MATHEMATICS & STATISTICS FOR MANAGERS

(THEORY – III , IV & V UNITS)

16CCBB4

BBA - II 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.

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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.

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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?

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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.

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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.

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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 $□□_2$ **.**

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

Co-efficient of variation denoted by C.V. and is given by C.V. = ($\frac{\sigma}{\bar{x}}$ x 100)%

X

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.

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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

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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.

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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).

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