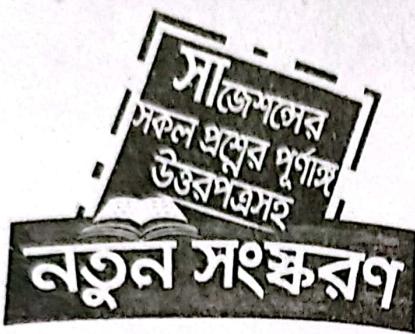
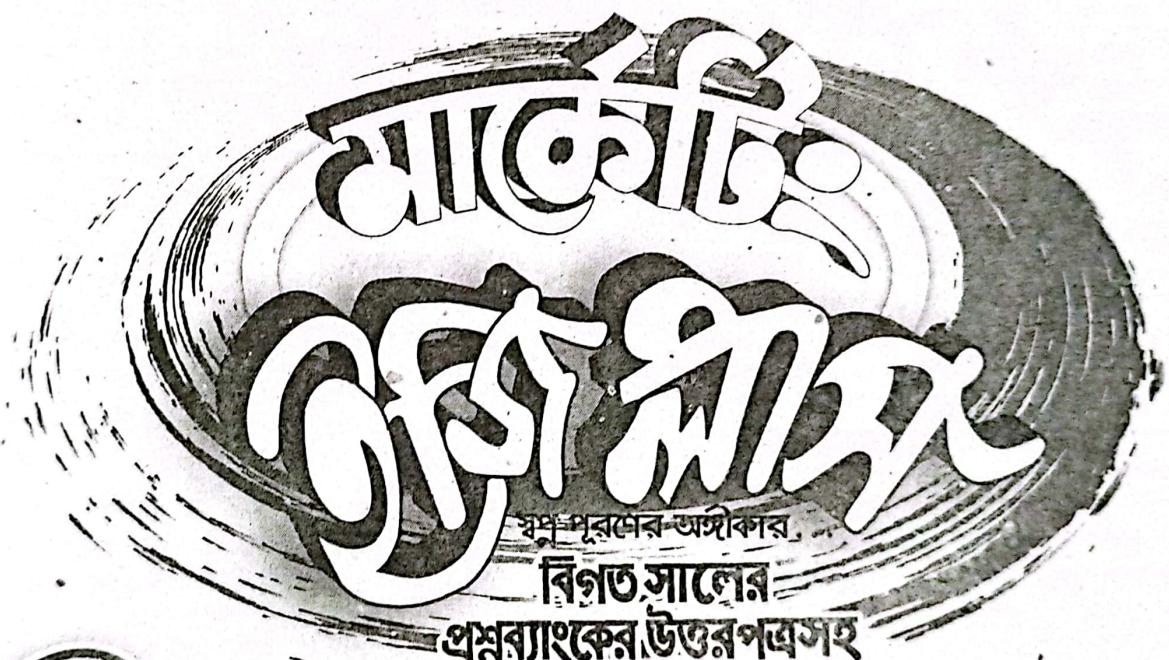


জাতীয় বিশ্ববিদ্যালয়ের আনার্স মিতীয় বর্ষের ছাত্রছাত্রীদের জন্য
নতুন সিলেবাস অনুযায়ী সদাসরি হ্যাডনোট থেকে রচিত।



অনিষ্ট মিতীয় বর্ষ



ব্যবসায় পরিসংখ্যান-১ Business Statistics-1 (In English)

বিষয় কোড : ২২২৩০৫

সম্পূর্ণ নতুন সিলেবাসের আলাকে রচিত

Introduction to Statistics

[পরিসংখ্যানের সূচনা]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answers)

Q1 What is statistics? (পরিসংখ্যান কি?)

Ans. Statistic is the Science of decision making in the field of uncertainty.

Q2 What is the origin of the word 'Statistics'? (পরিসংখ্যান শব্দের উৎপত্তি কোথা থেকে?)

Ans. The origin of the word 'Statistics' is 'Status' or 'Statistic'.

Q3 Who is the father of modern statistics? [N.U. 2014]

Ans. R. A. Fisher.

Q4 Define business statistics? (ব্যবসায় পরিসংখ্যান কি?) [N.U. 2011, 2013, 2015, 2017, 2021]

Or, What is business statistics?

Ans. Business Statistics is a science assisting us to make business decision under uncertainties based on some numerical and measurable scale.

Q5 What is data? (উপাস্ত কি?) [N.U. 2021]

Ans. Data are the collection of raw facts and figures from any sets of enquiry for the purpose from any sets of enquiry for the purpose of statistical analysis.

Q6 Define primary data. [N.U. 2015]

Ans. Data that have been Collected from the organ of the held is called primary data.

Q7 What is variable? (চলক কি?)

Ans. The Characteristic which varies over the units is called variable.

Q8 What is statistical data? (পরিসংখ্যানিক উপাস্ত কি?)

Ans. A collection of any number of related observations on one or more variables is called statistical data.

Q9 What are sources of data? (তথ্য বা উপাস্তের উৎস কি?)

Ans. Data can be collected from three sources :
 (i) Primary source;
 (ii) Secondary source;
 (iii) Internal Source.

1.10 Write the definition of continuous variable with examples. [N.U 2012]

Ans. A continuous variable is one that can take on any value within given range.

1.11 What is stem and leaf display? (কান্ডপাতা প্রদর্শনী কি?) [N.U 2015]

Ans. One technique that is used to display quantitative information in a condensed form is the stem and leaf display. (পরিমাণগত তথ্যকে সংপিক্ষণাকারে প্রদর্শনের নিমিত্তে ব্যবহৃত কোশলই হলো কান্ড-পাতা প্রদর্শনী।)

1.12 What is histogram? (আয়তলেখ কি?) [N.U. 2011, 2013, 2016]

Or, What is meant by histogram?

Ans. Histogram is a suitable graph for representing the frequency distribution of a continuous series.

1.13 What is data point? (উপাস্ত বিন্দু কি?)

Ans. A single observation from a data set is called data point.

1.14 What is tabulation? (সারণিবদ্ধকরণ কি?)

Ans. Tabulation refers to the systematic arrangement of the information in rows and columns.

1.15 What is geographical classification? [N.U. 2016]

Ans. When data are classified on the basis of geographical or vocational differences between the various items, it is called geographical classification.

1.16 What is parameter?

Ans. Characteristic or measure obtained from a population is parameter.

Chapter-2

Collection of Data

উপাত্ত সংগ্রহ

ক-বিভাগ (Part-A).

