Seat No.	

Kamala College, Kolhapur

(Autonomous)

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

Examination March/April - 2024

Elements of Statistics

Sub. Code: AEC-318

Day and Date: Saturday, 20/04/2024

Time : 12:00 pm to 03:00 pm

Total Marks: 80

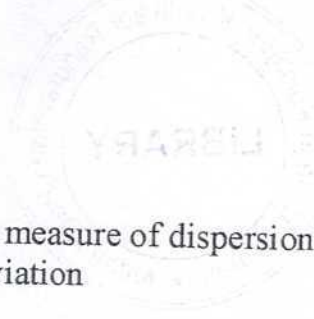**Instructions:**

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. If all observations in a set of observations are the same, the variance of the set of values is :
   a) One   b) Zero   c) Infinity   d) Not possible to calculate

2. A population consisting of all real numbers is an example of :
   a) A finite population   b) An infinite population
   c) An imaginary population   d) None of the above

3. Range of the following data:
   52,62,72,82,92
   a) 0   b) 40   c) -40   d) Not determinable

4. Which of the following is a measure of central tendency?
   a) Quartile deviation   b) Mean
   c) Standard deviation   d) None of the above

5. Which of the following is a unitless measure of dispersion?
   a) Range   b) Mean deviation
   c) Coefficient of variation   d) Standard deviation

6. Which absolute measure of dispersion is not affected by extreme values?
   a) Standard deviation
   b) Coefficient of variation
   c) Range
   d) Quartile deviation

7. Which of the following is a measure of dispersion?
   a) Range
   b) S.D
   c) Variance
   d) All of the above

8. The mean of the following data 40,50,55,78,58 is:
   a) 57   b) 57.2   c) 56   d) 56.2

9. 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

10. What is the main purpose of using regression analysis?
    a) To determine causation between variables
    b) To predict the value of one variable based on another
    c) To calculate the standard deviation of the data
    d) To measure the association between variables without making predictions

11. What are the main components of a time series?
    a) Trend, seasonality, and noise
    b) Mean, median, and mode
    c) Variance, standard deviation, and skewness
    d) Correlation, regression, and covariance

12. Which of the following scenarios represents an example of a time series dataset?
    a) The population of a city at different time points.
    b) The shoe sizes of individuals in a store.
    c) The colors of cars in a parking lot.
    d) The weights of fruits in a basket.

Q. 2

16

a) Explain the different types of sampling methods. State advantages of sampling over the census method.

b) Draw a pie and bar diagram to represent the following data.

Items of expenditure	expenditure
Food	85
Clothing	45
House rent	70
Education	62
Fuel	30
miscellaneous	25

Q.3   16

a) What is meant by correlation? Distinguish between linear and non-linear correlation. Find Spearman's rank coefficient of correlation

Age of Cars	2	4	6	8	10	12
Cost (Rs.) (In'00 Rs.)	16	15	18	17	21	20

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

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

Q.4   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 and SD and their relatives' measures for the data off-sale values.

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

Q.5   16

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

Runs taken by A	50	40	40	30	50
Runs taken by B	40	20	10	00	10

Calculate the coefficient of variation, compare the CV, and interpret who is more consistent.

b) State the requirements of good averages. State the relationship between the mean, median, and mode. For a moderately skewed distribution, the difference between mean and mode is 6 and their sum is 50, find the value of the median.

Q.6

a) Define Spearman's rank and Karl Pearson's correlation coefficient. Calculate the Spearman 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: Frequency, Inclusive and Exclusive types of classes, Frequency distribution and Mid-point.

Q.7

a) Explain various components of time series. Give two examples of each component. Apply the method of 3 yearly moving.

Year	Production (Tones)
2012	40
2013	44
2014	42
2015	48
2016	51
2017	50
2018	54
2019	56

b) Define time series. State its uses. For time series data, if y= 110.83+ 11.07x; where x = 2t-4001, is the equation of best-fitted trend then estimate the value of y for t = 2020.

Q.8 Write notes. (Any four out of six)

a) Meaning and Scope of statistic.

b) Least square method for measuring trend.

c) Discrete and Continuous random variable

d) Concept of Regression and lines of regression.

e) Merits and Demerits of the mean.

f) Primary and Secondary data.

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