



WEST BENGAL STATE UNIVERSITY
B.Com. Programme 2nd Semester Examination, 2021

FACGCOR04T-B.Com. (DSC4)

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

1. Answer any **five** questions from the following: 2×5 = 10
- (a) If $A = \{1, 3\}$ and $B = \{4, 5\}$ are two sets then show that $A \times B \neq B \times A$.
- (b) If $X = \begin{pmatrix} 1 & 2 \\ 0 & -1 \end{pmatrix}$, find $X \cdot X^T$, where X^T is transpose of X .
- (c) Using left hand limit and right hand limit, test existence of $\lim_{x \rightarrow 0} \frac{|x|}{x}$.
- (d) Find $\frac{dy}{dx}$, where $y = \frac{3x}{x+2}$.
- (e) Find the median of the following numbers: 4, 3, 2, 5, 3, 4, 5, 1, 7, 3, 2, 1.
- (f) If Mode = 45 and Median = 25 of a given distribution. Find Mean.
- (g) If $r = 0.4$, $\text{cov}(x, y) = 10$ and $\sigma_y = 5$, then find the value of σ_x .
- (h) Find the Geometric Mean (G M) of 3, 9, 27.

GROUP-B

Answer any four questions from the following

5×4 = 20

2. Without using Venn diagram, for any sets A , B and C , prove that
$$A - (B \cup C) = (A - B) \cap (A - C).$$
3. Solve the system of equations by Cramer's rule:
$$2x - 3y + z = 4; \quad x - y + z = 6; \quad 3x + 5y - z = 19$$
4. In what time will a sum of money double itself at 5% p.a. compound interest?
(Given $\log 2 = 0.3010$; $\log 105 = 2.0212$).

5. Show that the minimum value of the function $f(x) = x + \frac{1}{x}$ is greater than its maximum value.

6. Draw the cumulative frequency diagram (both more-than and less-than ogive) of the following frequency distribution and locate graphically the median:

Marks-group	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total
No. of students	4	8	11	15	12	6	4	60

7. Determine the relative importance for food group, given that the cost of living index number for 1995 with 1990 as base is 175 from the following figures:

Group	Food	Clothing	Fuel	Rent	Miscellaneous
% increased in expenditure	65	90	20	150	70
Weight	?	12	18	20	10

GROUP-C

Answer any *two* questions from the following

10×2 = 20

8. The median and the mode of the following daily wage distribution of 230 workers are known to be Rs. 33.50 and Rs. 34 respectively. Find missing frequencies.

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

9. (a) If $y = e^{ax} - e^{-ax}$, then show that $\frac{d^2y}{dx^2} = a^2y$.

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- (b) Calculate mean deviation about median and its coefficient from the following data:

5

x	10	11	12	13	14
f	3	12	18	12	3

- 10.(a) Find the rank correlation of 9 students at the College test (x) and the University examination (y) are as follows:

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x	77	50	71	72	81	94	96	99	67
y	82	66	78	84	47	85	99	99	68

- (b) Find mode of the following data:

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Marks	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45
No. of students	7	10	16	32	24	18	10	5	1

N.B. : Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.

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