Total number of printed pages–7

2021

(Held in 2022)

STATISTICS

(Honours)

Paper : STA–HC–5026

(Statistical Computing using C/C++ Programming)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following as directed :

    $1 \times 7 = 7$

    (a) The brain of any computer system is :

    (i) ALU

    (ii) memory

    (iii) CPU

    (iv) control unit

    (Choose the correct option)

(b) Evaluate 10% 2.

(c) A C-variable cannot start with

(i) an alphabet

(ii) a digit

(iii) a special character other than underscore

(iv) Both (ii) and (iii)

(Choose the correct option)

(d) The expression $a = 22/7 * 5/3$ would evaluate the value of a as _____ .

(Fill in the blank)

(e) Which of the following escape sequences moves the cursor position to the new line ?

(i) \r

(ii) \n

(iii) \t

(iv) \v   (Choose the correct option)

(f) State whether the following declaration is allowed in C :

Char str[3] = "GOOD" ;

(g) Array can be considered as a set of elements stored in consecutive memory locations having

(i) different data type

(ii) same data type

(iii) same scope

(iv) None of the above

(Choose the correct option)

2. Answer the following questions briefly :

2×4=8

(a) Differentiate between hardware and software.

(b) Write the output of the following C-programme segment :

```
{
    int a = 45 ;
    float b = 3·5 ;
    a = a + b ;
    b = a - b ;
    a = (a + b)/2 ;
    b = (a - b)/2 ;
    printf ("%d %f", a, b) ;
}
```

(c) What does the statement

$$\text{int A [50] ;}$$

represent in C/C++ language?

(d) Write the following algebraic expressions in C/C++ :

(i) $3x^2 + 2x + 5$

(ii) $\dfrac{2by}{d+1} - \dfrac{2}{3(y+x)}$

3. Answer **any three** questions from the following : $5\times3=15$

(a) Draw a flowchart for calculating mean deviation from mean.

(b) Write a C/C++ program to find arithmetic mean and harmonic mean of n observations.

(c) Describe the 'switch' statement.

(d) (i) Write a note on overflow and underflow of data. 3

(ii) What will be the output of the following program segment ? 2

```
main ()
{
    int i = 2, j = 3, k, l;
    float a, b;
    k = i/j * j;
    l = j/i * i;
    a = i/j * j;
    b = j/i * i;
    printf ("%d %d %f %f\n", k, l, a, b);
}
```

(e) Write a C/C++ program to determine the transpose of an $n \times n$ matrix A.

4. Answer *either* (a) *or* (b) :

(a) *(i)* Write briefly on 'C tokens'. 2

(ii) Write a note on 'else-if' ladder.

3

(iii) Write a C/C++ programme to determine the value of $n!$ 5

(b) (i) Evaluate float type variable x such that

$x = a * b/2 + 3/2 * b + 2 + c$

assuming $a = 4$, $b = 1$, $c = 3.2$

2

(ii) Describe the 'for loop' briefly.

3

(iii) Write a C/C++ programme to arrange n numbers in ascending order.

5

5. Answer **either** (a) **or** (b) :

(a) (i) What are different relational operators available in C ?

2

(ii) State the precedence rule of arithmetic operators.

2

(iii) Write a C/C++ programme to find the correlation coefficient of n pairs of observations.

6

(b) (i) What is an algorithm ?

1

(ii) Briefly explain the 'do...while' loop.

2

(iii) Write a programme in C/C++ to obtain an approximate value of the integral $\int_0^2 \frac{e^x}{1+x}$ by using Simpson's $\frac{1}{3}$rd rule.　7

6. Answer *either (a) or (b)* :

(a) *(i)* Elaborate on increment and decrement operators.　2

(ii) Describe the procedure of initialization of one-dimensional array.　2

(iii) Write a C/C++ programme to find the variance and coefficient of variation of n observations.　6

(b) *(i)* Write an explanatory note on 'for' loop.　3

(ii) Write a C/C++ programme to find an approximate solution of the equation $\frac{1}{x} - e^{-x} = 0$ using Newton-Raphson method.　7