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর (Brief Questions & Answers)

- 2.01 What is data? (উপাত্ত কী?)**
- Ans. A collection of any number of related observations of one or more variables are called data.
- 2.02 What is raw data? (কাঁচা উপাত্ত কাকে বলে?)**
- Ans. Information before it is arranged or analyzed by statistical methods are raw data.
- 2.03 What is continuous data? (অবিচ্ছিন্ন উপাত্ত কী?)**
- Ans. Data that may progress from one class to the next without any break may be expressed by either whole numbers or fractions called continuous data.
- 2.04 What is discrete data? (বিচ্ছিন্ন উপাত্ত কী?)**
- Ans. Data that do not progress from one class to the next without a break; that is, where classes represent distinct categories or counts and may be represented by whole numbers are called discrete data.
- 2.05 What is data array? (উপাত্ত বিন্যাস কী?)**
- Ans. The arrangement of raw data by observations in either ascending or descending order is data array.
- 2.06 What is data point? (উপাত্ত বিন্দু কী?)**
- Ans. A single observation from a data set is called data point is called point.
- 2.07 What is 2 to the k rule?**
- Ans. If k represents the number of classes and N the total number of observations, then the value of k will be the smallest exponent of the number 2, so that $2^k \geq N$. This is termed as 2 to the k rule.
- 2.08 What is classification? [N.U-2014]**
- Ans : Classification is the process of arranging data as collected by proper investigation in some groups or class in relation with definite. Characteristics Grouping of related facts into classes.
- 2.09 What is sturges rule? (স্টোগেজের সূত্র কী?)**
- Ans. According to sturge's rule the number of classes can be determined by the formula : $K = 1 + 3.222 \log_e N$ (স্টোগেজের সূত্রানুসারে শ্রেণির সংখ্যা নির্ধারণ করা হয়, সূত্রটি হলো : $k = 1 + 3.222 \log_e N$)
- 2.10 What is bar diagram? (দড় চিত্র কী?)**
- Ans. Bar diagrams are the most common type of diagrams used in practice. A bar is a thick line whose width is shown merely for attention.
- 2.11 What is simple bar diagram? (সরল দড় চিত্র কী?)**
- Ans. The bar diagram which represents single dimensions called simple bar diagram.
- 2.12 What is scatter diagram? [N.U-2014]**
- Ans : A graph of points on a rectangular grid; the X and Y coordinates of each point corresponded to the two measurements made on some particular sample element, and the pattern of points illustrates the relationship between the two variables.
- 2.13 What is multiple or compound bar diagrams? (বহু বা যৌগিক দড় চিত্র কী?)**
- Ans. The bar diagram which represents two or more data set is called multiple or compound bar diagram.
- 2.14 What is broken bar? (ভঙ্গুর দণ্ড কী?)**
- Ans. In certain series there may be wide variations in values some values may be very small and others very large. In order to gain space for the smaller bars of the series, the largest bar may be broken. Such diagram is called broken bar.
- 2.15 What is Angular or Pie diagram Or Pie chart? (কোণিক নকশা বা বৃত্ত পরিলেখ বা পাই-চার্ট কী?)**
- Ans. Pie chart is a circular diagram and the angle of the sector of a circle is used in pie chart.
- 2.16 What is Sample? (নমুনা কী?)**
- Ans. A collection of some, but not all, of the elements of the population under study, used to describe the population.
- 2.17 What is the area of pie chart?**
- Ans. The area of a circle represents the total value and the different sectors of the circle, represent the different parts.
- 2.18 Write down the sturges rule. (স্টোগেজের সূত্র লিখি।)**
- Ans. Class interval = $\frac{\text{Range}}{1+3.222\log_e N}$.

Chapter-3

Presentation of Data

[তথ্য উপস্থাপন]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answers)

3.01 What is data array? (উপাত্ত বিন্যাস কী?)

Ans. An organized display of data that shows the number of observations from the data set that falls into each of a set of mutually exclusive and collectively exhaustive classes is frequency distribution.

3.02 What is class interval? (শ্রেণি ব্যাপ্তি কী?)

Ans. The difference between the lower limit class and upper limit class is called class interval.

3.03 What is equal class interval? (অসম শ্রেণি ব্যাপ্তি কী?)

Ans. The distribution which width of the each class is equal is called class interval. For example 10-20, 20-30, 30-40 etc.

3.04 What is unequal class interval? (অসম শ্রেণি ব্যাপ্তি কী?)

Ans. The distribution which width of the each class is not equal is called unequal class interval. For example : 0-100; 100-500, 1000-1200 etc.

3.05 What is open-ended class? (আন্ত খোলা শ্রেণি কী?)

Ans. A class that allows either the upper or lower end of a quantitative classification scheme to be limit less is called open-ended class.

3.06 What is class limit and class boundaries? (শ্রেণি সীমা এবং শ্রেণি সীমানা কী?)

Ans. In the construction of a grouped frequency distribution each class interval is represented by a pair of numbers. These two numbers specifying the limits of a class (or class interval) are called the class limits.

3.07 What is upper class limit and the smaller on lower class limit? (উচ্চ শ্রেণি সীমা এবং নিম্ন শ্রেণি সীমা কী?)

Ans. The bigger of the pair is known as upper class limit and the smaller as lower class limit with respect to the given class interval.

3.08 Define frequency density. [N.U. 2011, 2015, 2017]

Or, What is frequency density? (গণসংখ্যা ঘনত্ব কী?)

Ans. Frequency density is the percentage of observation fall within each class in respect of their class width.

3.09 What is percentage frequency distribution? (শতকরা গণসংখ্যা নিরবেশন কী?)

Ans. A percentage frequency distribution is one in which the number of observations for each class interval is converted into a percentage frequency by dividing it by the total number of observations in the entire distribution.

3.10 What is relative frequency distribution? (আপেক্ষিক গণসংখ্যা নিরবেশন কী?)

Ans. The display of a data set that shows the fraction or percentage of the total data set that falls into each of a set of mutually exclusive and collectively exhaustive classes are called relative frequency distribution.

3.11 What is exclusive method (Overlapping)? (বহিজুড়িয়ে বা বাদ দেয়া পদ্ধতি কী?)

Ans. The method whose limit is equal to the lower limit of the next class.

3.12 What is called exclusive method (non-overlapping)? (অভিজুড়ি পদ্ধতি কী?)

Ans. The method whose limit of one class is included in that class itself is called in exclusive method.

3.13 Define cumulative frequency. [N.U. 2016]

Ans. A cumulative frequency distribution is the frequencies of class internal are added successively from top to bottom & represent the cumulative number of observations less than or equal frequency.

3.14 What is cumulative frequency distribution (ক্রমযোজিত গণসংখ্যা নিরবেশন বলতে কী বুঝি?)

Ans. Cumulative frequency distribution is a tabular display of data showing how many observations.

3.15 What is bivariate or, tow way frequency distribution? (দ্বি-চলক বিশিষ্ট গণসংখ্যা নিরবেশন কী?)

Ans. A frequency table where two variables have been measured in the same set of items through cross classification is known as bivariate frequency distribution or two-way frequency distribution.

3.16 What is Deviation bars? (পার্থক্যমূলক দণ্ড কী?)

Ans. Deviation bars are popularly used for representing net quantities - excess or deficit, Such bars can have both positive and negative values.

3.17 What is Two-dimensional diagrams (Area or surface diagram)? (দ্বি-মাত্রিক নকশা কী?)

Ans. The diagram where both is height and width are taken into Account for presenting the data. These diagrams, also known as surface diagrams or area diagrams.

3.18 What is Rectangles? (আয়তক্ষেত্র কী?)

Ans. When statistical data are presented in a rectangle from is called rectangle.

