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 $X . X^T$, where X^T is transpose of *X*.

 (c) Using left hand limit and right hand limit, test existence of $\lim_{x \to 0} \dfrac{|x|}{x}$.

 (d) Find $\dfrac{dy}{dx}$, where $y = \dfrac{3x}{x+2}$.

 (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:
$$2x - 3y + z = 4;\ x - y + z = 6;\ 3x + 5y - z = 19$$

4.   In what time will a sum of money double itself at 5% p.a. compound interest?
(Given log2 = 0.3010; log105 = 2.0212).

5. Show that the minimum value of the function $f(x) = x + \dfrac{1}{x}$ 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 $\qquad 10 \times 2 = 20$

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.   10

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 $\dfrac{d^2 y}{dx^2} = a^2 y$.   5

(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: 6

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: 4

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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