Kamala College, Kolhapur (Autonomous)

B.C.A (Part -II) (Semester - III)

Examination December - 2023

Elements of Statistics

Sub. Code: AEC-318

Day and Date: Friday, 01/12/2023   **Total Marks: 80**
Time   : 08:00 am to 11:00 am

Instructions:

1. *Que.1 and Que.8 are compulsory*
2. *Attempt any three questions from Que. No.2 to Que. No. 7*
3. *Figures to the right indicate total marks.*
4. *Use of a simple calculator is allowed.*
5. *Graph papers will be supplied on request.*

Q. 1 Multiple choice questions.   12

1. Which of the following is an example of qualitative data?
   a) Height of a person   b) Temperature in Celsius
   c) Color of a car   d) The number of books in a library
2. A time series data analysis reveals a repeating pattern in data that occurs annually. What type of variation is this indicative of?
   a) Seasonal variation   b) Secular trend
   c) Random variation   d) Cyclic variation
3. If the correlation coefficient between two variables is 0, it suggests:
   a) A strong positive relationship   b) A strong negative relationship
   c) No relationship   d) A perfect relationship
4. The 25th percentile of a dataset is also known as:
   a) The mean   b) The median
   c) The first quartile   d) The standard deviation
5. The mean of a dataset is 25, and the standard deviation is 5. What is the coefficient of variation (CV)?
   a) 20%   b) 5%
   c) 0.2   d) 125%

6. An upward or downward long-term movement in a time series data is called:
   a) Seasonal variation
   b) Secular trend
   c) Random variation
   d) Cyclic variation
7. The interquartile range (IQR) is a measure of:
   a) Central tendency
   b) Dispersion
   c) Association
   d) Probability
8. Which of the following is considered NOT an example of primary data collection?
   a) Surveying people about their preferences
   b) Analyzing data from a published research paper
   c) Interviewing an individual person
   d) Conducting experiments in a laboratory
9. Which of the following is a measure of central tendency that is not affected by outliers in a dataset?
   a) Mean
   b) Median
   c) Mode
   d) Range
10. In a simple linear regression equation $Y = 2X + 5$, the slope of the line is:
    a) 2
    b) 5
    c) 7
    d) None of these
11. What type of sampling technique involves dividing the population into subgroups and then taking a random sample from each subgroup?
    a)   Simple random sampling
    b)   Systematic sampling
    c)   Stratified sampling
    d)   Convenience sampling
12. Which of the following is a measure of association used to analyze the strength and direction of a relationship between two variables?
    a)   Correlation coefficient
    b)   Mode
    c)   Standard deviation
    d)   Variance

Q. 2   16

a) Define mean, median, and mode. Find the same for the following data.

Daily wages (Rs.)	100-200	200-300	300-400	400-500	500-600	600-700
No. of workers	4	6	20	10	5	5

b) Calculate the Range, QD, and SD and their relatives' measures for the data off-sale values.

Sale: 12,25,30,15,15,20,13

Q.3   16

a) Explain the term correlation and types of correlation. Write a note on the scatter diagram.

b) State the relation between regression coefficients and correlation coefficients.

Write the equation of two lines of regression. You are given
$\sum X = 400, \sum Y = 500, N = 10, \sigma_x^2 = 2.5^2, \sigma_y^2 = 3.5^2$ and $r = 0.8$.
Obtain the regression equation Y on X, estimate the value of Y when X=55.

Q.4   16

a) Define Time series and its uses. Obtain three yearly moving and progressive averages of the following data.

Year	2011	2012	2013	2014	2015	2016	2017	2018
Values	20	24	22	25	28	30	33	30

b) Explain why the sampling technique is better than the census method. What are the different methods of sampling? Explain any one of them.

Q.5   16

a) The following data gives the number of catches taken by A and B in 5 one-day matches.

Catches were taken by A	5	4	4	3	5
Catches were taken by B	4	2	1	0	1

b) State the requirements of good averages. The average income of factory workers was Rs. 270. The mean income of 70 male workers was Rs 300. Find the mean income of 30 female workers.

Q.6   16

a) You are analyzing the monthly incomes of employees in a company, which are grouped into income intervals. The frequency distribution of incomes is as follows:

Income Interval (in $000s)	20-30	30-40	40-50	50-60	60-70
No. of employee	8	12	18	10	6

Draw a histogram and ogive curve of this data. Determine the median and mode using the same.

b)   State and explain the components of time series in detail.

Q.7   16

a) Define Spearman's rank and Karl Pearson's correlation coefficient. Calculate Spearman's rank correlation coefficient (R) between the two kinds of assessment of graduate student's performance in a college and interpret it.

Student ID	1	2	3	4	5	6	7	8	9
Internal Marks (X)	47	38	60	46	50	65	51	68	73
External Marks (Y)	50	30	35	44	58	66	49	72	74

b) Define the terms: Class interval, Mid Value, Class frequency, and Frequency distribution.

Q.8 Write notes. (Any four out of six)   20
   a) Discrete and Continuous random variable
   b) Requirements of good measures of dispersion.
   c) Primary and Secondary Data.
   d) Concept of Regression and lines of regression.
   e) Merits and Demerits of mean.
   f) Sample, Population and Sampling