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S. No. of Question Paper : 1208

Unique Paper Code : 237405

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Name of the Paper : Computer Programming in C (STHT-404)

Name of the Course : B.Sc. (H) Statistics

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

All questions are compulsory.

Attempt all parts of a question in continuation.

1. Attempt any ten parts :

10×3

- (i) Describe two different ways to access an array element.
- (ii) What is a structure ? How its members are accessed ?
- (iii) What is the difference between the following mode of file opening ?
 - (a) "w"
 - (b) "r"
 - (c) "a"
- (iv) Evaluate the following for int m=2, n=5;
 - (a) ++n*n-- + 3*++m
 - (b) m%(n*6%4)
 - (c) m++*m*n++
- (v) Differentiate between float, double and long double number.
- (vi) What is the type of return value of function sizeof() ?
- (vii) Give an illustrative example of a calculation wherein the change in precedence of operators can make a difference in the result.
- (viii) What does the arithmetic operator % do with operands and what type of operands this operator can have ?
- (ix) How are comments useful in a program ? How are comments included in a C program ?
- (x) Give an illustration of data of type enum.
- (xi) What functions may be used for input and output of a single character ?

P.T.O.

2. Explain the output of the following programs (Attempt any *two* parts) :

2×5

```
(i) #include<stdio.h>
void main( )
{
    int a[20], i, tp, j, n;
    scanf("%d", &n);
    for(i = 0, i < n; i++)
        scanf("%d", &a[i]);
    for(i = 0, i < n; i++)
        for(j = 0, j < n - 1 - i; j++)
            if(a[j] > a[j + 1])
            {
                tp = a[j];
                a[j] = a[j + 1];
                a[j + 1] = tp;
            }
    for(i = 0; i < n; i++)
        printf("\n%d", a[i]);
}

(ii) #include<stdio.h>
int fun(int n, int m)
{
    int r;
    r = m%n;
    while(r != 0)
    {
        m = n;
        n = r;
        r = m%n;
    }
    return(n);
}

void main( )
{
    int a, b;
    a = 47;
    b = 41;
    if(a < b)
        printf("%d %d %d", a, b, fun(a, b));
    else
        printf("%d %d %d", a, b, fun(a, b));
}
```

```
(iii) #include<stdio.h>
main()
{
    int i = 0, x = 0;
    do {
        if(i%5 == 0) {
            x++;
            printf("%d", x);
        }
        ++i;
    } while(i < 20);
    printf("\nx = %d", x);
}
```

3. Attempt any *two* parts :

2×5

- (i) What is meant by the storage class of a variable ? Explain the *four* storage class specifications available in C.
- (ii) What are the function prototypes ? What is their purpose ? Where within a program are function prototypes normally placed ? How do you declare function prototypes ?
- (iii) Obtain the output :

```
#include<stdio.h>
int fn(int v)
{
    if(v == 1 || v == 0)
        return 1;
    if(v%2 == 0)
        return fn(v/2) + 2;
    else
        return fn(v - 1) + 3;
}
void main( )
{
    printf("%d\n", fn(7));
}
```

4. Attempt any *two* parts : 2×5
- (i) Develop a C program to find variance and coefficient of variation of the discrete data given in the form :
- $$\{(x_i, f_i) \mid i = 1, 2, 3, \dots, n \leq 25\}$$
- (ii) Write a C program to draw a random sample of size n ($n \leq 25$) from a $\chi^2_{(10)}$ distribution and obtain its mean and variance.
- (iii) Develop a C program to sort an array $(x_i, i = 1, 2, 3, \dots, n \leq 25)$.
5. Attempt any *two* parts : 2×7½
- (i) Given two independent samples $(x_i, i = 1, 2, \dots, n_1 \leq 25)$ and $(y_i, i = 1, 2, \dots, n_2 \leq 25)$ drawn from the normal population $N(\mu_1, \sigma^2)$ and $N(\mu_2, \sigma^2)$ respectively, write a C-program to test for the equality of two means using t-test.
- (ii) Develop a C program to find out the trend values for a given time series having n observations by the method of moving averages using m points time period.
- (iii) Given the data $(x_i, y_i, z_i, i = 1, 2, \dots, n \leq 25)$, develop a function to compute correlation between X and Y . Hence using this function develop a C program to compute coefficient of multiple correlation of X on Y and Z and partial correlation coefficient of X and Y given Z .