'समानो मन्त्रः समितिः समानी'

UNIVERSITY OF NORTH BENGAL
B.Com. Programme 4th Semester Examination, 2023

DSC8-COMMERCE

BUSINESS MATHEMATICS AND STATISTICS

Time Allotted: 2 Hours
Full Marks: 60

The figures in the margin indicate full marks.

GROUP-A / বিভাগ-ক / खण्ड-क

Answer any *two* questions
যে-কোন *দুটি* প্রশ্নের উত্তর দাও
कुनै दुई प्रश्नको उत्तर दिनुहोस्

$12 \times 2 = 24$

1. (a) The expenditure of 1,000 families is given below: 6

Expenditure:	40-59	60-79	80-99	100-119	120-139
No. of Families:	50	?	500	?	50

The median of the distribution is Rs. 87.50. Find the missing families.

(b) Evaluate: 6

$$\lim_{x \to 1} \frac{x^2 - 1}{\sqrt{3x+1} - \sqrt{5x-1}}$$

2. (a) Fit a straight line trend equation by the method of least square and estimate the value of 2010: 6

Year:	2001	2002	2003	2004	2005	2006	2007	2008
Value:	380	400	650	720	690	600	870	930

(b) If $x = t \log t$ and $y = \frac{\log t}{t}$, find $\frac{dy}{dx}$ at $t = 1$. 6

3. (a) Define Consumer Price Index and explain its uses. 6

'Consumer Price Index'-এর সংজ্ঞা দাও এবং এর ব্যবহারগুলি কি কি ?

Consumer Price Index परिभाषित गर्नुहोस् र यसको प्रयोगहरू व्याख्या गर्नुहोस् ।

(b) A sum of money invested at C. I. payable yearly amounts to Rs. 10,816 at the end of the second year and to Rs. 11,248.64 at the end of the third year. Find the rate of interest and the sum. 6

4. (a) Ten students were given the following marks in Mathematics and Statistics: 6

Mathematics (x):	40	20	10	48	6	37	14	8	7	18
Statistics (y):	30	35	25	32	15	45	20	3	10	27

Calculate the rank correlation coefficient between x and y.

(b) Find the inverse of the matrix A where $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & -2 & -3 \\ 3 & 1 & 6 \end{bmatrix}$ and hence solve the   6

equation $2x + 3y + 4z = 4$, $5x - 2y - 3z = 4$, $3x + y + 6z = 1$.

GROUP-B / বিভাগ-খ / খণ্ড-খ

5. Answer any *four* questions: $6 \times 4 = 24$

যে-কোন *চারটি* প্রশ্নের উত্তর দাওঃ

কুনै <u>चार</u> प्रश्नको उत्तर दिनुहोस्

(a) Find S.D. from the following frequency distribution: 6

Weight:	44-46	46-48	48-50	50-52	52-54
Frequency:	3	24	27	21	5

(b) A function $f(x)$ is defined as follows: 6

$$f(x) = \begin{cases} 3 + 2x & \text{for} & -3/2 \le x < 0 \\ 3 - 2x & \text{for} & 0 \le x < 3/2 \\ -3 - 2x & \text{for} & x \ge 3/2 \end{cases}$$

Show that $f(x)$ is continuous for $x = 0$ and discontinuous for $x = 3/2$.

(c) Prepare Price Index Number for 2000 with 1994 as base from the following data   6
by using Fisher's method:

Commodity	1994		2000	
	Quantity	Price (Rs.)	Quantity	Price (Rs.)
A	5	2.00	7	4.50
B	7	2.50	10	3.20
C	6	8.00	6	4.50
D	2	1.00	9	1.80

(d) Find from the first principle the derivative of $\dfrac{1}{\sqrt{x}}$.   6

(e) Find the matrices A and B given that :   6

$$2A + B = \begin{bmatrix} 2 & 3 \\ 5 & 1 \end{bmatrix} \text{ and } 3B - 2A = \begin{bmatrix} 10 & 1 \\ 3 & 5 \end{bmatrix}$$

(f) Find $\dfrac{dy}{dx}$ when: 3+3

(i) $y = 2^x \cdot x^5$ (ii) $3x^2 - x^2 y + 2y^3 = 0$.

GROUP-C / বিভাগ-গ / खण्ड-ग

6. Answer any *four* questions: $3 \times 4 = 12$

যে-কোন *চারটি* প্রশ্নের উত্তর দাওঃ

कुनै <u>चार</u> प्रश्नको उत्तर दिनुहोस्

(a) In a moderately asymmetrical distribution, the Mode and Mean are 32.1 and 35.4 respectively. Calculate the Median.   3

(b) What is Singular Matrix?   3

Singular Matrix কি ?

Singular Matrix भनेको के हो ?

(c) In what time will a sum of money be double itself at 5% p.a. C. I.?   3

(d) If $f(x) = |x| - 2x$, find $f(1)$ and $f(-1)$.   3

(e) For the following lines of regression find the mean values of x and y: 3

     $8x - 10y + 66 = 0$, $40x - 18y = 214$

(f) The mean of the following numbers is 68, find the value of x: 3

     45, 52, 60, x, 69, 70, 26, 81, 94.

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