*S.Prakash, M.Com., MBA., M.Phil.,PGDCA.,(Ph.D).,*
*Assistant Professor in Commerce ,*
*Pavendar Bharathidasan College of Arts and Science.*

# BUSINESS TOOLS FOR DECISION MAKING (THEORY)

## (16CCCCM8)

## B.COM IV SEMESTER

## SECTION – A (2 MARKS)

**1.What is meant by Statistics?**

A branch of knowledge and a body of techniques dealing with numerical statements.

**2.Definition – Statistics:**

According to Spiegel" It is concerned with scientific method for collecting, organizing, summarizing, presenting and analyzing data, as well as drawing valid conclusions and making reasonable decisions on the basis of such analysis".

**3.What are the functions of Statistics?**

Collection, Numerical presentation, Classification and Tabulation, Diagrammatic representation, Reduction of Data, Forecasting, Policy making, Effect measuring and testing hypothesis.

**4.What are the scope of Statistics?**

Statistics, Industry and Commerce, Statistics and Economics.

**5.Define Classification:**

It is the process of arranging data according to the common characteristics possessed by the individual items.

**6.Enumerate the types of Classification:**

Geography, Chronology, Quality and Quantity.

**7.Explain Class frequency:**

The number of values which belong to a class is known as the class frequency or the frequency. Under quantitative classification, 171 is given as the frequency of the class 35 – 49.

**8. Mid – Value:**

Mid – value or midpoint of a class is the average of its lower and upper limits as well as boundaries.

**9.What do you understand Tabulation?**

A Statistical Table is a systematic arrangement of data in columns and rows. Classified data are presented in tabulate form.

**10.What are the parts to be involved in a Good Table?**

Identification Number, Title, Head note, Stubs, Captions, Body of the Table, Foot Notes and Source.

**11.Explain the Diagrams and Charts:**

One of the most effective and interesting alternative way in which a statistical data may be presented is through diagrams and graphs. There are several ways in which statistical data may be displayed pictorially such as different types of graphs and diagrams.

**12.What are the types of Diagrams?**

One dimensional Diagrams – Bar Diagrams Two dimensional Diagrams – Rectangles, squares and Circles including Pie diagram Three dimensional diagrams – Cubes Pictograms and Cartograms.

**13.Discuss Graphs:**

One goal of statistics is to present data in a meaningful way. It's one thing to see a list of data on a page, it's another to understand the trends and details of the data.

**14.What is the meaning of Measures of Central Tendency?**

Measures of central tendency which are also known as averages, gives a single value which represents the entire set of data. The set of data may have equal or unequal values. Measures of central tendency are also known as "Measures of Location".

**15.Definition - Measures of Central Tendency:**

"An average is a value which is typical or representative of a set of data" - Murray R.Speiegel.

**16.What are the different kind of Measures of Central Tendency?**

a) Arithmetic Mean
b) Median
c) Mode
d) Geometric Mean
e) Harmonic Mean

**17. What is meant by Arithmetic Mean?**

It is the total of the values of the items divided by their number. A.M is the abbreviation X is the symbol for arithmetic mean. The terms 'Mean' and 'Average' also refer to arithmetic mean.

**18. Explain Weighted Arithmetic Mean:**

All values do not carry equal importance. Hence, values have different weight age and arithmetic mean is calculated on the basis of their relative importance.

**19. Define Median:**

It is the value of the middle most item when all the items are in order of Magnitude. M denotes Median.

**20. What is meant by Mode?**

It is the value which has the greatest frequency density. Z denotes Mode.

**21. Expand and Explain G.M:**

Geometric Mean is the appropriate root (corresponding to the number of items) of the product of the values of the items.

**22. Explain H.M:**

Harmonic Mean is the reciprocal of the mean of reciprocals of the values of the items.

**23. What is meant by Measure of Dispersion**?

Measures of Dispersion in particular help in finding out the variability or Dispersion/Scatteredness of individual items in a given distribution. The variability (Dispersion or Scatteredness) of the data may be known with reference to the central value (Common Average) or any arbitrary value or with reference to other values in the distribution. The mean or even Median and Mode may be same in two or more distribution.

