

Semester	:	III (New)	Term	:	I	Academic Year	:	2020-21
Course No.	:	STAT -231	Title	:	Statistical Methods			
Credits	:	2(1+1)						

Q1. State the limitations of statistics.

- Ans: 1. Statistics does not study qualitative phenomenon
 2. Statistics does not study individuals
 3. Statistics laws are not exact laws
 4. Statistics does not reveal the entire information
 5. Statistics is liable to be misused
 6. Statistical conclusions are valid only on average base

Q2. Write down properties of good average.

- Ans: 1. It should be rigidly defined
 2. It should be easy to understand and easy to calculate
 3. It should be based on all the observations
 4. It should be least affected by fluctuations in sampling
 5. It should be capable of further algebraic treatment
 6. It should not be affected much by the extreme values
 7. It should be located easily

Q3. Write the properties of regression coefficient.

- Ans: 1. The geometric mean of the two regression is equal to coefficients regression ($r = \sqrt{b b'}$)
 2. If one of the regression coefficient is greater than unity, the other must be less than unity.
 3. Arithmetic mean of the regression coefficients is greater than the correlation coefficient.
 4. Regression coefficients are independent of the change of origin but not of scale.
 5. Units of "b" are same as that of the dependent variable.
 6. Regression is only a one-way relationship between dependent) and independent variables.
 7. The range of "b" is from $-\infty$ to $+\infty$. $-\infty$ for negative "b" and $+\infty$ for positive b.

Q4. Compare "Census" and "Sampling".

BASIS FOR COMPARISON	CENSUS	SAMPLING
Meaning	A systematic method that collects and records the data about the members of the population is called Census.	Sampling refers to a portion of the population selected to represent the entire group, in all its characteristics.
Enumeration	Complete	Partial
Study of	Each and every unit of the population.	Only a handful of units of the population.
Time required	It is a time consuming process.	It is a fast process.
Cost	Expensive method	Economical method
Results	Reliable and accurate	Less reliable and accurate, due to the margin of error in the data collected.
Error	Not present.	Depends on the size of the population
Appropriate for	Population of heterogeneous nature.	Population of homogeneous nature.

Q5. Write the various steps involved in testing of hypothesis.

Ans: 1. The null and alternative hypothesis will be formulated.

2. Test statistic will be constructed

3. Level of significance will be fixed

4. The table (critical) values will be found out from the tables for a given level of significance

5. The null hypothesis will be rejected at the given level of significance if the value of test statistic is greater than or equal to the critical value. Otherwise null hypothesis will be accepted.

6. In the case of rejection the variation in the estimates will be called 'significant' variation. In the case of acceptance, the variation in the estimates will be called 'not significant'.

SECTION "B"

Q6. Answer in one sentence

a) List out the three basic principles of design of experiment.

Ans: 1. Randomization 2. Replication 3. Local control

b) State the addition theorem on probability.

Ans: Let A and B be any two events which are not mutually exclusive, then

$$P(A \text{ or } B) = P(A \cup B) = P(A + B) = P(A) + P(B) - P(A \cap B) \quad (\text{or}) \\ = P(A) + P(B) - P(AB)$$

c) Write the any two sources of secondary data.

Ans: News paper, TV, internet, Magazines, Books, other publications, etc.

d) Write the full form of CV and SD.

Ans: Coefficient of Variation and Standard Deviation

e) Define Statistics.

Ans: Statistics is the branch of science which deals with the collection, classification and tabulation of numerical facts as the basis for explanations, description and comparison of phenomenon. OR any other definition given text books

f) What is the difference between Deciles and Percentiles?

Ans: Deciles divides the distribution in 10 parts and percentiles in 100 parts.

g) Write the one formula each for Geometric Mean and Harmonic Mean.

Ans: $GM = \sqrt[n]{x_1 \cdot x_2 \cdot x_3 \dots x_n}$

$$HM = \frac{1}{\frac{1}{n} \sum \frac{1}{x}}$$

SECTION "C"

Q13. Choose the correct alternative. (the correct answers are given below.)

1. a) Mean

2. a) Positive

3. a) $2.5 \times n^{1/4}$

4. c) -1 to +1

5. c) Stepping back towards average

6. c) Chi-square-test

7. b) Equal to 1

8. b) Upper limit

9. b) Four

10. a) Poisson

11. a) Type-I

12. a) Pie