No. of Printed Pages : 5

MST-001

POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

01154

December, 2016

MST-001 : FOUNDATION IN MATHEMATICS AND STATISTICS

Time : 3 hours *Maximum Marks : 50*

Note :

(i) *Attempt **all** questions. 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 meaning.*

1. State whether the following statements are *True* or *False*. Give reasons in support of your answers. *5×2=10*

(a) Allotment of license number plates to different cars comes under the ordinal scale of measurement.

(b) The 10^{th} term of the sequence 1, 4, 7, ... is 28.

(c) Caption refers to the row heading, and explains what information the row presents.

(d) Number of patients visiting a hospital over a period of seven days is an example of discrete data.

(e) $\lim_{x \to -1} (1 + x + x^2 + x^3 + \ldots + x^{100}) = 101.$

2. (a) If A = {1, 3, 5}, B = {3, 5, 7, 9}, C = {2, 6, 8, 9} are subsets of the universal set

U = {1, 2, 3, 4, 5, 6, 7, 8, 9},

then verify De-Morgan's laws. 5

(b) Find the domain of the function $f : R \to R$, defined by $f(x) = \sqrt{(x-3)(5-x)}$, $x \in R$.

Also evaluate f(3), f(4) and f(5). 5

OR

(a) Find the sum of the G.P. $-1 + \frac{2}{3} - \frac{4}{9} + \ldots$ up to 8 terms. 5

(b) How many 4-digit numbers are possible using 9 digits 1, 2, 3, ..., 9 such that

(i) Three digits 1, 6, 8 are always included ?

(ii) Two digits 3, 8 are always excluded ? 5

3. (a) Discuss the continuity of the function

$$f(x) = |x - 3| \text{ at } x = 3.$$ 5

(b) Find the derivative of the function $\sqrt{\frac{x^2 + 1}{x + 1}}$. 5

OR

(a) Evaluate : 5

$$\int \frac{(a^x - b^x)^2}{a^x b^x} dx$$

(b) Evaluate : 5

$$\int_0^3 \frac{x - 5}{(x + 1)(x + 2)^2} dx$$

4. (a) Using the properties of determinants evaluate

$$\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}.$$ 5

(b) Solve the following system of equations using the matrix method : 5

$$4x + 2y = 6$$

$$6x + 3y = 8$$

OR

(a) Distinguish between quantitative and qualitative data, and discrete and continuous data. Also give an example in each case. 5

(b) Write the five differences between primary and secondary data. 5

5. (a) Present the following information in a suitable tabular form : 5

In 2009, out of a total 2000 employees in a company, 1550 were members of a trade union. The number of women employees was 250, of which 200 did not belong to any trade union. In 2010, the number of union employees was 1725, out of which 1600 were men. The number of employees who did not belong to any trade union was 380, of which 155 were women.

(b) A company is started by four persons A, B, C and D and they distribute the profit or loss among themselves in the proportion 4 : 3 : 2 : 1. In the year 2010, the company earned a profit of ₹ 14,400. Represent the shares of their profits in a pie chart. 5

OR

(a) Draw a histogram for the following data : 4

Class	*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 following data : 6

31, 42, 22, 27, 33 , 27, 37, 28, 34, 44, 25, 39, 26, 31, 26, 33, 46, 48, 50.