**24. Definition – Measure of dispersion:**

" Dispersion is the measure of variation of the items" - A.L.Bowley. In a group of individual items, all the items are not equal. There is difference or variation among the items. For example, if we observe the marks obtained by a group of students, it could be easily found the difference or variation among the marks.

**25. Discuss Quartiles:**

Quartiles are three in number and are denoted by $Q_1$, $Q_2$ and $Q_3$. Quartiles are positional values. Their role is similar to that of median.

**26. How many parts of the Quartiles:**

**$Q_1$** is the value of an item below which there would be one quarter of the items.

**$Q_2$** is the Median and

**$Q_3$** is the value of an item below which there would be three quarters of the items.

**27. What do you mean by Range? Give the Formula:**

Range is the difference between the largest and the smallest of the values.

Symbollically, Range = L - S

where L = Largest value

S = Smallest value

Co-efficient of Range is given by = L – S / L + S

**28. Explain Deciles:**

Deciles are nine in numbers and are denoted by $D_1$, $D_2$,,$D_3$ and $D_4$. Deciles are positional values, They divided the total frequency into ten equal parts.

**29. What is Percentiles?**

Percentiles are ninety nine in number and are denoted by $P_1$, $P_2$, $P_3$and $P_{99}$.They are intended to divide the total frequency into hundred equal parts.

**30. What are the useful in Percentiles?**

It is a very useful measure in Education and Psychology. Percentile ranks of scores are also calculated, Kelly's measure of skewness is based on Percentiles.

**31. Discuss Quadratic Mean:**

It is a rarely used measure. It is used when there are both positive and negative values. It is greater than arithmetic mean and it gives greater importance to higher values by considering the squares of the values.

**32. Enumerate Moving Average:**

It is one of the most useful measures in estimating trend of a time series. Moving total is divided by the specified number to get the corresponding moving average.

**33. Discuss Progressive Average:**

It is used by many business houses and other establishments to know the average sales, revenue, cost. It facilitates periodical evaluation of performances.

**34. Explain Quartile Deviation:**

It is half of the difference between the first and the third quartiles. Q.D $= Q_3 - Q_1 / 2$

**35. Give the formula for Co-efficient of Quartile Deviation:**

$$\text{Co-efficient of Quartile Deviation} = \frac{Q_3 - Q_1}{Q_3 + Q_1}$$

**36. Define M.D:**

Mean Deviation is the arithmetic mean of the absolute deviations of the values from their arithmetic mean or median or mode.

**37. What do you meant by Standard Deviation?**

Standard Deviation is the root mean square deviation of the values from their arithmetic mean. S.D. is the abbreviation of standard Deviation and it is represented by the symbol □□□read as sigma. The square of standard deviation is called variance denoted by $□□_2$ **.**

**38. Give the formula for Co-efficient of Variation:**

Co-efficient of variation denoted by C.V. and is given by C.V. = $(\frac{□□}{X} \times 100)\%$

**39. What are the observations Of Co-efficient of Variations?**

(i) Co-efficient of variation is a percentage expression, it is used to compare two or more groups.

(ii) The group which has less coefficient of variation is said to be more consistent or more stable, and the group which has more co-efficient of variation is said to be more variable or less consistent.

**40. Explain Skewness:**

Central value of a group of items and their closeness to the central value are considered. The third aspect is known as Skewness.

**41. Definition – Skewness:**

"Skewness is the degree of Asymmetry. Or departure from symmetry of a distribution. (Murray R.Spiegel)

**42. Explain Moments:**

Moments are the mean of various powers of deviations of items. If the deviations are about arithmetic mean. The moments are called as Central Moments.

**43. Discuss Raw Moments:**

The deviations are taken from values other than the A.M. the moments are called as raw moments. These deviations are measured from origin which is Zero.

