Assignment No. 1

A]

Q:① :- Define statistics and state applications and limitations of agricultural statistics?

Ans :- Def^n :-

The branch of mathematics which deals with the study of collection of data, analysis of data, presentation of data and its interpretation. is called as statistics.

Applications of Agricultural statistics :-

① Statistical methods are now used practically in all branches of agriculture.

② It was only due to need of statistical tools to handle the problems in agri. research that there was tremendous developments in statistical theory.

③ statistics used in agricultural research for efficient planning of experiment and for interpretation of data.

④ At the first stage of scientific inquiry data pertaining to study has to be collected. This process of data may involves field's trials, laboratory experi-ments and sample survey.

⑤ There is hardly any field whether it be trade, industry or commerce, economics, biology, botany, astronomy, physics, chemistry, education, medicine, sociology, psychology or meteorology where statistical tools are not applied or applicable.

Limitations of statistics :-

① Statistical theory can be applied only when there is variability in the experimental material.

② In chemistry for example chemical combination of two atoms of hydrogen and one atom of oxygen will result in one water molecule.

③ On the other hands in biological science, variability in a common characteristics.

④ Even if particular variety of crop is sowed under similar conditions the yields on the crop from different plots may not be equal.

⑤ Statistics deal with only aggregates or groups and not with individual object.

⑥ The average yeild of a crop per unit area in locality May be good, but there can be field which gives very poor yeild.

⑦ Statistical techniques can not give an explanation for such individual variations

Q.2 :- Define Mean, Mode and Median to compute descrete and continuous series?

Ans :- Mean :-

The sum of total no^r. of obse-rvations devided by total no^n of obser-vations is known as mean.

Mode :-

The mode or modal value is that value in a series observations which is occurs greatest frequency.

Median :-

The median is the middle most item (value) that devides the distribution into two equal parts. when items are arranged in a ascending order called as median.

* computation of A mean :-

In descret series ;

a. Direct method :-

$$\bar{X} = \frac{\Sigma fx}{N}$$

where,

f = Frequency

X = The variable in question.

N = Total no. of observations.

b. Short cut method :-

$$\bar{X} = A + \frac{\Sigma fd}{N}$$

where,

A = Assumed mean

d = (x − A)

N = Total no of observations i.e. Σf

In continuous series ;

① Direct method :-

$$\bar{X} = \frac{\Sigma fm}{N}$$

where, m = mid point of various classes.

f = Frequency

N = total no. of Frequency.

$$\text{Mid-point} = \frac{\text{Lower limit} + \text{Upper limit}}{2}$$

② Short cut method :-

$$\bar{X} = A + \frac{\Sigma fd}{N}$$

* computation of Mode :-

In descret series ;

In descrete series quite often mode can be determined just by inspecting i.e. by looking to the

Value of the variable around which the items are most heavily concentra-
-ted.

In continuous series;
Determine the value of mode by applying the following formula;

$$M_o = l + \frac{\Delta_1}{\Delta_1 + \Delta_2} \times i$$

l = lower limit of modal class.
Δ_1 = Diff between the frequency of the modal class and the frequency of pre modal class i.e. preceeding class.
i.e. $|F_1 - F_0|$.
Δ_2 = The difference between the frequency of the modal class and the frequency of post modal class. i.e. succeding class (ignoring signs).
i.e. $|F_1 - F_2|$
i = The class interval of the modal class

$$M_o = L + \frac{F_1 - F_0}{2F_1 - F_0 - F_2} \times i$$

* Computation of Median;
In descret series;

$$Med^x = \text{size of } \frac{N+1}{2}^{th} \text{ item (value).}$$

In continuous series;

$$\text{Median} = L + \frac{N/2 - C.F.}{F} \times i$$

C.F = cummulative frequency.
F = frequency of the median class.
i = class interval of the median class.

Q. 3:- Explain the concept of measure of central tendency and measure of dispersion?

Ans:- Measure of central tendency :-

one of the most important objectives of statistical analysis is to get one single value that describes the characteristics of the entire mass of unwieldy data such value is called as central value or Average or expected value of the variable. The avera

Average is very commonly used in day to day conversation.

Average :-

Average is an attempt to find one single figure to describes whole of figures called as average.

* measure of Dispersion :-

defn :- Dispersion is the measure of variation of the items or (values). is called as measure of dispersion.

or

The degree to which numerical data tend to spread about and average value is called the variation of or the dispersion of the data.

or

Dispersion is spread of the degree of scattered of variation of the variable about a central value.

or

The measurment of scatterness of the mass of figure is a series about an average is called as measure of ~~central~~ tendency. variations or dispersion

* Significance of measuring variations :-

① To determine the relability of an average or mean.