3.19	What is squares? (বর্গক্ষেত্র কী?) Ans. The diagram which is presented by square is called square.	3.23	What is Ogive Or, Cumulative frequency curve? (অজিভ বা ক্যাম্যোজিভ গণসংখ্যা রেখা কী?) Ans. When cumulative frequencies are plotted on a graph, then the frequency curve obtained is called 'ogive' or 'cumulative frequency curve'.
3.20	What is pictograms or ideographs? (চিত্র নকশা বা পিটোগ্রাম কী?) Ans. A Pictogram is another form of pictorial bar chart. Small symbols or simplified pictures are used to represent the size of the data.	3.24	What is population? (সমষ্টি কী?) Or, Define population. [N.U-2014] Ans. A collection of all the elements we are studying and about which we are trying to draw conclusions.
3.21	What is cartogram or, statistical maps? (মানচিত্র নকশা বা পরিসংখ্যানিক মানচিত্র কী?) Ans. Cartograms or statistical maps are used to give quantitative information on a geographical basis.	3.25	What is representative sample? (প্রতিনিধিত্ব নমুনা কী?) Ans. A sample that contains the relevant characteristics of the population in the same proportions as they are included in that population.
3.22	What is Frequency curve? (গণসংখ্যা রেখা কী?) Ans. Frequency curve is obtained by joining the points of frequency polygon by a freehand smoothed curve.	3.26	What is Frequency Polygon? (গণসংখ্যা বাহ্যিক কিংবা রেখা কী?) Ans. A frequency polygon expresses distribution of data by means of a single line determined by the midpoints of classes.

খ ও গ-বিভাগ (Part-B & C)

সংক্ষিপ্ত ও রচনামূলক প্রশ্নাঙ্গোত্তর

(Short & Broad Questions with Answers)

Ques-3.01 What is data? (তথ্য/উপাত্ত কি?)

Or, What do you mean by data? (তথ্য/উপাত্ত বলতে কি বুঝ?)

Or, Definition of data. (তথ্য/উপাত্তের সংজ্ঞা দাও।)

Ans : Information collection from individuals of a sample or a population against any variable is known as data i.e. numerical facts gathered from a statistical investigation are called a data. It is the plural form of datum. Single information of a phenomenon on any subject of interest is called a datum. So, data is called the collection of datum.

Example : If we are interested about the height of the students of 1st semester in BBA of AUB, then a single value of the height of a student is called datum and the set of all values of height will be data.

Ques-3.02 What is primary data? (প্রাথমিক তথ্য/উপাত্ত কি?)

Or, What do you mean by primary data? (প্রাথমিক তথ্য/উপাত্ত বলতে কি বুঝ?)

Or, Definition of primary data. (প্রাথমিক তথ্য উপাত্তের সংজ্ঞা দাও।)

Ans : There are two types of data. Primary data is one of them. The data collected for the first time by the investigator as original data are known as primary data. Thus it is the first hand information collected, compiled and published by organization for some purpose. They are most original data in character and have not undergone any sort of statistical treatment.

Example : Population census reports are primary data because these are collected by the population census organization.

Ques-3.03 What is questionnaire? (প্রশ্নালী কি?)

Or, What do you mean by questionnaire? (প্রশ্নালী বলতে কি বুঝ?)

Ans : A questionnaire is a written list of questions which are answered by a lot of people in order to provide information to a report or a survey. It is a form containing a set of questions especially one addressed to a statistically significant number of subjects as a way of getting information for a survey. List of a research or survey questions asked to respondents and designed to extract specific information. It serves four basic purposes they are as under

- (i) Collect the appropriate data.
- (ii) Make data comparable and amenable to analysis.
- (iii) Minimize bias in formulating and asking questions.
- (iv) To make questions engaging and varied usually. It consists of a number of questions that the respondent has for answer in a set format.

Ques-3.04 Write down the good questionnaire? (উত্তম প্রশ্নালীর অপরিহার্য বৈশিষ্ট্য কি কি?)

Or, What are the essential characteristics of a good questionnaire?

Ans : A good questionnaire should possess the following characteristics :

1. It should provide necessary instructions to the formats.

Measures of Central Tendency

[কেন্দ্রীয় প্রবণতার পরিমাপসমূহ]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answers)

- 4.01** What is Central Tendency. (কেন্দ্রীয় প্রবণতা কি?)
[N.U. 2011, 2014]
Ans. Central tendency is a typical value of a data set around which other figures congregate.
- 4.02** What are the Measures of central Tendency?
(কেন্দ্রীয় প্রবণতার পরিমাপসমূহ কি কি?)
Ans. There are 5' measures of central Tendency :
(1) Arithmetic Mean; (2) Median; (3) Mode; (4) Geometric Mean; (5) Harmonic Mean.
- 4.03** What does quartile mean? [N.U. 2021]
Or, Define quartiles. (চতুর্থক কি?)
Ans. The quartiles that divide the data into 4 equal parts.
- 4.04** Define decile. (দশমক কি?)
Ans. The Fractiles that divide the data into 10 equal parts.
- 4.05** What is percentile? (শতমাত্রক কি?)
Ans. The Percentiles of a Set of data are those values which divides the total observations into 100 equal parts.
- 4.06** Define fractiles.
Ans. The fractiles that divide the data into 100 equal parts.
- 4.07** What is the relationship among AM, GM & HM? (AM, GM & HM এর সম্পর্ক কি?)
Or, When AM, GM & HM equall? [N.U. 2013]
Ans. $AM \geq GM \geq HM$
- 4.08** Write down the formula of Mode in case of group data. (গুচ্ছকের সূত্র লিখি)
Ans. $Mode = L + \frac{\Delta_1}{\Delta_1 + \Delta_2} \times C.$
- 4.09** Which of the following relationship is true in a multimodal distribution.
Ans. (a) $Mean - Mode = 3(Mean - Median)$ (b) $Mode = (3Median - 2Mean)$ (c) $3mean = (2Mean + Mode)$ (d) All of above.
- 4.10** When Mode is ill defined?
Ans. If a Series of observations has more than one mode then the mode is said to be ill defined mode.
- 4.11** Write down the formula of combined Mean.
(সমিলিত গড়ের সূত্র লিখি)
Ans. Combined Mean = $\frac{N_1 \bar{x}_1 + N_2 \bar{x}_2}{N_1 + N_2}$
- 4.12** Define Geometric Mean. (জ্যামিতিক গড় কি?)
Ans. Geometric Mean is the root of the product of nth Variables.
- 4.13** What is Harmonic Mean? (তরঙ্গ গড় কি?)
Ans. Harmonic Mean is the ratio between the number of items and the Sum of reciprocals of items.
- 4.14** Write down the 'Karl pearson' formula for exception in case of deterring mode.
Ans. Mode = $(3 Median - 2 Mean.)$
- 4.15** What is average? (গড় কি?)
Ans. Average is an attempt to find one single figure to describe whole of figures.
- 4.16** What is Arithmetic Mean? (গাণিতিক গড় কি?)
Ans. An Arithmetic Mean is a numerical value obtained by dividing the Sun of values of all the observations by the total number of observations.
- 4.17** Write down the formula of Geometric Mean.
(জ্যামিতিক গড়ের সূত্র লিখি)
Ans. $GM = \sqrt[n]{x_1 \times x_2 \times x_3 \times \dots \times x_n}$
- 4.18** Write down the uses of Harmonic Mean.
(তরঙ্গ গড়ের ব্যবহার লিখি)
Ans. The harmonic mean is particularly useful for computation of average rates and ratios.
- 4.19** If Mean > Median > Mode, what does it indicate?
Ans. Positively skewed distribution.
- 4.20** Which measure is the best average? (কোন পরিমাপটি সর্বোৎকৃষ্ট?)
Ans. Arithmetic mean is the best Average.
- 4.21** What is relationship a many Arithmetic Mean, Geometric Mean and Harmonic Mean. (গাণিতিক গড়, জ্যামিতিক গড় ও তরঙ্গ গড়ের সম্পর্ক লিখি)
Ans. $AM \geq GM \geq HM$
- 4.22** Find the mean of first 10 numbers. (প্রথম ১০টি সংখ্যার গড় বের কর)।
Ans. Mean = $\frac{1+2+3+4+5+6+7+8+9+10}{10}$

