



**WEST BENGAL STATE UNIVERSITY**  
B.Com. Honours 2nd Semester Examination, 2020

**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**

1. Answer any **five** questions from the following: 2×5 = 10
- (a) If  $A = \{1, 2, 3, 4, 5\}$ , and  $B = \{2, 4, 6, 8, 10\}$ , then find  $A \cap B$  and  $A \Delta B$ .
- (b) Find the values of  $a$ , if the matrix  $\begin{bmatrix} a-1 & 5 \\ 4 & a \end{bmatrix}$  is singular.
- (c) If  $A = \begin{pmatrix} -3 & 0 \\ -7 & 10 \end{pmatrix}$  and  $B = \begin{pmatrix} -5 & 3 \\ 0 & -7 \end{pmatrix}$ , find  $AB$  and  $BA$ .
- (d) If  $x = at^2$  and  $y = 2at$ , then find  $\frac{dy}{dx}$ .
- (e) Calculate the mode of the following numbers:  
7, 4, 10, 15, 7, 3, 5, 2, 9, 12
- (f) For a distribution A.M. is 40 and variance is 100; find the co-efficient of variance.
- (g) What are the major uses of Time Series?
- (h) Find the S.D. of 1, 5, 6.

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) Determine the matrices  $A$  and  $B$  where  $A + 2B = \begin{bmatrix} 1 & 2 \\ 6 & -3 \end{bmatrix}$  and  $2A - B = \begin{bmatrix} 2 & -1 \\ 2 & -1 \end{bmatrix}$ .
- (c) A person borrowed some money at 3% simple interest and let it at 5% compound interest. His gain in 3 years was Rs. 541. Find the amount he had borrowed.
- (d) Show that the maximum value of  $x^3 + \frac{1}{x^3}$  is less than its minimum value.
- (e) 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
No. of Students	4	8	11	15	12	6

- (f) A statistical figure related to rainfall and production of rice is given. Find the most likely production corresponding to the rainfall 40 cms.

	Rainfall	Production
Mean	35	50
S.D.	5	8

Co-efficient of correlation = 0.8.

3. Answer any **two** questions from the following:

10×2=20

- (a) (i) Solve by Cramer's rule:

5+5

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

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

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

- (ii) A firm assume a cost function  $C(x) = x\left(\frac{x^2}{10} + 200\right)$ , where  $x$  is monthly output

in thousand units. Its revenue function is given by  $R(x) = \frac{1}{2}(2200 - 3x)x$ . Find the output per month to make the marginal profit equal to zero and find the profit at this level of output.

- (b) Fit a straight line trend by method of least square and estimate the value for 1990:

8+2

Year	1960	1965	1970	1975	1980	1985
Value of Sale	12	15	17	22	24	30

- (c) The median and mode of the following frequency distribution are known to be 27 and 26 respectively. Find the values of  $a$  and  $b$ .

10

Values	0-10	10-20	20-30	30-40	40-50
Frequency	3	$a$	20	12	$b$

- (d) (i) Find the cost of living index number of the following table:

4+6

Items	Index	Weights
A	428	45
B	240	15
C	200	8
D	125	20
E	170	12

- (ii) Construct five-yearly moving averages of the number of students studying in a college:

Year	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
No. of Students	332	317	357	392	402	405	410	427	405	431

**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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