

**POST GRADUATE DIPLOMA IN
APPLIED STATISTICS/MASTER OF
SCIENCE (RENEWABLE ENERGY
AND ENVIRONMENT)
(PGDAST/MSCRWEE)**

Term-End Examination

June, 2026

**MST-001 : FOUNDATION IN MATHEMATICS
AND STATISTICS**

Time : 3 Hours

Maximum Marks : 50

Note : (i) *Question No. 1 is compulsory.*

(ii) *Attempt any **four** questions from the
remaining question nos. 2 to 7.*

(iii) *Use of Scientific calculator (non-
programmable) is allowed.*

(iv) *Use of Formulae and Statistical
Tables Booklet for PGDAST is
allowed*

(v) *Symbols have their usual meanings.*

1. State whether the following statements are True or False. Give reasons in support of your answer :

$$5 \times 2 = 10$$

(a) All possible orders of a matrix having 8 elements are 4×2 and 2×4 .

(b) In exclusive method of classification, upper limit of a class is included in the same class.

(c)
$$\int_3^5 (x - 4)^2 dx = \frac{2}{3}$$

(d)
$$\frac{d}{dx}(4x - 6)^4 = 16x$$

(e) Median is a permissible statistical tool in nominal scale data.

2. (a) How many 5-letter words are possible using 8 letters a, b, c, d, e, f, g, h such that :

5

(i) two letters a, b are always included ?

(ii) three letters a, c, d are always excluded ?

- (b) If the 4th and the 7th terms of a G.P. are 24 and 192, respectively, find the G.P. 3
- (c) Find $(A - B)$ and $(A \cap B)$, if $A = \{1, 2, 3, 4, 5\}$ and $B = \{4, 5, 6, 7, 8\}$. 2
3. (a) Find local maximum and minimum values of the function $f(x) = 4x^3 - 21x^2 + 18x + 9$. 4
- (b) Prove that $\int_0^5 \left| x^2 - 3x + 2 \right| dx = \frac{29}{2}$ 3
- (c) Find $\lim_{x \rightarrow 2} f(x)$, where
- $$f(x) = \begin{cases} x^2 + 2, & x \leq 2 \\ 2 - x^2, & x > 2 \end{cases} \quad 3$$
4. (a) Solve the given set of equations using matrix method : 5

$$2x + 3y = 5$$

$$4x + 6y = 10$$

(b) Prove that 5

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix} = (a + b + c) (ab + bc + ca - a^2 - b^2 - c^2)$$

5. (a) The marks (out of 50) of 30 students of a college in a course of statistics are given below :

10, 15, 32, 27, 40, 36, 47, 08, 29, 10, 46,
35, 42, 07, 15, 20, 42, 49, 36, 25, 40, 40,
45, 28, 43, 05, 22, 48, 50, 19.

- (i) Construct a continuous frequency distribution by taking suitable class width.

- (ii) Draw the histogram of the frequency distribution constructed in part (i). 3+3

- (b) What are different types of data ?
Explain each one of them with an example of each. 4

6. (a) Draw a suitable diagram for the given monthly expenditure of a family over different heads as given below : 6

Head	Expenditure (in ₹)
Food	4,000
Education	2,000
Clothing	1,000
Rent	2,000
Miscellaneous	1,000

- (b) Identify which scale is used in the classification of the people of society based on : 4

- (i) Religion
- (ii) Income
- (iii) Education
- (iv) Height

7. (a) In a group of 400 typists, 300 can type in English and 150 can type in Hindi.

Then how many can type in :

(i) Both Hindi and English

(ii) Only Hindi

(iii) Only English 5

(b) Evaluate : 5

$$\int x e^{-ax} dx$$

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