



WEST BENGAL STATE UNIVERSITY
BBA Honours 1st Semester Examination, 2020, held in 2021

BBAHGEC01T-BBA (GE1)

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.*

1. Answer any **five** questions from the following: 2×5 = 10
- (a) If $A = \{1, 2, 3, 4, 5\}$, $B = \{2, 4, 6, 8, 10\}$ then find $(A \cup B) - (A \cap B)$.
- (b) For two sets A and B find $A - B$ by Venn diagram.
- (c) If $A = \begin{pmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 3 & 4 & 5 \\ 6 & 7 & 8 \end{pmatrix}$ then find $(2A + 3B)$.
- (d) Show that $\begin{vmatrix} 0 & a & b \\ -a & 0 & c \\ -b & -c & 0 \end{vmatrix} = 0$
- (e) If $x = at$ and $y = \frac{a}{t}$; then find $\frac{dy}{dx}$.
- (f) Two variables x and y are related by $y = 3 - 7x$. If S.D. of x is 3, find the S.D. of y .
- (g) Find the median of
33, 72, 88, 70, 29, 54, 86, 91, 57, 60
- (h) Find the Geometric mean of
3, 6, 24, 48
- (i) Write Laspeyre's and Paasche's formula for Index Number.
- (j) What are the major uses of Time Series?
2. Answer any **four** questions from the following: 5×4 = 20
- (a) Prove analytically that for any two sets A and B ,
 $(A \cap B)^c = A^c \cup B^c$
- (b) For the matrix $A = \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 4A + 3I = 0$. Hence find A^{-1} .
- (c) Show that the maximum value of $x^3 + \frac{1}{x^3}$ is less than its minimum value.

- (d) If the average weight of the following frequency distribution is 117 kg then find the value of x .

Weight (kg)	100	110	120	$x + 25$	140
No. of persons	1	4	2	2	1

- (e) Draw a pie chart to represent the following data relating to the production cost of a manufacturer

Cost of Material	Rs. 18,360
Cost of Labour	Rs. 16,524
Direct expenses	Rs. 3,672
Overhead	Rs. 7,344

- (f) From the following data calculate 3 years weighted moving average with weights 1, 2, 1 respectively:

Year	1	2	3	4	5	6	7
Value	2	4	5	7	8	10	13

3. Answer any **two** questions from the following: 10×2 = 20

- (a) (i) Solve by Cramer's Rule: 5

$$x + 2y + 3z = 6$$

$$2x + 4y + z = 7$$

$$3x + 2y + 9z = 14$$

- (ii) If $x^m y^n = (x + y)^{m+n}$, then prove that $\frac{dy}{dx} = \frac{y}{x}$. 5

- (b) (i) For a certain establishment the total revenue function R and the cost function C are given by $R = 83x - 4x^2 - 21$ and $C = x^3 - 12x^2 + 48x + 11$, where $x =$ output. Obtain the output for which the profit is maximum. 5

- (ii) Find the present value of an annuity of Rs. 300 per annum for five years at 4%. 5

$$\text{Given } (1.04)^{-5} = 0.82222$$

- (c) Fit a straight line trend by method of least square and estimate the value for 2002. 10

Year	2004	2005	2006	2007	2008	2009	2000	2001
Value	80	90	92	83	94	99	92	104

- (d) The runs of two batsmen Kohli and Smith obtained in 10 consecutive innings are as follows: 10

Kohli	19	31	48	53	67	90	10	62	40	8
Smith	32	28	47	63	71	39	10	60	96	1

Find which batsman is more consistent in getting runs.

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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