

BBA 3rd Semester (Honours) Examination, 2023 (CBCS)

Subject : Business Statistics

Course : BBA-3.2

Time: 4 Hours

Full Marks: 80

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.*

Answer Question No. 1 and any five from the rest.

1. Answer any ten questions:

2×10=20

~~(a)~~ Define median for a grouped frequency distribution.

~~(b)~~ What do you understand by classification of data?

~~(c)~~ Define Central Tendency.

~~(d)~~ What do you mean by 'measures of location'?

~~(e)~~ What are the partition values of a distribution?

~~(f)~~ Find the median of the simple series:

32, 22, 29, 17, 40, 26, 21, 20.

~~(g)~~ What do you mean by an inclusive series?

~~(h)~~ What do you understand by the term 'regression'?

~~(i)~~ What is meant by an index number?

~~(j)~~ When does a distribution get positively and negatively skewed?

~~(k)~~ Why is Fisher's index called ideal?

(l) The average rates of dividend for engineering chemical and textile industry for a year are 25%, 40% and 20%. The number of observations on which these averages are based are 40, 50 and 30. Calculate the pooled arithmetic mean.

(m) The sum of 50 observations is 500, the sum of their square is 6000 and their median is 12. Find the coefficient of skewness.

(n) What is the difference between the Additive model and Multiplicative model of time series?

(o) If two groups contain n_1 and n_2 observations with means \bar{x}_1, \bar{x}_2 and standard deviations σ_1 and σ_2 respectively, then what is the standard deviation of the composite group, taking n_1 and n_2 observations together?

2. (a) For any four real quantities a, b, c and d , show that A.M. > G.M.
 (b) In two factories A and B engaged in the same industry in an area, the average weekly wages in Rs. and the standard deviations are as follows:

Factory	Average Weekly Wage	S.D.	No. of Wage Earners
A	34.5	5.0	476
B	28.5	4.5	524

- (i) Which factory A or B pays out larger amount as weekly wages?
 (ii) What is the average wages of all the workers in two factories taken together?
 (iii) In a frequency distribution, the coefficient of skewness based on quartiles is 0.6. If the sum of the upper and lower quartiles is 100 and median is 38, find the value of upper quartiles. 4+(3+2+3)
3. (a) The arithmetic mean of two observations is 127.5 and their geometric mean is 60. Find (i) their harmonic mean and (ii) the two observations.
 (b) The arithmetic mean and standard deviation of series of 20 items were calculated by a student as 20 cms and 5 cms respectively. But while calculating them an item 13 was misread as 30. Find the correct arithmetic mean and standard deviation. 6+6

4. (a) Pearson's measure of skewness of a distribution is 0.5. Its median and mode are respectively 42 and 36. Find the coefficient of variation.
 (b) How is skewness different from Kurtosis?
 (c) For a mesokurtic distribution, the first moment about 7 is 23 and the second moment about origin is 1000. Find the fourth moment about the mean. 4+3+5

5. (a) What is correlation? Explain the implications of positive and negative correlation.
 (b) The coefficient of correlation between two variables X and Y is 0.48. The covariance is 36. The variance of X is 16. Find the standard deviation of Y.
 (c) Given the following information:
 $r_{xy} = 0.8, \sum xy = 60, \sigma_y = 2.5$ and $\sum x^2 = 90$, where x and y are the deviations from the respective means, find the number of items (n). 6+3+3

6. (a) The value of Spearman's rank correlation coefficient for certain pairs of number of observations, was found to be $2/3$. The sum of squares of the differences between corresponding ranks was 55. Find the number of pairs.
 (b) Quotations of index number of security prices of a certain joint stock company and of prices of preference shares and debentures are given below:

Preference Share Price (X) :

73.2 85.8 78.9 75.8 77.2 81.2 83.8

Debentures Price (Y) :

97.8 99.2 98.8 98.3 98.3 96.7 97.1

Use the method of rank correlation to determine the relationship between preference prices and debenture prices.

7. (a) On each of 30 items, two measurements are made. The following summations are given:
 $\sum X = 15$, $\sum Y = -6$, $\sum XY = 56$, $\sum X^2 = 61$ and $\sum Y^2 = 90$.
 Calculate the product moment correlation coefficient and the slope of the regression line of Y on X. How would your results be affected if X is replaced by $U = (X - 1)/2$.
- (b) If the two lines of regression lines are:
 $4x - 5y + 30 = 0$ _____ (i) and
 $20x - 9y - 107 = 0$ _____ (ii), which of these is the line of regression of x on y, and y on x. Find r_{xy} and σ_y , when $\sigma_x = 3$. 6+6

8. (a) What are the important points which have to be considered in the construction of index numbers?
- (b) From the following data calculate both price index and quantity index numbers using
 (i) Laspeyres' formula
 (ii) Fisher's ideal formula 6+6

Article	Base Year		Current Year	
	Price (Rs.)	Quantity	Price (Rs.)	Quantity
A	10	30	12	48
B	15	60	15	75
C	5	50	8	96
D	2	10	3	25

9. (a) Discuss the various components of time series.
- (b) Fit a parabolic curve to the time series data given below and estimate the trend value for 2019 : 6+6

Year :	2014	2015	2016	2017	2018
Sales :	10	12	13	10	8

10. Write short notes on *any two*: 6×2=12

- (a) Geometric mean
 (b) Properties of linear regression
 (c) Time reversal and Factor reversal Test of Index numbers
 (d) Least Square Method for linear trend

$\frac{1}{2.5} \times 3$