



# THE AMERICAN COLLEGE, MADURAI

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Re-accredited (2<sup>nd</sup> Cycle) by NAAC with Grade "A", CGPA – 3.46 on a 4-point scale

## Backlog Arrear Examination, March 2021

MAS 2438/2528

BUSINESS MATHEMATICS

Marks:75

Time: 3 Hrs

Answer any Five questions (5×15=75)

1. (a) Prove that  $A \cap (B \cap C) = (A \cap B) \cap C$ .

(b) If  $A = \{1,2,3,5\}$ ,  $B = \{2,3,4,6\}$  and  $C = \{1,2,4,5,7\}$  then verify the following relations:

(i)  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

(ii)  $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

2. (a) Solve the following problem by using the Cramer's rule  $\begin{pmatrix} 2 & 1 & -1 \\ 1 & 1 & 1 \\ 1 & -2 & -3 \end{pmatrix}$

(b) Prove that  $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$ .

3. (a) Find the inverse of the matrix  $\begin{pmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{pmatrix}$

(b) Let  $A = \begin{pmatrix} 2 & -3 & 1 \\ 4 & 2 & 3 \end{pmatrix}$  and  $B = \begin{pmatrix} 3 & -2 & 4 \\ 1 & 3 & -5 \end{pmatrix}$  then show that  $(A+B)^T = A^T + B^T$ .

4. Use the method of least squares and fit a straight line trend to the following data given from 82 to 92.

Year	82	83	84	85	86	87	88	89	90	91	92
Production in quintals	45	46	44	47	42	41	39	42	45	40	48

5. The probability that India wins a cricket test match against West Indies is known to be  $2/5$ . If India and West Indies play 3 test matches what is the probability that

(i) India will lose all the three test matches.

(ii) India will win at least one test match.

(iii) India will win all the tests.

(iv) India will win at most one match.

6. (a) Two dice numbered as 1, 2, 3, 4, 5, 6 on the faces are thrown. Let A be the event that Sum of the points on the faces shown is odd and B is the event that at least one number is Find the probabilities of the following

(i)  $(A \cap B)$  (ii)  $(A \cup B)$  (iii)  $A \cap \bar{B}$  (iv)  $\bar{A} \cap \bar{B}$

(b) The contents of three Urns are

Urn I: 1 white 3 red 2 black balls

Urn II: 3 white 1 red 1 black balls

Urn III: 3 white 3 red 3 black balls.

Two balls are chosen from a randomly selected urn. If the balls are 1 white and 1 red ball. what is the probability that they come from Urn II.

7. (a) Fit a Poisson distribution to the following data and calculate expected frequencies.

X	0	1	2	3	4
F	123	59	14	3	1

(b) Six dice are thrown 729 times. How many times do you expect atleast 3 dice to show a five or six.