POST GRADUATE DIPLOMA IN APPLIED STATISTICS (PGDAST)

Term-End Examination

00822

June, 2017

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 is allowed.

 (iv)   Symbols have their usual meaning.

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

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

    (b) $\dfrac{d}{dx} (4x - 6)^4 = 16x$.

    (c)   Collection of good teachers in India forms a set.

(d) The heading of the rows given in the first column of a table are called captions.

(e) A researcher used 2011 census data in her study. It is primary data for her.

2. (a) Find the sum of the series $-1, -\dfrac{1}{4}, \dfrac{1}{2}, \dfrac{5}{4}, \ldots$

to 14 terms. **2**

(b) If the 4th and the 7th terms of a G.P. are 24 and 192, respectively, find the G.P. **3**

(c) There are 16 cricket players including 8 batsmen, 6 bowlers and 2 wicket keepers. In how many ways can 11 players be selected having 6 batsmen, 4 bowlers and 1 wicket keeper ? **5**

OR

(a) If A = {1, 2, 3, 4, 5}, B = {4, 5, 6, 7, 8}, then find $(A - B)$ and $(A \cap B)$. **2**

(b) If $f(x) = 4 - |x - 3|$, then find $f(2)$ and $f(-2)$. **2**

(c) 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 ? **6**

3. (a) Find the local maximum and minimum values of the function

$$f(x) = 2x^3 - 15x^2 + 36x + 5.$$

5

(b) Evaluate :

5

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

OR

(a) Find $\lim_{x \to 2} f(x)$, where $f(x) = \begin{cases} x^2 + 2 & x \le 2 \\ 2 - x^2 & x > 2 \end{cases}$.

Check whether the above function is continuous at $x = 2$.

5

(b) Evaluate :

5

$$\int xe^{-ax}\, dx.$$

4. (a) Identify whether the following data are discrete or continuous :

2

(i) Time in hours of completing the question paper of MST-001.

(ii) Number of students present in the examination of the paper MST-001.

(iii) Marks of students in the paper MST-001.

(iv) Number of students who passed in the paper MST-001.

(b) Identify which scale is used in the classification of the people of a society based on : 2

(i) religion

(ii) income

(iii) education

(iv) height

(c) Prove that 6

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

$$= (a + b + c)(ab + bc + ca - a^2 - b^2 - c^2).$$

OR

(a) List any four differences between primary and secondary data. 4

(b) Solve the following system of linear equations using the matrix method : 6

$$4x - 3y = 5$$

$$x + y = 3$$

5. The marks (out of 50) of 30 students of PGDAST programme in MST-001 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

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

(b) Draw the histogram.

(c) Draw less than ogive.   *3+3+4*

OR

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

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

(b) Draw a stem-and-leaf display for the given data :   *4*

41, 42, 22, 33, 27, 57, 64, 67, 58, 44, 65, 26, 63, 35, 61, 46, 59, 50, 42, 60