

Dear Student,

Please read the information on assignments in the Programme Guide that we have sent you after your enrolment. A weightage of 30%, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignments for the theory courses MST-001 to MSTE-004 have been given in this booklet.

Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

- 1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLLMENT NO :

NAME :

ADDRESS :

.....

.....

PROGRAMME CODE:

COURSE CODE:

COURSE TITLE:

STUDY CENTRE: DATE:

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise.
- 5) This assignment is to be submitted at the Study Centre.

We strongly suggest that you should retain a copy of your answer sheets.

- 6) This assignment is valid from January 1st, 2025 up to December 31, 2025.
- 7) The latest assignments should be submitted by the candidate.
- 8) **You cannot fill the Exam Form for this course** till you have submitted this assignment. So solve it and **submit it to your study centre at the earliest.** If you wish to appear in the **TEE, June 2025**, you should submit your TMAs by **March 31, 2025**. Similarly, If you wish to appear in the **TEE, December 2025**, you should submit your TMAs by **September 30, 2025**.

We wish you good luck.

TUTOR MARKED ASSIGNMENT

MST-001: Foundation in Mathematics and Statistics

Course Code: MST-001

Assignment Code: MST-001/TMA/2025

Maximum Marks: 100

Note: All questions are compulsory. Answer in your own words.

1. State whether the following statements are **True** or **False**. Give reason in support of your answer: (5×2=10)

(a) Between any two different rational numbers there is another rational number.

(b)

$$\int_{-1000}^{1000} (x^{1001} + x^{2001} + x^{3001}) dx = 0$$

(c) 210 is 51st term of the sequence 10, 15, 20, 25, ...

(d)

$$\begin{vmatrix} a & x & b+c \\ b & x & c+a \\ c & x & a+b \end{vmatrix} = 0$$

(e) The range of the data shown in the following frequency distribution is 350.

Classes	200-250	250-300	300-350	350-400	400-450	450-500	500-550
Frequencies	0	7	3	8	4	0	0

2. (a) A carpenter was hired to build 192 window frames. The first day he made five frames and each day thereafter he made two more frames than he made the day before. How many days he will take to finish his job? (4)

(b) Set having values $\frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \frac{1}{25}, \frac{1}{36}, \frac{1}{49}, \dots$ is countable. (3)

(c) How many words each of three vowels and two consonants can be formed from the letters of the words INVOLUTE? (3)

3. (a) Express 700.1400.2100.2800.3500.42000 in terms of factorial.

(b) How many different signals are possible with 5 blue, 4 red, 3 white and 2 green flags by using all at a time in a queue?

(c) If in a hall there are 10 randomly selected students then how many numbers of ways are there such that all of them have different birthday. Assume that all of them have their birthday in non-leap years. (2+4+4)

4. Discuss the continuity and differentiability of the following function at $x = 2/3$: (5+5)

$$f(x) = \begin{cases} \left| x - \frac{2}{3} \right|, & x \neq \frac{2}{3} \\ 0, & x = 2/3 \end{cases}$$

5. Evaluate the following integrals: (5+5)

(i) $\int (10x^9 + 40x^4 + 3) \sqrt{x^{10} + 8x^5 + 3x + 5} \, dx$

(ii) $\int \frac{1}{(x-5)(x^2+4)} \, dx$

6. Find values of x, y and z given that

$$5x + y + z = 36$$

$$x + y + z = 16$$

$$10x + 2y + 2z = 72$$

You are bound to use the matrix techniques to solve the given equations. (10)

7. (a) Write flow charts of Cramer rule and matrix method. (10)
- (b) Write whether the following data are discrete or continuous. Give reason in support of your answer. (5×2=10)
- i) Number of children in a family in a colony of 100 families.
 - ii) Number of pages in each of the 50 books having some mistake.
 - iii) Height of students of IGNOU who enrolled in 2021.
 - iv) Waiting time of metro when a person reaches metro station.
 - v) Monthly income of the family.
8. (a) Write any 10 principles of data visualisation.
- (b) What is the relation of unit on y-axis with unit on x-axis in histogram. (5+5)