



WEST BENGAL STATE UNIVERSITY
B.Com. Major 4th Semester Examination, 2025

BCMDSC404T-B.COM. (MAJOR)
BUSINESS MATHEMATICS AND STATISTICS

Time Allotted: 2 Hours

Full Marks: 50

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

Answer any two questions from the following

10×2 = 20

1. (a) Evaluate: $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x - 3}$

= ② $\frac{3 + (2+2+1)}{+2}$

- (b) A firm produces x units of output at a total cost of Rs. $\left(300x - 10x^2 + \frac{1}{3}x^3\right)$. Find
(i) output, at which marginal cost is minimum (ii) output at which average cost is minimum (iii) output at which average cost is equal to marginal cost.

(c) Find $\frac{dy}{dx}$ if $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

2. (a) If $A = \{1, 2, 3, 5, 7\}$ and $B = \{2, 3, 4\}$, find $A - B$ and $A \cap B$.

2+4+4

- (b) Two unbiased dices are thrown together. Find all possible outcomes. What is the probability of getting sum of two faces 8?

- (c) Sum of two numbers is 12. Find the maximum value of their product.

3. (a) Draw a pie chart to present the following data on the proposed outlay during a Five-Year plan of a Government.

4+4+2

Items	Rs. (in Crores)
Agriculture	12,000
Industry and Minerals	9,000
Irrigation and Power	6,000
Education	8,000
Communication	5,000

- (b) Calculate the standard deviation for the following data:

x	5	10	15	20	25
f	1	2	3	2	1

- (c) If the mean and median of a frequency distribution be 35 and 33 respectively, find the mode of the distribution.

4. (a) For a matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, find $A + A'$. Where A' is the transpose of A .

2+4+4

- (b) If $r_{xy} = 0.6$, $\sigma_y = 4$ and $b_{yx} = 0.48$, find the value of σ_x .

- (c) Fit a least square straight line to the following data taking x as independent variable and y as dependent variable:

x	0	5	10	15	20	25
y	12	15	17	22	24	30

GROUP-B

Answer any two questions from the following

15×2 = 30

5. (a) What sum of money invested at 5% per annum, payable half-yearly, for two years will amount to Rs. 1000?

5+5+5

- (b) Solve by Cramer's rule:

$$x + 2y - z = 9$$

$$2x - y + 3z = -2$$

$$3x + 2y + 3z = 9$$

- (c) In a class of 50 students, 15 students read Economics, 20 read Computer Science and 20 read Mathematics, 3 read Economics and Computer Science, 6 read Computer Science and Mathematics, 5 read Economics and Mathematics, 7 read none of the three subjects. How many students read all three subjects? (Solve this problem using set operation)

6. (a) The median and mode of the following daily wage distribution of 230 workers are known to be Rs. 33.50 and Rs. 34 respectively. Find the missing frequency.

8+7

Wages (Rs.)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	16	?	?	40	?	4

- (b) Ten students obtained the following marks in Mathematics and Statistics. Calculate the rank correlation coefficient:

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks in Mathematics	78	52	48	68	62	25	90	52	48	69
Marks in Statistics	68	42	60	58	42	30	78	42	58	61

= 7

7. (a) The score of two batsman A and B in ten innings during a certain season are

8+7

A	32	28	47	63	71	39	10	60	96	14
B	19	31	48	53	67	90	10	62	40	80

= 8

Who is more consistent player in scoring?

- (b) Using 3 year moving average method determine the trend and short-term fluctuations for the following data:

Year	1961	1962	1963	1964	1965	1966	1967
Values	21	34	45	28	40	57	73

2
2.2 - 20 + 6