**44. Definition – Kurtosis:**

Kurtosis in Greek means "Bulginess".(G.Simpson and F.Kafka): Kurtosis is the degree of peakedness of a distribution, usually taken relative to a normal distribution.

**45. Define Correlation:**

It is the degree of relation between two variables. It may also be said as the co-variation between two variables. A correlation between age and height in children is fairly causally transparent, but a correlation between mood and health in people is less so. Does improved mood lead to improved health, or does good health lead to good mood. or both? In other words, a correlation can be taken as evidence for a possible causal relationship, but cannot indicate what the causal relationship,

**46. How should you calculate the values for Correlation?**

The value of r is such that $-1 < r < +1$. The + and – signs are used for positive linear correlations and negative linear correlations, respectively.

**47. Explain Positive correlation:**

If x and y have a strong positive linear correlation, r is close to +1. An r value of exactly +1 indicates a perfect positive fit. Positive values indicate a relationship between x and y variables such that as values for x increases, values for y also increase.

**48. Discuss Negative correlation:**

If x and y have a strong negative linear correlation, r is close to -1. An r value of exactly -1 indicates a perfect

negative fit. Negative values indicate a relationship between x and y such that as values for x increase, values for y decrease.

**49. Elaborate No correlation:**

If there is no linear correlation or a weak linear correlation, r is close to 0. A value near zero means that there is a random, nonlinear relationship between the two variables.

Note : that r is a dimensionless quantity; that is, it does not depend on the units employed.

**50. Explain Perfect Correlation:**

A perfect correlation of ± 1 occurs only when the data points all lie exactly on a straight line. If r = +1, the slope of this line is positive. If r = -1, the slope of this line is negative.

**51. What do you understand by Partial Correlation?**

If a population or data-set is characterized by more than two variables, a partial correlation coefficient measures the strength of dependence between a pair of variables that is not accounted for by the way in which they both change in response to variations in a selected subset of the other variables.

**52. Discuss Bivariate Correlation:**

If a pair (X, Y) of random variables follows a bivariate normal distribution, the conditional mean E(X|Y) is a linear function of Y, and the conditional mean E(Y|X) is a linear function of X. The correlation coefficient r between X and Y, along with the marginal means and variances of X and Y, determines this linear relationship.where E(X) and E(Y) are the expected values of X and Y, respectively, and σx and σy are the standard deviations of X and Y, respectively.

**53. Explain Rank Correlation:**

A rank correlation coefficient can measure that relationship, and the measure of significance of the rank correlation coefficient can show whether the measured relationship is small enough to likely be a coincidence. For example: If there is only one variable, the identity of a college football program, but it is subject to two different poll rankings (say, one by coaches and one by sportswriters).

**54. What are the different symbols of Correlation?**

- Spearman's ρ
- Kendall's τ
- Goodman and Kruskal's γ

**55. Discuss Increasing Rank Correlation:**

An increasing rank correlation coefficient implies increasing agreement between rankings. The coefficient is inside the interval [−1, 1] and assumes the value: 1 if the agreement between the two rankings is perfect; the two rankings are the same. 0 if the rankings are completely independent. −1 if the disagreement between the two rankings is perfect; one ranking is the reverse of the other.

**56. Elaborate Spearman's Rank Correlation:**

Spearman's rank correlation coefficient or Spearman's rho, named after Charles Spearman and often denoted by the Greek letter (rho) or as , is a nonparametric measure of statistical dependence between two variables. It assesses how well the relationship between two variables can be described using a monotonic function. If there are no repeated data values, a perfect Spearman correlation of +1 or −1 occurs when each of the variables is a perfect monotone function of the other.

**57. What is meant by Co-efficient of Correlation?**

This method of studying correlation is the simplest of all he methods. The only thing that is required under this method is to find out the direction of change of X variable and Y variable. The formula applicable is: RC = ± √[± (2 c-)/ n] Where RC stands for coefficient of correlation by the concurrent method; C stands for the number of concurrent deviations or the number of positive signs obtained after multiplying Dx with Dy. N = number of pairs of observations compared.