② As a basis for the control of the variability.

③ To compare two or more series with regard to their availability.

④ To facilitated the use of other statistical measures.

Properties of good measure of variations

① It should be easy to understand.

② It should be easy to defined.

③ It should have sampling study.

Q.4:- Define classification and enlist the types of classification and merits of arithmetic mean ?

Ans:- classification :-

The process of arranging data in group or classes according to resemblance and similarities is technically called classification.

Types of classifications :-

① According to Attributes :-

① Simple classification
② Manifold classification
③
④ According to :

① Geographical classification
② Chronological classification
③ Quantitative classification.
④ Qualitative classification

Merits of Arithmetic mean :-

① It is simplest, average to understand and easier to compute.
② It is affected by the value of every item in the series.
③ It is defined by rigid mathematical formula with the result that every one who computes the average gets the same answer.
④ Being determined by a rigid formula. It tends to itself to subsequent algebric treatment, better than median or the mode.
⑤ The mean is typical in the sense that it is the centre of gravity balancing the value on entire side of it.
⑥ It is calculated value, and not based position in the series.

Q. ⑤:- Explain the need for sampling and
i) Sampling with replacement (SWR)
ii) Sampling without replacement (SWOR)

Ans:- Sampling :-

The method of selecting samples from a population is known as sampling.

Need for sampling :-

The sampling method have been extensively used for variety of purposes and in great diversity of situations.

In practice it may not be possible to collected information on all units of a population due to various reasons such as:

① Lack of resources in terms of money, personnel and equipment.

② The experimentation may be destructive in nature. e.g. finding out the germination percentage of seed material or in evaluating the efficiency of an insecticide the experimentation is destructive.

③ The data may be wasteful if they are not collected within a time limit. The census survey will take longer time as compared to the sample survey. Hence for getting quick results sampling is preffered. Moreover a sample survey will be less costly than complete enumeration.

④ Sampling remains the only way when population contains infinetely many number of units.

⑤ Greater accuracy.

i) Sampling with replacement :- i) When the successive draws are made with placing back the units selected in the proceding draws. it is known as sampling with replacement

ii) It is a method of selection of 'n' units out of the N units one by one such that at each stage of selection each

unit has equal ~~change~~ chance of being selected i.e. $\frac{1}{N}$

ii) Sampling without Replacement (SWOR):

i) When the successive draws are made with placing back the units selected in the preceeding draws. It is known as sampling with replacement and when such replacement is not made it is known as sampling without replace-ment.

ii) It is a method of selection of 'n' units of the N units one by one such that at any stage of selection, anyone of the remaining units have the same chance of being selected i.e. $\frac{1}{N}$.

8] Define :-

① Statistics
② population
③ Sample
④ parameter
⑤ Standard deviation
⑥ Standard error.

Ans:- ① Statistics :-

The branch of mathematics which deals with the study of collection of data, analysis of data, presentation of data and interpretation of data is known as statistics.

② population :-

The aggregate or totality of all possible objects possessing the specified characteristics is called as population.

③ Sample :-

The portion or small numb of unit of the total population is called as sample.

④ parameter :-

A summary that measure and describes any given

characteristics of the population is known as parameter.

(3) Standard deviation :-

It is defined as the positive square-root of the arithmetic mean of the square of the deviations of the given observations from their arithmetic mean.

(5) Standard error :-

The standard deviations of the sampling distributions of a statistics is called as standard error of statistics.

C] Fill in the blanks :-

i) The standard deviation of sample mean distribution is known as standard error.

ii) The sum of deviations of items (values) Ignoring sign is the least.

iii) The difference betn upper limit and lower limit is called as class interval.

D] True or false :-

i) Mode can be located graphically :- True.

ii) Frequency always taken on X axis and class interval always taken on Y-axis. - False.

E]. Write the formula :-

i) Arithmetic mean for ungrouped data

$$\bar{x} = \frac{\Sigma x_i}{N}$$

ii) median for continuous series :-

$$\text{Median} = L + \frac{N/2 - c.f.}{f} \times i$$

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iii) mean deviation, Range and its ~~classification~~ coefficient.

Mean deviation :-

$$M.D. = \frac{1}{N} \cdot \Sigma |X - A|$$

or

$$M.D. = \frac{1}{N} \cdot \Sigma |D|$$

Range = L - S.

coefficient of Range = $\frac{L - S}{L + S}$.

iv) measure of skewness and measure of kurtosis.

skewness = mean = Median = Mode.

coefficient of skewness =

$$Sk = \frac{3 (\text{Mean} - \text{Median})}{S.D.}$$

Measure of kurtosis :-

$$\beta_2 = \frac{\mu_4}{\mu_2}$$