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

FACGCOR04T-B.Com. (DSC4)

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 $A = \{1, 2, 3, 4, 5\}$, $B = \{2, 4, 6, 8, 10\}$ then find $(A \cup B) - (A \cap B)$.

   (b) If $A = \begin{pmatrix} 2 & 4 \\ 3 & 7 \end{pmatrix}$, then find $\text{Adj}(\text{Adj}A)$.

   (c) Evaluate $\lim\limits_{x \to 2} \dfrac{x^2 - 4}{x - 2}$

   (d) If $x = at$ and $y = \dfrac{a}{t}$ then find $\dfrac{dy}{dx}$

   (e) If mean of 7, $x - 3$, 10, $x + 3$ and $x - 5$ is 15, find x.

   (f) Calculate mode of the following numbers:

      $10,\ 15,\ 7,\ 4,\ 7,\ 3,\ 5,\ 2,\ 12,\ 9.$

   (g) If $b_{yx} = -0.5$ and $b_{xy} = -0.8$, find r_{xy}.

   (h) Find the mean when variance is 2 and c.v. is 10%.

GROUP-B

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

2. For two sets A and B, prove analytically that $(A \cap B)^c = A^c \cup B^c$, where X^c is the complement of the set X.

3. Solve the system of equation by Cramer's rule:

   $x + 2y + 3z = 6,\ \ 2x + 4y + z = 7,\ \ 3x + 2y + 9z = 14$

4. A person borrowed some money at 3% simple interest and let it at 5% compound interest. His gain in three years was Rs 541. Find the amount he had borrowed.

5. Show that the minimum value of $x^3 + \dfrac{1}{x^3}$ is greater than its maximum value.

6. The weights (in kg) of 50 persons are given below. Arrange the data in a frequency distribution with class interval of 5 kg.

    76, 64, 53, 55, 66, 72, 52, 63, 46, 51,

    53, 56, 65, 60, 47, 55, 67, 73, 44, 54,

    64, 74, 48, 59, 72, 61, 43, 69, 61, 58,

    42, 52, 62, 72, 43, 63, 71, 64, 58, 67,

    46   55, 65, 75, 48, 59, 67, 77 64, 78

7. Find median from the following distribution:

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	15	20	35	20	10

GROUP-C

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

8. (a) If $x^m y^n = (x + y)^{m+n}$ then prove that $\dfrac{dy}{dx} = \dfrac{y}{x}$. 5

   (b) For the matrix $A = \begin{pmatrix} 1 & 0 & 0 \\ 2 & 1 & 3 \\ 0 & 0 & 1 \end{pmatrix}$ prove that $A A^{-1} = I_3$, where I_3 is the identity 5

   matrix of order 3.

9. (a) Draw a pie-chart to represent the following data relating to the production cost of a manufacturer: 5

   Cost of material: Rs. 18360

   Cost of labour: Rs. 16524

   Direct expenses: Rs. 3672

   Overhead: Rs. 7344

(b) A statistical figure related to rainfall and production of rice is given. Find the most likely production corresponding to rainfall 40 cm. 5

	Rainfall	Production
Mean	35	50
S D	5	8

Coefficient of correlation = 0.8.

10.(a) Find S.D. of the following distribution: 5

Values	0-10	10-20	20-30	30-40	40-50
Frequency	3	11	20	12	4

(b) From the following data calculate 3 years weighted moving averages with weights 1, 2, 1 respectively. 5

Year	2011	2012	2013	2014	2015	2016	2017
Value	2	4	5	7	8	10	13

11. From the following data find Fisher's Index Number: 10

Commodity	Rate / Unit		Quantity	
	Base Year	Current Year	Base Year	Current Year
A	6	10	50	56
B	2	2	100	120
C	4	6	60	60
D	10	12	30	24
E	8	12	40	36

12. Fit a straight line trend by the method of least square and estimate the value for 2022. 10

Year	2013	2014	2015	2016	2017	2018	2019	2020
Value	80	90	92	83	94	99	92	104

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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