

**POST GRADUATE DIPLOMA IN
APPLIED STATISTICS (PGDAST)**

Term-End Examination

01182

December, 2018

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

Time : 3 hours

Maximum Marks : 50

Note :

- (i) *Question no. 1 is compulsory. Questions no. 2 to 5 have internal choices.*
- (ii) *Use of scientific calculator is allowed.*
- (iii) *Use of Formulae and Statistical Tables Booklet for PGDAST is allowed.*
- (iv) *Symbols have their usual meanings.*

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

$5 \times 2 = 10$

(a) If $A = \{a, b, a, b, d\}$, $B = \{5, 6, 7, 7, 9\}$ then $A \sim B$.

(b) $\lim_{x \rightarrow 5} \frac{x^2 - 25}{x - 5} = 10$

(c) The number of hits on IGNOU website on a given day for 30 days is an example of continuous data.

(d) In exclusive method of classification, each upper class limit is included in the class interval.

(e)
$$\int_2^6 8 \, dx = 32.$$

2. (a) In a group of 500 persons, 400 can speak Hindi and 150 can speak English. Then how many can speak

(i) both Hindi and English ?

(ii) Hindi only ?

5

(b) If $f(x) = 5 - |x - 3|$, then evaluate $f(2)$, $f(-2)$, $f(6)$, $f(-5)$, $f(12)$.

5

OR

(a) Prove that $5^{\frac{1}{3}} \cdot 5^{\frac{1}{9}} \cdot 5^{\frac{1}{27}} \dots$ to $\infty = \sqrt{5}$.

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(b) Find the number of terms in the following series :

$$-1, -\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, \dots, 14.$$

2

(c) In how many ways can 3 prizes be distributed among 5 students when

(i) No student gets more than one prize ?

(ii) No student gets all the prizes ?

(iii) A student may get any number of prizes ?

6

3. (a) Find the relation between "a" and "b" if the function $f(x)$ is given to be continuous at $x = 0$, where

$$f(x) = \begin{cases} 2x - a, & x \geq 0 \\ ax + b + 3, & x < 0 \end{cases} \quad 5$$

(b) Find local maximum and minimum values of the function

$$f(x) = 4x^3 - 21x^2 + 18x + 9 \quad 5$$

OR

(a) Evaluate :

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$$\int x^2 e^{-x} dx$$

(b) Evaluate :

5

$$\int_{-3}^3 e^{|2x|} dx$$

4. Solve the following system of equations by Cramer's rule : 10

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

$$-x + 4y + 5z = 8$$

$$2x + 5y + 3z = 10$$

OR

- (a) Explain four levels of measurement scales in detail with one example in each case. 6
- (b) What are the differences between primary and secondary data ? 4
5. (a) Draw a percentage bar diagram for the following data : 5

Category	Cost per unit 1990	Cost per unit 2000
Material	20	32
Labour	25	36
Delivery	5	12
Total	50	80

- (b) Draw a suitable diagram to represent the expenditure of ₹ 100 over different budget heads given as follows, of a family :

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Item	Expenditure (in ₹)
Food	25
Clothing	15
Education	20
Transport	10
Outing	10
Miscellaneous	5
Savings	15

OR

- (a) Draw a histogram to the following frequency distribution :

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Class Interval	Frequency
0 – 10	20
10 – 20	32
20 – 30	8
30 – 40	2
40 – 70	60
70 – 80	35
80 – 100	10

- (b) Draw a box plot for the given data :

17, 15, 17, 20, 13, 15, 15, 16, 16, 15, 19, 12,
19, 14, 11, 14, 16, 10, 19, 18, 20, 14, 17, 19,
16, 22, 21, 23, 14, 12, 18, 13, 12, 25, 14, 15,
31, 17, 10, 21.

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