4.23	What is Raw Data? (কাঁচা উপাত্ত কি?) Ans: Information before it is arranged or analyzed by statistical methods.	4.29	What is Cumulative Frequency Distribution? Ans: In this method the upper limit of one class is included in that class itself.
4.24	What is Frequency Distribution? (গণসংখ্যা নিবেশন কি?) Ans: An organized display of data that shows the number of observations from the data set that falls into each of a set of mutually exclusive and collectively exhaustive classes.	4.30	What is Bi-variate? (বিচলক কি?) Ans: A frequency table where two variables have been measured in the same set of items through cross classification is known as bi-variate frequency distribution.
4.25	What is Equal class interval? (সম প্রশিল্পিতি কি?) Ans: The distribution which width of the each class is equal is called equal class interval. For example 10-20, 20-30, 30-40 etc.	4.31	What is Stem and leaf display? (ফোড় ও পত্র কি?) Ans: One technique that is used to display quantitative information in a condensed form is the stem and leaf display. <i>[N.U 2012]</i>
4.26	What is Unequal class interval? (অসম প্রশিল্পিতি কি?) Ans: The distribution which width of the each class is not equal is called unequal class interval. For example: 0-100, 100-500, 500-1000, 1000-1200 etc.	4.32	What is Bar Diagram? Ans: Bar diagrams are the most common type of diagrams used in practice. A bar is a thick line whose width is shown merely for attention.
4.27	What is Sturgess rule? (স্টুগেজ নীল কি?) Ans: According to sturgess's rule the number of classes can be determined by the formula: $K=1+3.222 \log N$	4.33	What is Mode? (প্রচুরক শ্রেণি কি?) Ans: Mode is the value which occurs the greatest number of frequency in a series. Mode is the most fashionable or typical value of a distribution, because it is repeated the highest number of times in the series.
4.28	What is Exclusive method? (বহিজড়িতি পদ্ধতি কি?) Ans: Under this method, the 'upper limit of one class-interval is the lower limit of the next class.	4.34	What is Modal Class? (প্রচুরক শ্রেণি কি?) Ans: The class which belongs highest frequency is called modal class. No extra column is required for calculating mode.

খ ও গ-বিভাগ (Part-B & C)

সংক্ষিপ্ত ও রচনামূলক প্রশ্নাঙ্গোত্তর

(Short & Broad Questions with Answers)

Ques-4.01 What is central tendency? (কেন্দ্রীয় প্রবণতা কি?)

Or, What do you mean by central tendency? (কেন্দ্রীয় প্রবণতা বলতে কি বুঝ?)

Or, Definition of tendency? (কেন্দ্রীয় প্রবণতার সংজ্ঞা?)

Ans : Central tendency is a typical value of a data set around which other figures congregate. In a representative sample the value of a series of data has always been a tendency to cluster around a certain point usually at the centre of the series is called central tendency.

If we keenly observe a normal frequency distribution we find that the density of frequency is much in the middle position. The central value of the distribution is some where in the middle of the distribution.

Ques-4.02 Which measures of central tendency is the best and why?

[N.U. 2018 (Marketing)]

Ans : Mean, median and mode are usually the best measures of central tendency.

Actually it depends on your data or variable. See the distribution (histogram) first and then decide. There can often be a "best" measure of central tendency, with regards to the data you are analyzing but there is no one. This is because whether you use the median, mean or mode will depend on the type of data you have such as nominal or continuous data; whether your data has outlines and/or is skewed; and what you are trying to show for your data. Further considerations of when to use each measure of central tendency is four in our guide on the basis.

Ques-4.03 What is arithmetic mean? (গাণিতিক গড় কি?)

Or, What do you mean by arithmetic mean? (গাণিতিক গড় বলতে কি বুঝ?)

Or, Definition of arithmetic mean? (গাণিতিক গড়ের সংজ্ঞা?)

Ans : The mean which is calculated by totaling the results of the observations and dividing this total by the number of frequency or observation is called arithmetic mean.

Measures of Variation

[ভেদাক্ষের পরিমাপ]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answers)

- | | |
|--|---|
| <p>5.01 What is Dispersion? <i>[N.U. 2011]</i>
 Ans. The distance of different values from the central value is called dispersion.</p> <p>5.02 What do you mean by measures of dispersion.
 Ans. The Measures of dispersion are called averages of second order.</p> <p>5.03 How many types of measure of dispersion?
 Ans. Two types of measure of dispersion (i) Absolute measure (ii) Relative measure.</p> <p>5.04 The difference between the first and third quartile is called the?
 Ans. Inter Quartile Range.</p> <p>5.05 Define inter quartile range.
 Ans. The difference between the first and third quartile is called inter quartile range.</p> <p>5.06 Write down the formula for quartile Deviation?
 Ans. $Q.D = \frac{Q_3 - Q_1}{2}$</p> <p>5.07 What is the mode of 4, 6, 8, 10, 6 and 12? <i>[N.U. 2013]</i>
 Ans. 6.</p> <p>5.08 What is absolute measure?
 Ans. When dispersion is measured in original units then it is known as absolute measure of dispersion.</p> <p>5.09 What is mean deviation?
 Ans. Mean deviation is the arithmetic mean of the deviation of series computed from any measures of central tendency.</p> <p>5.10 What is quartile deviation.
 Ans. Quartile deviation is obtained by dividing the difference upper and lower quartile by 2.</p> <p>5.11 Find the mean if co-efficient of variance = 15% and variance = 4 ?
 Ans.</p> <p style="margin-left: 20px;">We Know,</p> $CV = \frac{\delta}{x}$ $\Rightarrow 5\% = \frac{2}{x}$ $\Rightarrow \bar{x} = \frac{2}{5\%} = 40$ | <p>5.12 What is Co-efficient of range?
 Ans. Co-efficient of range is the ratio of range to the Sum of their highest value and the lowest value.</p> <p>5.13 Write the formula of co-efficient of Variance.
 Ans. $CV = \frac{\text{Standard deviation (SD)}}{\text{Arithmetic Mean (X)}} \times 100$.</p> <p>5.14 What is standard deviation? <i>[N.U. 2011, 2021]</i>
 Ans. The standard deviation is the positive square root of the mean of the squared deviations from their mean of a set of value.</p> <p>5.15 Write the formula of combined standard deviation.
 Ans. $CSD = \sqrt{\frac{N_1 d_{12} + N_2 d_{22} + N_1 d_{12} + N_2 d_{21}}{N_1 + N_2}}$</p> <p>5.16 Mention the relationship among mean, median and mode in case of positively skewed distribution. <i>[N.U. 2012]</i>
 Ans. In case of positive skewed distribution the relationship among mean, median and mode are $\bar{x} > me > mo$</p> <p>5.17 What is Box-plot. <i>[N.U. 2013]</i>
 Ans. Box plot is the graphical Presentation of Five number Summary.</p> <p>5.18 Write down the formula of co-efficient of variance.
 Ans. $CV = \frac{\text{Standard deviation}}{\bar{x} (\text{Mean})} \times 100$</p> <p>5.19 What are five number summary?
 Ans. 1. Lowest value; 2. Highest value; 3. First Quartile; 4. Third Quartile; 5. Median.</p> <p>5.20 What is five numbers summary? <i>[N.U. 2012]</i>
 Ans. A-5 Number summary especially construct with 5 value/ numbers. These are: (1) Smallest or, Minimum value- X_{\min} (2) First quartile – Q_1 (3) Third Quartile- Q_3 (4) Median– Med (5) Largest or Maximum value- X_{\max}</p> <p>5.21 What is Range? <i>[N.U. 2011]</i>
 Ans. Difference between highest value and lowest value.</p> |
|--|---|