**58. Explain Regression Analysis:**

Regression analysis is a statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables (or 'predictors'). More specifically, regression

analysis helps one understand how the typical value of the dependent variable (or 'criterion variable') changes when any one of the independent variables is varied, while the other independent variables are held fixed.

**59. What are the models of Regression?**

Regression models involve the following variables: The unknown parameters, denoted as β, which may represent a scalar or a vector. The dependent variable, Y. In various fields of application, different terminologies are used in place of dependent and independent variables. A regression model relates Y to a function of X and β.

**60. What is meant by Linear Regression?**

In linear regression, the model specification is that the dependent variable, is a linear combination of the parameters (but need not be linear in the independent variables).

**61. Enumerate Multiple Linear Regression:**

Multiple linear regression, there are several independent variables or functions of independent variables.

**62. What is meant by Time Series?**

It is a collection of observations made sequentially in time. The series of values are observed at regular intervals of time such as sales, annual profits and decennial census.

**63. Write the Components of Time Series:**

The fluctuations in a time series are found to be of four different natures. They are: Secular Trend, Seasonal Fluctuations, Cyclical Fluctuations and Irregular Variations.

**64. Explain Secular Trend:**

It is also simplified called as Trend. The overall long-term nature of a time series is the trend. It may be increasing one as noticed in population, price, number of automobiles on road and literacy.

**65. Discuss Seasonal Fluctuations:**

Season is a period which is a part of one year. Certain Variations are observed at some seasons and they are found to recur year after year.

**66. What are the causes for the Seasonal Variations?**

Climate and weather conditions Customs, Traditions and habits.

**67. What do you understand Cyclical Fluctuations:**

These are similar to seasonal variations. The difference is in the period/ If changes take place periodically and if the period is more than one year, the variations are said to be cyclical fluctuations.

**68. Define Irregular Variations:**

Variations which are not of the three types namely, trend, seasonal and cyclical are called irregular variations. The causes of some of them are known and are found irregular.

**69. Which methods are used to estimate the Secular Trend?**

Graphic method, Semi-Averages method, Moving Averages method and Method of Least square.

**70. Enumerate Graphic Method:**

It is also known as free – hand method. X axis represents time and Y axis the data. Each pair of time and the observed value is represented a point on a graph sheet.

**71. What is meant by Semi-Averages Method?**

The data is divided into two parts equally and the average of the values of each half together with the mid period is plotted as a point on a graph sheet.

**72. Explain Moving Average Method:**

It is one of the most useful measures in estimating trend of a time series. Moving total is divided by the specified number to get the corresponding moving average.

**73. Discuss Least Square Method:**

A line of best fit is a straight line that is the best approximation of the given set of data. It is used to study the nature of the relation between two variables. A line of best fit can be roughly determined using an eyeball method by drawing a straight line on a scatter plot so that the number of points above the line and below the line is about equal . A more accurate way of finding the line of best fit is the least square method.

**74. Which Model is best for a Least Square Method?**

A statistical technique to determine the line of best fit for a model. The least squares method is specified by an equation with certain parameters to observed data. This method is extensively used in regression analysis and estimation.

**75. What are the principles of Least Squares?**

The Legendr's principles of least square states that the error or the residual sum of squares be least. The parameters (constant) involved in any relation between two variables are determined such that the condition is satisfied.

**76. Discuss Fitting of a Straight Line:**

It is meant that a linear relation of the form Y = a+bX is to be found out on the basis of, n pairs of observed values of X and Y. It is in turn means determining the values of 'a' and 'b'.

**77. Explain Index Numbers:**

It is a statistical measure designed to show changes in a variable or group of related variables with respect to time, geographic location or other characteristic such as income, profession etc.

**78. Definition – Index Numbers:**

According to A.M.Tuttle " It is a single ratio which measures the combined change of several variables between two different times, places or situations."

