \frac{\sum fd}{\sum f}$$

$$\text{Median} = L_1 + \left(\frac{\frac{n}{2} - f_i}{f_m} \right) C$$

$$\text{Mode} = L_1 + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2} \right) C$$

$$\text{Percentile} = L_1 + \left(\frac{P \times n - F}{f} \right) C$$

$$\text{Variance} = \frac{\sum fd^2}{\sum f} - \left(\frac{\sum fd}{\sum f} \right)^2$$

$$\text{Coe. Var} = \frac{\sigma}{\bar{x}} \times 100$$

$$\text{Skewness} = \frac{\text{Mean} - \text{Mode}}{\sigma}$$

$$\text{Kurtosis} = \frac{\text{Semi Inter Quartile Range}}{P_{90} - P_{10}}$$

$$\text{Coefficient of Correlation} = \frac{n \sum xy - \sum x \sum y}{\sqrt{(n \sum x^2 - (\sum x)^2)(n \sum y^2 - (\sum y)^2)}}$$

Normal Equations

$$Y = a + b_1 x_1 + b_2 x_2$$

$$\sum y = na + b_1 \sum x_1 + b_2 \sum x_2$$

$$\sum x_1 y = a \sum x_1 + b_1 \sum x_1^2 + b_2 \sum x_1 x_2$$

$$\sum x_2 y = a \sum x_2 + b_1 \sum x_1 x_2 + b_2 \sum x_2^2$$

Least square method for trend

$$T = \bar{Y} + \left(\frac{\sum ty}{\sum t^2} \right) t$$