5.22 The coefficient of variation of a distribution is 22.50% and the value of mean is 8.50. Find the value of standard deviation. [N.U. 2012]
Ans. Given, coefficient of variation (c.v) = 22.50%

Mean (\bar{x}) = 7.5

$$\text{We know, C.V} = \frac{\sigma}{\bar{x}}$$

$$\Rightarrow 22.50 = \frac{\sigma}{7.5}$$

$$\Rightarrow \sigma = 22.50 \times 7.5$$

$$\Rightarrow \sigma = 168.75$$

$$\therefore \sigma = 168.75$$

5.23 If the first and third quartiles are 22.16 and 56.36 respectively. What is the quartile deviation?

Ans. 17.1.

5.24 Highest value is 34 and lowest value is 4 what is Range?

Ans. 30.

5.25 Define Standard Deviation. [N.U. 2014]

Ans : The standard deviation is the positive square root of the mean of the squared deviations from their mean of a set of value.

5.26 What are Absolute measures?

Ans: Absolute measures are described by a number or value to represent the amount of variation or differences among values in a data set.

5.27 What are relative measures?

Ans: The relative measures are described as the ratio of a measure of absolute variation to an average and is termed as coefficient of variation.

5.28 How many types of absolute measures?

Ans: (a) Range; (b) Quartile Deviation; (c) Mean Deviation Or, Average Deviation; (d) Standard Deviation.

5.29 What is Coefficient of Range?

Ans: The relative measures of range is called the coefficient of range is obtained by applying the following formula: Coefficient of Range (CR) = $\frac{L - S}{L + S}$

5.30 What is Covariance?

Ans: Covariance is the only measure of dispersion that used for bi-variate or, two way frequency distribution/ variable. To compute it, deviations are taken from each variable's of the series with mean. The sum of multiplying both deviations and deviations and divided by total number of pairs observation. The result so obtained is called covariance.

5.31 What is Coefficient of Variation?

Ans: Coefficient of variance is the relative measurement of dispersion. It is the most important and popularly used relative measure of dispersion. Coefficient of variance can be defined as the product of the ratio of standard deviation

and mean. Symbolically, $CV = \frac{\sigma}{\bar{x}} \times 100$

খ ও গ-বিভাগ (Part-B & C)

সংক্ষিপ্ত ও রচনামূলক প্রশ্নাঙ্ক

(Short & Broad Questions with Answers)

Ques-5.01 What is dispersion/ variability? (বিত্তীয় কি?)

Or, What do you mean by dispersion/ variability?

Or, Definition of dispersion? [N.U. 2013 (Old)]

Ans : The distance or difference between the variables and their mid or central value is called the dispersion. It is one of the statistical methods of measuring the deviation of the variables to their mean value.

Popular definition are as follows :

According to A. L. Bowley, "Dispersion is the measure of the variation of the items."

According to L. R. Connor, "Dispersion is the mean of extent to which individual items vary."

Brooks and Dick, "Dispersion or spread is the degree of the scatter or variation of the variable about a mid or central value."

Ques-5.02 What is range? (পরিসর কি?)

Or, What do you mean by range? (পরিসর বলতে কি বুঝ?)

Or , Definition of range.

Ans : Range is the simplest and a rude measure of dispersion which is based on two extreme observations only.

The absolute difference between the highest and lowest observation of a distribution or data series is called range. When the frequency distribution is arranged in order to magnitude then range will be the absolute difference between the mid values of last class and first class. Also it can be estimated by the difference of the upper limit of the last class and lower limit of the first class.

Formula,

$$\text{Range} = L - S$$

$$R = \text{Range}$$

$$L = \text{Largest/ Upper/ Highest limit}$$

$$S = \text{Smallest/ lowest limit}$$

Skewness, Moments and Kurtosis

[বক্ষিমতা, পরিঘাত ও সুচালতা]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answer)

6.01 What is of skewness?

Ans : Skewness is the degree of a symmetry or, departure from symmetry, of a distribution.

6.02 What is the value of 1st central moment?

Ans : Value of first central moment s always zero.

6.03 What is moment? [N.U. 2021 (Marketing)]
Or, What is moment about origin?

Ans : Average of different power of the observation is called moment about origin. i.e. the raw materials about zero are moments about origin.

6.04 What is the main difference between dispersion and skewness?

Ans : Dispersion shows us the spread of individual value about the central value. On the other hand skewness shows us departure from symmetry.

6.05 Write down the formula given by karl Pearson's co-efficient of skewness.

Ans : Co-efficient of Skewness (SK_p) = $\frac{\text{Mean} - \text{Mode}}{\text{Standard Deviation}}$

Or, $(SK_p) = \frac{\bar{x} - Mo}{\sigma}$ In case of Mode is ill defined the co-efficient can be determined by the changed formula Co-efficient of Skewness $(Sk_p) = \frac{3(\text{Mean} - \text{Mode})}{\text{standard Deviation}}$

Or, $(SK_p) = \frac{3(X - \text{Med})}{\sigma}$

6.06 Types of skewness are?

Ans : Skewness is of two types as : (i) Positive Skewness, (ii) Negative Skewness.

6.07 Types of Kurtosis are?

Ans : Kurtosis is of three types as : i. Mesokurtic, ii. Leptokurtic, iii. Platy kurtic

6.08 Give the concept of Moments.

Ans : Moments can be defined as the arithmetic mean of various powers of deviations taken from the mean of a distribution. Actually it describes the various characteristics of frequency distribution.

6.09 How many methods for computing moments?

Ans : Moments can be computed by using following two methods :

1. Deviations taken from Arithmetic Mean (Moments about Mean)
2. Deviation taken from Assumed Mean (Moments about Arbitrary Origin)

6.10 What are the relation between central moments and raw moments?

Ans : Central moments can be calculated from raw moments. Relations between the central moments and raw moments are given below :

$$(i) \mu_1 = 0 \quad (ii) \mu_2 = v_2 - (v_1)^2 \quad (iii) \mu_3 = v_3 - 3v_2v_1 + 2(v_1)^3$$

$$(iv) \mu_4 = v_4 - 4v_3v_1 + 6v_2v_1^2 - 3(v_1)^4$$

6.11 What is Kurtosis?

Ans : The word 'kurtosis' comes from a Greek word meaning 'humped'. In statistics, it refers to the degree of flatness or peakedness in the region about the mode of a frequency curve.