**79. What are the types of Index Numbers?**

- Price – Index Numbers
- Quantity Index Numbers
- Value – Index Numbers

**80. What are the general problems in the Index Numbers?**

Purpose, Base Period, Items, Price Quotations, Average, Weighting and Formula.

**81. Discuss Simple Index Number:**

A simple index number is a number that measures a relative change in a single variable with respect to a base.

**82. Explain Composite Index Number:**

A composite index number is a number that measures an average relative changes in a group of relative variables with respect to a base.

**83. What is meant by Price index Numbers?**

Price index numbers measure the relative changes in prices of a commodities between two periods. Prices can be either retail or wholesale.

**84. Discuss Quantity Index Numbers:**

These index numbers are considered to measure changes in the physical quantity of goods produced, consumed or sold of an item or a group of items.

**85. Explain Simple Aggregate Method:**

The total of current year prices for various commodities is divided by the corresponding base year price total and multiplying the result by 100.

**86. Discuss Relatives Method:**

The Price relatives P for price index number and the quantity relatives is Q, for quantity index number are calculated and their A.M or G.M.

**87. What is Price Index?**

A price index compares the price of a commodity in a given period of time to the price paid for the commodity at a particular point in time in the past.

**88. Explain Simple Price Index:**

A simple price index tracks the price of a single commodity.

**89. Discuss Aggregate Price Index:**

It tracks the prices for a group of commodities at a given period of time to the price paid for that group of commodities at a particular point in a time in the past.

**90. Elaborate Unit Test:**

It is to be independent of the units in which prices and quantities are quoted. For example Rice and Price.

**91. Discuss Time Reversal Test:**

A test used with index numbers that is satisfied when the new index is the reciprocal of the original index if the functions of the base period and given period are interchanged; the advantage of index numbers meeting the criteria of the test is that a symmetric comparison of the two periods is obtained and the results are consistent whether one or the other period is used as a base.

**92. Explain Factor Reversal Test:**

A test for index numbers in which an index number of quantity, obtained if symbols for price and quantity are interchanged in an index number of price, is multiplied by the original price index to give an index of changes in total value. The factor reversal test requires that multiplying a price index and a volume index of the same type should be equal to the proportionate change in the current values (e.g. the "Fisher Ideal" price and volume indexes satisfy this test, unlike either the Paasche or Laspeyres indexes).

**93. What is meant by Family Budget Method:**

The family budgets of a large number of people are carefully studied and the aggregate expenditure of the average family on various items is estimated. These values are used as weights. Current year's price are converted into price relatives on the basis of base year's prices and these prices relatives are multiplied by the respective values of the commodities, in the base year. The total of these products is divided by the sum of the weights and the resulting figure is the required index numbers.

**94. Discuss Cost of Living Index Numbers:**

Cost-of-living index is a theoretical price index that measures relative cost of living over time or regions. It is an index that measures differences in the price of goods and services, and allows for substitutions with other items as prices vary.

**95. Briefly explain Laspeyres Index:**

- Quantities are from the base period
- Reflects changes in prices alone
- Tends to overestimate price
- Ignores changes in consumption
- Easiest to calculate
- Consumer Price Index-modified

**96. Explain Paasche Method:**

- Quantities are from the given period
- Reflects changes in production consumption
- Tend to underestimate price change
- Weights have to be revised each time period
- Can be costly and time consuming

**97. Elaborate Weight aggregate price index:**

- Weights are from one or more representative periods
- Bureau of Labor Statistics revises weights every 10 years
- Producer Price Index
- Government agencies indicies are publishes in series (impractical to use Paasche)

**98. What are the main steps in Cost of Living Index Number?**

Purpose, Base year, Family Budget enquiry, Prices, Averages and Formula.

**99. Explain Fisher's Formula:**

It is said to be 'ideal' because it satisfies all the three tests of a good index number formula which have the drawback of computational difficulty.

**100. What are the methods used to be the Aggregative Method?**

- Laspeyre's Formula
- Paasche's Formula
- Fisher's Formula
- Kelly's Formula
- Bowley's Formula and
- Marshall – Edgeworth's Formula