Seat No. : _____

NP-103

November-2025

BBA/BS (BBA), Sem.-III

MDC-234 : Business Statistics

Time : 2:00 Hours] **[Max. Marks : 50**

Instruction : Use of simple calculator is allowed.

1. (a) Define the terms with example. **5**
   (1) Nominal
   (2) Ordinal
   (3) Interval
   (4) Ratio

1. (b) Ms. Payal Tikki, HR analyst at Blue Wave Enterprises, recorded the weekly work hours of employees : **5**

Weekly Work Hours (Hours)	0-2	2-4	4-6	6-8	8-10	10-12
Number of Employees	20	35	40	25	50	29

Determine the Mean, Median, and Mode to understand employee workload and support workforce planning.

OR

1. (a) The table below shows the distribution of time (in minutes per day) spent on mobile phones by college students : **5**

Mobile Usage (minutes/day)	44-46	46-48	48-50	50-52	52-54	54-56	56-58
Number of Students	15	35	40	65	42	39	7

Compute the co-efficient of quartile deviation.

1. (b) Mr. Natwar Hatela, HR analyst, wants to compare salaries of workers in two manufacturing firms to see which offers better compensation : **5**

Firm	**Number of Workers**	**Mean Salary (₹)**	**SD (₹)**
A	500	1500	200
B	550	1300	150

Decide which firm provides better pay and consistency for employees.

2. (a) Mr. Shailesh Vaghmare, financial analyst at XYZ Investments, wants to see if mutual fund returns are influenced by Sensex returns : **5**

Sensex Return (%)	10	12	15	11	14	16	13	18
Mutual Fund Return (%)	7	8	10	7	9	11	8	13

Calculate Karl Pearson's correlation coefficient to guide investment strategies and portfolio allocation.

2. (b) If $r_{12} = 0.6$, $r_{13} = 0.7$, $r_{23} = 0.65$, find partial correlation coefficient between x_1 and x_2 after eliminating the linear effect of x_3 (i.e., $r_{12.3}$). **5**

OR

2. (a) Dr. Siddhi Sharmili, education researcher at Greenfield College, wants to see if students who score high in Mathematics also score high in Statistics : **5**

Mathematics Marks	85	78	92	70	85	65	78	92
Statistics Marks	88	82	95	72	90	68	80	95

Find the Spearman's Rank Correlation Coefficient to identify performance patterns and guide remedial or enrichment programs.

2. (b) If $r_{12} = 0.6$, $r_{13} = 0.3$, $r_{23} = 0.5$, find multiple correlation coefficient between x_1 and a group of variables x_2 and x_3 (i.e., $R_{1.23}$). **5**

3. (a) State Properties of Regression Coefficients. **5**

3. (b) In a random sample of size 28, $b_{xy} = -1.3$ and $\frac{S_x^2}{S_y^2} = 4$, find r and b_{yx}. **5**

OR

3. (a) The two regression equations are $x = 4.2 + 0.2\,y$ and $y = 2.4 + 0.32x$, find the value of $\bar{x}$, $\bar{y}$ and r. **5**

3. (b) Find partial regression coefficient of x_1 on x_2 after eliminating linear effect of x_3 i.e., $b_{12.3}$, if $r_{12} = 0.65$, $r_{13} = 0.5$, $r_{23} = 0.3$, $S_1 = 2$, $S_2 = 3$ and $S_3 = 4$. **5**

4. (a) Discuss various components of Time Series. **5**

4. (b) Ms. Charmy Chaplin, market analyst at ABC Retailers, wants to study quarterly sales from 1985 to 1989 to identify peak and low seasons : **5**

Year	Quarter			
	Q1	**Q2**	**Q3**	**Q4**
1985	58	50	60	55
1986	60	60	66	59
1987	63	50	60	60
1988	73	55	55	63
1989	72	75	65	74

Calculate seasonal indices to guide production, inventory, and marketing strategies.

OR

4. (a) Mr. Kaival Chikna, a researcher, wants to observe the trend of a stock by smoothing its monthly closing prices using a 7-month moving average : **5**

Month	1	2	3	4	5	6	7	8	9	10	11	12
Price (₹)	100	102	101	105	107	110	108	109	111	115	117	120

This helps in identifying the underlying trend of the stock prices.

4. (b) Dr. Yana Tandon, a production analyst, wants to study the annual production (in '000 tons) of a company. Fit a straight-line trend using the least squares method to understand the growth trend of production over the years. Also find production of the year 2007. **5**

Year	1995	1997	1999	2001	2003
Production ('000 tons)	40	50	66	74	80

5. Do as directed : (Any **10**) **10**

(1) Time 00:00 or Temperature 0°C is an example of _____ level.

(a) Interval (b) Ratio

(2) In a google form if a question is "State any five things that are interesting in your college life" then it is a/an _____ question.

(a) open ended (b) closed ended

(3) Karl Pearson Product Moment Method is used for _____ data.

(a) quantitative (b) qualitative

(4) If $\sum d^2 = 0$, then correlation coefficient is _____.

(a) 1 (b) 0

(5) The correlation coefficient is independent of change of Origin and Scale. (True/False)

(6) _____ variation may be caused by factors like strikes, floods, natural calamities etc.

(a) Cyclical (b) Irregular

(7) If the linear trend Y = 25.7 + 2.5(X – 2002), then the trend for the year 2007 is _____.

(a) 38.2 (b) 141

(8) The average of each quarter of the data is 65.75, 58.25, 56.50 and 59.50. Obtain seasonal indices for first quarter.

(a) 109.6 (b) 97.1

(c) 94.2 (d) 99.17

(9) b_{yx}, b_{xy} and r have always the same sign. (True/False)

(10) 4 different shopping applications are ranked by one customer is an example of _____ level.

(a) nominal (b) ordinal

(11) Regression was first used by Sir Francis Gatton. (True/False)

(12) The _____ of regression coefficient is equal to the square of the correlation coefficient.

(a) sum (b) product