6.12 What is the meaning of $\beta_2=3$?

Ans : When $\beta_2=3$, the curve or distribution is mesokurtic.

6.13 What do you mean by β_2 ?

Ans : β_2 measures the kurtosis based on moments.

$$\beta_2 = \frac{\mu_4}{\mu_2^2}, \text{ Notations are in usual meaning.}$$

6.14 What is platy kurtic?

Ans : A distribution is said to be platy kurtic (or, to have negative kurtosis) if its frequency curve is more flat-topped than the normal curve.

6.15 What is the formula for measures of Kurtosis?

Ans : The only measure of kurtosis is due to Karl Pearson and is based on central moments. This measures s given by Karl Pearson

6.16 Moments are which type and What they are?

Ans : Moments are two types as : (i) Raw moments, (ii) Central or Corrected Moments.

Ques-6.01 What is Raw moment?

Ans : Moments measured about any arbitrary constant rather than the arithmetic mean are the central moments. Mathematically,

$$\mu' r = \frac{\sum f(x - A)^r}{n}, \text{ for ungrouped data}$$

$$\mu' r = \frac{\sum f(x - A)^r}{n}, \text{ for grouped data}$$

Ques-6.02 Write three features or properties of skewness.

Ans : (i) Skewness is a unit free measure. (ii) Skewness can be positive or negative. (iii) In a symmetrical distribution skewness is zero.

Ques-6.03 How many types of skewness?

Ans : There are three types of skewness viz: (i) Positive skewness (Positively skewed distribution), (ii) Negative Skewness (Negatively Skewed Distribution) (iii) Zero Skewness (Symmetrical Distribution)

Ques-6.04 What is symmetric curve?

Ans : Symmetric curve is the curve of a symmetric distribution which is bell shaped. It slopes equally from the top point to the both sides of the curve.

Ques-6.05 What is the value of Karl Pearson's coefficient of skewness?

Ans : Theoretically, the value of SK_p varies between ± 3 . But for a moderately skewed distribution, value of $SK_p = \pm 1$.

Ques-6.06 Write down the formula of Bowley's coefficient of skewness :

$$\text{Ans : The formula is } (SK_b) = \frac{Q_3 + Q_1 - 2\text{median}}{Q_3 - Q_1}$$

Ques-6.07 What is meso-kurtic?

Ans : The frequency curve of a normal distribution is neither very peaked nor flat-topped i.e.; it is of moderate peakedness and known as mesokurtic.

Ques-6.08 What is lepto-kurtic?

Ans : A distribution is said to be lepto-kurtic if its frequency curve has a sharper peak than that of a normal curve.

Ques-6.09 When $\beta_2 > 3$, it means what?

Ans : When $\beta_2 > 3$, the curve or distribution is platikurtic.

খ ও গ-বিভাগ (Part-B & C)

সংক্ষিপ্ত ও ব্রচনামূলক প্রশ্নাঙ্ক

(Short & Broad Questions with Answers)

Ques-6.01 What is skewness?

Or, Define skewness. [N.U. 2011 (Old)]

Or, What do you mean by skewness?

Or, Definition of skewness.

Or, Explain about skewness.

Ans : Introduction : Skewness is the shape of a distribution. It indicates about the shape of a distribution, i.e. how much differ from the symmetric curve.

□ Definition : Some definition of skewness are as under-

According to Croxton and Cowden, "When a series is not symmetrical it is said to be asymmetrical or skewed."

According to Morris Hambur, "Skewness refers to the asymmetry or lack of symmetry in the shape of a frequency distribution."

According to Garrett, "A distribution is to be skewed when the mean and the median fall at different points in the distribution and balance is shifted to one side or the other to left or right."

Conclusion : According to above discussion we can say that Skewness is the asymmetry or lack of symmetry in the shape of a frequency distribution.

Ques-6.02 What are the types of skewness?

Or, Discuss the classification of skewness.

Or, Discuss the various types of skewness.

Or, Write the method of skewness.

Ans : There are three types of skewness :

(i) Positive skewness

(ii) Negative skewness

(iii) Zero skewness

Discuss it as under :

(i) Positive Skewness : The frequency curve is said to be positively skewed when the right tail of the curve is longer than the left. In this case mean and median are pulled away from mode to the right hand side. For the positively skewed distribution we may have- Mean > Median > Mode.

(ii) Negative Skewness : When the frequency curve is not symmetric and it slopes more to the left side rather than the right side of the curve and the height of right side is greater than the left side the curve is said to be the negatively skewed curve or simply negative skewness. In this case we may have Mean < Median < Mode.

(iii) Zero Skewness : The skewness of a frequency distribution is zero when its mean median and mode coincide i.e. for a zero skewed distribution $AM = Median = Mode$.

Ques-6.03 Write some features of skewness.

Or, Write some properties of skewness.

Or, Discuss some characteristics of skewness.

Ans : The properties or characteristics of skewness are as follows-

(i) Skewness is associated with direction of variation or the departure from symmetry

Chapter-7

Correlation Analysis [সহ-সম্বন্ধ বিশ্লেষণ]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answer)

01 Define co-efficient of correlation. [N.U. 2011, 2021]

Ans. Co-efficient of correlation is the measure of the strength of the linear relationship between two variables.

02 Write the different types of correlation.

Ans. Three types of correlation.

03 Regression coefficient of x on y is 0.70 and y on x is 0.80 Find the value of correlation. [N.U. 2012]

$$\begin{aligned} \text{Ans. Correlation (r)} &= \sqrt{b_1 \times b_2} \\ &= \sqrt{b_{yx} \times b_{xy}} \\ &= \sqrt{0.80 \times 0.70} \\ &= \sqrt{0.5600} \\ &= 0.074 \end{aligned}$$

7.04 Write the Symbol of rank correlation.

Ans. Rho

7.05 In case of unequal rank, write the formula of rank correlation.

$$\text{Ans. Rank correlation } 1 - \frac{6Sd^2}{n^3-n}$$

7.06 What is rank correlation?

Ans. The Co-efficient of correlation between two sets of rank is called rank correlation.

7.07 Define zero correlation?

Ans. When there is no correlation between two variables is called Zero correlation.

খ ও গ-বিভাগ (Part-B & C)

সংক্ষিপ্ত ও রচনামূলক প্রশ্নোত্তর

(Short & Broad Questions with Answers)

Ques-7.01 What is correlation? (সহ-সম্বন্ধ কি?)

Or, Definition of correlation. (সহ-সম্বন্ধ এর অর্জন দাও।) [N.U. 2015 (Marketing)]

Or, What do you mean by correlation? (সহ-সম্বন্ধ বলতে কি বুঝ?)

Ans : If the change in one variable affects a change in other variable. The variable are said to be correlated i.e. simultaneous change or mutual linear inter dependence of two or more variables is called correlation.

Definitions stated by some statisticians are as under :

R. I. Levin said, "Correlation is the relationship between variables."

Yalun Chon said, "Correlation analysis attempts to determine the degree of relationship among variables."

Simpson and Kafka said, "Correlation analysis deals with the associations between two or more variables."

