UNIVERSITY OF NORTH BENGAL

B.Com. Programme 4th Semester Examination, 2020

DSC8-COMMERCE

BUSINESS MATHEMATICS AND STATISTICS

Full Marks: 60

ASSIGNMENT

The figures in the margin indicate full marks.
All symbols are of usual significance.

Answer any *three* questions　　　　20×3 = 60

किन्हीं <u>तीन</u> प्रश्नों का उत्तर दीजिये

নিম্নলিখিত যে-কোনো *তিনটি* প্রশ্নের উত্তর দাও

कुनै <u>तीन</u> प्रश्नका उत्तर दिनुहोस्

1. (a) Solve by Cramer's Rule:　　　　7+7+6

　　　　$3/x + 2/y + 4/z = 19$

　　　　$2/x - 1/y + 1/z = 3$

　　　　$6/x + 7/y - 1/z = 17$

　　(b) Prove that the function $f(x) = 12 - 24x - 15x^2 - 2x^3$ has x maximum at $x = -1$ and minimum at $x = -4$ and point of inflexion at $x = -5/2$.

　　(c) Evaluate:

$$\int \frac{e^{-x}dx}{1 + e^{-x}}$$

2. (a) A function is defined as:　　　　7+7+6

　　　　$f(x) \quad = x \qquad$ when $x < 1$

　　　　　　　　$= 1 + x \quad$ when $x > 1$

　　　　　　　　$= 3/2 \quad$ when $x = 1$

　　　Examine the continuity of the function at $x = \frac{1}{2}$ and $x = 1$.

　　(b) The total cost 'C' of output 'q' is given by $C = 300q - 10q^2 + 1/3\,q^3$

　　　Find the output levels at which the marginal cost and the average cost attain their respective minima.

　　(c) Define Consumer Price Index and explain its uses.

3. (a) The mean weight of 150 students in a class is 60 kg. The mean weight of boy students is 70 kg and the mean weight of girl students is 55 kg. Find the number of boys and girls in the class.   7+7+6

(b) The expenditure of 1000 families is given below

Expenditure (Rs.)	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 number of missing families.

(c) Show that correlation coefficient is geometric mean of regression coefficients.

4. (a) Find SD from the following frequency distribution   7+7+6

Weight	40-46	46-48	48-50	50-52	52-54	Total
Frequency	3	24	27	21	5	80

(b) In order to find the correlation coefficient between two variables X and Y from 12 pairs of observations, the following calculation were made

$$\sum X = 30, \ \sum Y = 5, \ \sum X^2 = 670, \ \sum Y^2 = 285, \ \sum XY = 334$$

On subsequent verification, it was found that $(X = 11, Y = 4)$ was copied wrongly, the correct value being $(X = 10, Y = 14)$, find the correct value of correlation coefficient.

(c) Prove that Fisher's Index Number satisfies both time reversal test and factor reversal test.

5. (a) Fit a straight line trend equation by the method of least square and estimate the value of 2010.   8+12

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

(b) Find the median and mode from the frequency distribution:

Marks	Number of students
Less than 10	5
Less than 20	9
Less than 30	15
Less than 40	18
Less than 50	22

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