WEST BENGAL STATE UNIVERSITY
B.Com. Honours 2nd Semester Examination, 2022

FACHGEC02T-B.Com. (GE2)

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 *five* questions from the following   2×5 = 10

1. (a) If $S = \{1, 3, 5, 7, 9, 12, 15\}$ be a universal set and $X = \{1, 5, 9, 15\}$, $Y = \{3, 7, 9, 12, 15\}$ are two subsets of S then find
$$(X \cap Y) \cup (X - Y)$$

   (b) If $A = \begin{pmatrix} -3 & 0 \\ -7 & 10 \end{pmatrix}$ and $B = \begin{pmatrix} -5 & 3 \\ 0 & -7 \end{pmatrix}$ find AB and BA.

   (c) Evaluate: $\lim\limits_{x \to 3} \dfrac{\sqrt{x} - \sqrt{3}}{x^2 - 9}$.

   (d) Find $\dfrac{dy}{dx}$ when $y = e^{3x^2}$.

   (e) Calculate the mode of the following numbers:
   7, 4, 10, 15, 7, 3, 5, 2, 9, 12

   (f) For a distribution A.M. in 40 and variance is 100; find the co-efficient of variance.

   (g) If $b_{yx} = -0.9$ and $b_{xy} = -0.4$, find r_{xy}.

   (h) Find the S.D. of 1, 5, 6.

GROUP-B

Answer any *four* questions from the following   5×4 = 20

2.   In a class of 30 students, 12 students have taken Economics, 10 students have taken Economics but not Mathematics. Find the number of students who have taken Economics and Mathematics and those who have taken Mathematics but not Economics (by set theory solve it).

3.   Show that $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix} = (x-y)(y-z)(z-x)$

4.   Calculate the compound interest on Rs. 2000 at 5% in 5 years, the interest being compounded annually.

5.   Show that the function $f(x) = x^5 - 5x^4 + 5x^3 + 10$ has maximum at 1 and minimum at 3 but it has neither maximum nor minimum at 0.

6.   Draw a pie chart from the following data:

Revenue from central government:	160 cr.
Customs:	500 cr.
Excise:	330 cr.
Income tax:	110 cr.
Other Sources:	100 cr.

7.   Calculate the mean deviation from the mean for the following data:

Marks	0-10	10-20	20-30	30-40	40-50
No. of Students	6	5	8	15	16

8.   Find the correlation of coefficient from the following distributions:

x	1	2	3	4	5
y	6	8	11	8	12

9.   Find the cost of living index number of the following table:

Items	Index	Weights
P	317	50
Q	195	20
R	200	10
S	150	25
T	248	15

GROUP-C

Answer any *two* questions from the following $10 \times 2 = 20$

10.(a) Solve by Cramer's rule: 5

   $2x - 3y + z = 4$, $x - y + z = 6$, $3x + 5y - z = 19$

(b) Fit a straight line trend by the method of least squares and estimate the trend values: 5

Year	1961	1962	1963	1964	1965	1966	1967	1968
Value	80	90	92	83	94	99	92	104

11.   An incomplete distribution is given below: 10

Variable	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
Frequency	12	30	?	65	?	25	18	229

If median is 46 then find the missing frequencies.

12.(a) Calculate 5-yearly moving averages for the following time series: 5

Year	1	2	3	4	5	6	7	8	9	10
Value	110	104	98	105	109	120	115	110	114	122

(b) The average weight of the following frequency distribution is 117 kg, then find the value of x 5

Wages	100	110	120	$x+25$	140
No. of Workers	1	4	2	2	1

13.   Find the Laspeyre's and Paasche's index number from the following data: 10

Commodities	Base year		Current year	
	Price	Quantity	Price	Quantity
A	32	50	30	50
B	30	35	25	40
C	16	55	18	55

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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