So we can say that, the functional relationship between the variables of two series is called correlation.

Ques-7.02 Definition of co-efficient of correlation. (সহ-সম্বন্ধাত্মক এর সংজ্ঞা দাও।)

Or, What is co-efficient of correlation? (সহ-সম্বন্ধাত্মক কি?)

Or, What do you mean by co-efficient of correlation? (সহ-সম্বন্ধাত্মক বলতে কি বুঝ?)

Ans : The numerical measure of the degree of association between two variables x and y is called the co-efficient of correlation between them. That is the measurement method which measures the relation and the natures between two variables mathematically is called co-efficient of correlation. It is relative measures of correlation. Hence it is a constant or unit free number.

The relation of two interrelated variables are measured by the co-efficient of correlation. It is denoted by 'r'. The value of 'r' lies between -1 to +1. $r = +1$ means the perfect positive correlation exists the variables and $r = -1$ means the perfect negative correlation. $r = 0$ means no correlation between the variables. If the value of 'r' lies between '0' to ± 1 then the relation express the correlation exist either partial positive or partial negative.

Chapter-8**Regression Analysis**
[নির্ভরণ বিশ্লেষণ]**ক-বিভাগ (Part-A)****অতি সংক্ষিপ্ত প্রশ্নাবলি ও উত্তর****(Brief Questions & Answers)**

- Q.01** What is Regressions Analysis? /N.U. 2011/
Ans. Regression Analysis is a mathematical measure of the average relationship between two or more variables in terms of original units of the data.
- Q.02** What are the different types of connelation?
Ans. Three types connelation.
(i) Positive correlation; (ii) Negative correlation;
(iii) Zero correlation.
- Q.03** What is regression line?
Ans. A line fitted to a set of data Points to estimate the relationship between two variables.
- Q.04** Write down the formula for Regression coefficient y and x ?

$$\text{Ans. } b_1 = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}$$
- Q.05** Write down the formula for the Co-efficient of regression?
Ans. $y = a_1 + b_1 x$ and $x = a_2 + b_2 y$
- Q.06** What is independent variables?
Ans. The know variable as variables in regression analysis is called independent variables.
- Q.07** What is dependent variable? /N.U. 2013/
Ans. The variable we are tiring to predict in regression analysis is called dependent variable.
- Q.08** What is least Square method?
Ans. The Special mathematical model that is used to construct trend is called least squares method.
- Q.09** According to least square method write the formula of co-efficient of correlation.
Ans. $r_{xy} = \sqrt{b_1 \times b_2}$ Here, b_1 and b_2 are regressing co-efficient
- Q.10** Define scatter Diagram. /N.U. 2014/
Or. What is scatter diagram?
Ans. The simplest device for studying correlation in two variables is a special type of at chart called scatter diagram.
- 8.11** $r = + 1$ what does it mean.
Ans. $r = 1$ means perfect positive correlation between x and y.
- 8.12** What is ment by $r = 0.75$?
Ans. It is means by the partial positive correlation between the two variable. In this case, the change of the two variables is some direction.
- 8.13** Comment on the value -1 and 1 for r ?
Ans. -1 means Perfectly negative correlation are 1 means perfectly positive correlation.
- 8.14** If $b_{yx} = -0.8$ and $b_{xy} = -02$, $r_{xy} = ?$ /N.U. 2013/
Ans. $r_{xy} = \sqrt{b_{yx} \times b_{xy}} = \sqrt{(-0.8) \times 0(-0.2)} = 0.4$
- 8.15** $\leq r \leq$?
Ans. $-1 \leq r \leq + 1$
- 8.16** If $b_1=0.5$ and $b_2 = 0.2$. what does $r = ?$
Ans. $\infty = \sqrt{b_1 \times b_2} = \sqrt{0.5 \times 0.2} = 0.32$
- 8.17** Write the formula of determination.
Ans. Determination = r^2
- 8.18** What is the formula of probable error?
Ans. Probable error, P. E (r) = $0.6745 \times \frac{1 - r^2}{\sqrt{n}}$
- 8.19** Write the formula of Regression equation y on X.
Ans. $y = a_1 + b_1 x$.
- 8.20** What is meant by $r = +1$, $r = -1$ and $r = 0$? /N.U. 2012, 2014, 2021/
Ans. The value of $r = +1$, Means the perfect positive correlation.
The value of $r = -1$, Means called perfect Negative correlation.
The value of $r = 0$ Means called Zero (0) correlation.
- 8.21** What is difference between T-test and Z test?
Ans. Is the sample Size is small ($x < 30$) and Population standard deviation (δ) is unknown then t-test is used. On the other hand Z-test is used for the large sample ($n < 30$) test.
- 8.22** What is right tailed-test?
Ans. A test of any statistical hypothesis where the alternative is right tailed such as $H_0 : \mu = \mu_0$ as $H_1 : \mu > \mu_0$ is called a right tailed test.

- 8.23 **What is null hypothesis?** [N.U. 2014, 2021]
Ans. The hypothesis about a Population Parameter we wish to test is called a null hypothesis.
- 8.24 **What is another name of Test?**
Ans. Another name of t-test is small sample Test or student t-test.
- 8.25 **What is regression?**
Ans: The general process of predicting one variable from another by statistical means, using previous data.
- 8.26 **What is scatter diagram?**
Ans: A graph of points on a rectangular grid; the X and Y coordinates of each point corresponded to the two measurements made

on some particular sample element, and the pattern of points illustrates the relationship between the two variables.

- 8.27 **What is slope?**
Ans : A constant for any given straight line whose value represents how much each unit change of the independent variable changes the dependent variable.
- 8.28 **Define regression equation.** [N.U. 2021]
Ans : The equations by which the regression lines are expressed algebraically are called regression equation.

খ ও গ-বিভাগ (Part-B & C)

সংক্ষিপ্ত ও রচনামূলক প্রশ্নাঙ্গুল

(Short & Broad Questions with Answers)

Ques-8.01 What is regression? (নির্ভরণ কি?)

Or, What do you mean by regression? (নির্ভরণ বলতে কি বুঝ?) [N.U. 2015 (Marketing)]

Or, Definition of regression. (নির্ভরণের সংজ্ঞা দাও।)

Or, What is the concept of regression? (নির্ভরণের ধারণা কী?)

Ans : The statistical technique that expresses the relationship between two or more variables in the form of an equation to estimate the value of a variable based on the given value of another variable is called regression or regression analysis.

Some popular definition is as under :

R.I. Levin said, "Regression and correlation analysis show us how to determine both the nature and the strength of a relationship between two or more variables."

Allen. L.Webster said, "Regression determines the magnitude of the change in Y given a change in X."

Taro Yamane said, "One of the most frequently used technique in economics and business research to find a relation between two or more variables that are related causally is regression or regression analysis."

So it is clear from above definitions that regression or regression analysis is a statistical device with the help of which we are in a position to estimate the unknown values of one variable from known values of another variables.

Ques-8.02 State the uses of regression. (নির্ভরণের ব্যবহার শিখ।)

Or, Discuss the uses or utilities of regression or regression analysis. (নির্ভরণের ব্যবহার আলোচনা কর।)

Or, State the use of regression analysis.

Or, What are the uses of regression analysis?

