

2019

## STATISTICS — HONOURS

Paper : CC-7

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*1. Answer **any ten** from the following :

1×10

- (a) Round 17.3716512 and .0324571 to four decimal places.
- (b) Give two C keywords.
- (c) If  $\nabla$  is an operator such that  $\nabla f(x) = f(x) - f(x - h)$ , find a relation between  $E$  and  $\nabla$  operators,  $h$  being the interval of differencing.
- (d) Give two C identifiers.
- (e) If 18.72431 is rounded to 18.724, find the relative error.
- (f) Justify or correct the statement : “C is a machine language”.
- (g) If  $2/3$  is approximated by 0.66667, find the percentage error.
- (h) Give the structure of a unary operator in C.
- (i) Which of the following are valid identifiers : (i) `_stat` (ii) `_st, at` (iii) `st.at`?
- (j) If a number  $x$  is rounded to five decimal points giving percentage error of .007%, what is the absolute error?
- (k) Distinguish between C relational and logical operators.
- (l) What is the range of a C integer variable?
- (m) Suppose you are given 10 values and you want to write a program in C to find the mean. What header file you must include in the program?
- (n) What operation is performed by the C statement `a*=a;` ?
- (o) Give an example of an entry-controlled loop and give the structure.

2. Answer **any four** from the following :

5×4

- (a) What output is obtained, when you execute the following C program block?

```
float x;
x = 2577.2997;
printf ("%6.2f", x);
```

Justify the output and suggest modifications if you expect errors.

Please Turn Over

- (b) To solve the equation  $x^3 + y^2 = 2$  numerically, find the first two iterations, when the initial choice is taken as (0, 1).
- (c) Which C function is used to accept inputs from the user? Give the format, separately for floating point and integer type variables.
- (d) If  $x^{(k)} = x(x-1)(x-2) \dots (x - \overline{\{k-1\}})$ , find  $\Delta x^{(k)}$ .
- (e) Approximate  $\int_0^2 f(x) dx$  by Trapezoidal rule with 3 equispaced subdivisions. Give an example and compute the related absolute error.
- (f) Write a program in C to find the proportion of real number inputs lying between -1 and +1, both inclusive.

3. Answer **any two** from the following :

- (a) (i) Write a C function to calculate the mean of 1000 numbers using do-while looping structure.  
 (ii) Prove that the first order difference of a polynomial of degree  $n$  is itself a polynomial of degree  $n - 1$ . 6+4
- (b) (i) Write a C program to sort any given set of 10 numbers using a function with array as argument.  
 (ii) If the values of  $f(x)$  for  $x = 1, 2, 3, 4$  are respectively, 4, 13, 33, 67, construct a forward diagonal difference table. 7+3
- (c) (i) Write a program in C to find the roll number of the candidate getting the highest marks when roll numbers (from 1 to 15) and the corresponding marks are provided.  
 (ii) Write down the Lagrange's interpolation formula for  $n + 1$  arguments  $x_i, i = 0, 1, \dots, n$  the form  $\sum_{i=0}^n L_i(x) f(x_i)$  for some  $L_i(x)$ . Show that  $L_i(x)$  does not change under a linear transformation of  $x$ 's. 6+4
-