Ans : The uses of regression or regression analysis are not confined to economics and business field only. Its

1. Regression analysis is used in statistics in all those fields where two or more relative variables are having the tendency to go back to the average.
2. It is very useful for prediction purpose.
3. It is used more than the correlation analysis in many scientific studies.
4. It is widely used in social sciences like economics, natural and physical science.
5. We can calculate co-efficient of correlation and coefficient of determination with the help of regression.
6. It is used in statistical estimation of demand curves, supply curves, production function, cost function etc.
7. It predicts the value of dependent variable from the values of independent variables.
8. It is highly useful and the regression line equation helps to estimate the value of dependent variable, who the values of independent variables are used in the equation.

Ques-8.03 Discuss the importance or significance of regression or regression analysis. (নির্ভরণ বিশ্লেষণের গুরুত্ব আলোচনা কর।)

Or, State the merits or advantages of regression.

Or, state the necessity of regression. (নির্ভরণের গুরুত্ব ও প্রয়োজনীয়তা আলোচনা কর।)

Ans : There are various importance, necessity, merits or advantages of regression. These are as follows :

1. Regression analysis helps to obtain a measure of the error involved in the regression.

Index Number

[সূচক সংখ্যা]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answer)

9.01 What is index number?

[N.U. 2011]

Ans. Index number may be defined as the ratio that measures how much a variable changes over time.

9.02 How many types of index number?

Ans. Index number are 3 kinds. (i) Price Index; (ii) quantity Index; (iii) Value Index.

9.03 What is price index number?

[N.U. 2013]

Ans. The Price Index measures the relative change in the retail or wholesale price level of any Particular Commodity or a group of commodities.

9.04 What is laspeyres Index.

Ans. Laspeyres Index = $\frac{P_1 q_o}{P_o q_o} \times 100$.

9.05 What is Fisher's Index?

Ans. Fisher's Index = $\sqrt{\frac{P_1 q_o}{P_o q_o} \times \frac{P_1 q_1}{P_o q_q}} \times 100$.

9.06 Write the formula Paasche's price Index.

Ans. Paasche's price Index.

$P_{on} = \frac{p_n q_n}{p_o q_n} \times 100$

9.07 What is family budget method.

Ans. When the consumer price Index is computed on the family budgets of a large number of people, is called family budget method.

9.08 What is weighted Aggregate Index?

Ans. Using all the values considered this index assigns weights to these values.

9.09 What is unweighted Aggregates Index?

Ans. Uses all the values considered and assigns equal importance to each of these values.

9.10 What is chain Index.

Ans. At the when several bases are considered without a fixed base, it is called chain index.

9.11 State the meaning 'TRT' & 'F RT'

Ans. TRT means Time reversal test and FRT means Factor reversal test.

9.12 What is Index Number?

Ans: To weight an aggregates index, the Passche method uses as weights the quantities consumed during the current period.

9.13 What is Paasche's Method?

Ans: In weighting an aggregates index, the Passche method uses as weights the quantities consumed during the current period.

9.14 What is Quantity Index?

Ans: A measure of how much the number or quantity of a variable changes over time.

9.15 Under what condition time reversal test and factor reversal test is satisfied?

[N.U. 2012]

Ans. Time Reversal Test is satisfied when $oP_n \times nP_o = 1$

Factor reversal Test is satisfied when. $oP_n \times nQ_o = oV_n = \frac{\sum p_n q_n}{\sum p_o q_o}$

9.16 Which index number is ideal?

Ans. Fisher Index number is Ideal.

[N.U. 2013]

Business Forecasting and Time Series Analysis

[ব্যবসায় পূর্বানুমান ও কালীন সারি বিশ্লেষণ]

ক-বিভাগ (Part-A)

অতিসংক্ষিপ্ত প্রশ্নাবলি ও উত্তর

(Brief Questions & Answers)

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| <p>10.01 What is time series? <i>[N.U. 2016]</i>
 Ans. When data are arranged in against of time, it is called the time series.</p> <p>10.02 Give two examples of time series?
 Ans. (i) The Selling amount (y_t) of a Particular Grocer's shop in everyday.</p> <p>10.03 What is secular trend?
 Ans. A type of variation in a time series, the value of the variable tending to increase or decrease over a long period of time.</p> <p>10.04 Write down the components of time series. <i>[N.U. 2012, 2015]</i>
 Ans. The components of time series are (i) Trend (ii) Seasonal Variation (iii) Cyclical Variation (iv) Irregular variation.</p> <p>10.05 What do you mean by business forecasting?
 Or, What is business forecasting? <i>[N.U. 2015, 2021]</i>
 Ans : Busies formatives is contained with predication of future condition of basemen of the basis of past data.</p> <p>10.06 What are the method of determining trend.
 Ans. There are 4 methods for determining trend-
 (i) Free hand method; (ii) Semi Average Method. (iii) Moving average method; (iv) Least square method.</p> <p>10.07 Define Seasonal Variation.
 Ans. Patterns of change in a time series within a year is called seasonal variation.</p> <p>10.08 Define cyclical variation.
 Ans. The Periodic movements in a time series where the period is more than one year are called cyclic variations.</p> <p>10.09 Define irregular variation.
 Ans. A condition in a time series in which the value of variable is completely unpredictable.</p> <p>10.10 Write the Model of time series.
 Ans. (i) Additive Model $y = T + S + C + I$.
 (ii) Multiplicative Model, $y = TSCI$.</p> <p>10.11 Write four components of time series?
 Ans. Four components of time series are :
 (i) Secular Trend (ii) Seasonal Variation
 (iii) Cyclical fluctuation and (iv) Irregular fluctuation.</p> | <p>10.12 Write the methods of estimating trended?
 Ans. (i) Mean forecast (ii) Naive forecast (iii) Linear trend forecast (iv) Non linear trend forecast.</p> <p>10.13 Give the examples of cyclic variation?
 Ans. Example : The Production of jute in Bangladesh which is influenced by weather, Socio economic condition, farmer's personal view etc.</p> <p>10.14 The additive model of time series is expressed as?
 Ans. Detrending = $\hat{y} = y - \bar{y}$</p> <p>10.15 Multiplicative model is most after used for time series analysis. Is it true or false?
 Ans. True.</p> <p>10.16 Write the multiplicative model of time series?
 Ans. Detrending = $\hat{y} = \frac{y}{\bar{y}}$</p> <p>10.17 What is Cyclical Fluctuation?
 Ans: A type of variation in a time series, in which the value of the variable fluctuates above and below a secular trend line.</p> <p>10.18 What is Modified Mean?
 Ans: A statistical method used in time-series analysis to discard the highest and lowest values when computing a mean.</p> <p>10.19 What is Residual Method?
 Ans: A method of describing the cyclical component of a time series. It assumes that most of the variation in the series not explained by the secular trend is cyclical variation.</p> <p>10.20 What is Seasonal Variation?
 Ans: Patterns of change in a time series within a year, patterns that tend to be repeated from year to year.</p> <p>10.21 What is Secular Trend?
 Ans: A type of variation in a time series, the value of the variable tending to increase or decrease over a long period of time.</p> <p>10.22 What is meant by HO and HA? <i>[N.U. 2012]</i>
 Ans. Ho means null hypothesis (H Subscript 0) Ha means Alternative Hypothesis (H Subscript 1/A)</p> |
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