5. Attempt any **two** parts : (8×2=16)

(i) Given two independent samples $\{x_i, i = 1,2 .... n_1 \leq 25\}$ and $\{y_i, i = 1,2 .... n_2 \leq 25\}$ 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 function to compute $S^2 = \frac{1}{m-1}\sum_{i=1}^{m}(x_i - \bar{x})^2$ for given data $\{x_i \mid i = 1,2,3...m \leq 20\}$. Hence, using the above function write a C program to compute F statistics for testing equality of variances of two normal populations, given the two independent samples $\{x_i, i = 1,2.... n_1 \leq 20\}$ and $\{y_i, i = 1,2.... n_2 \leq 20\}$.

(iii) Consider given data in the form $\{(x_i, y_i, z_i) \mid i = 1,2,..., n \leq 20\}$. Develop a function to compute correlation between X and Y. Hence, using this function develop a C program to compute all pairs of correlation coefficients between X, Y, and Z.

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4255 **H**

Unique Paper Code : 2373012003

Name of the Paper : Computer Programming in C

Name of the Course : **B.Sc. (H) Statistics (NEP-UGCF)**

Semester : IV

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **All** Questions are compulsory, questions have internal choice.

1. Attempt **any ten** parts : (4×10=40)

(i) What is meant by preprocessor directive in C? What is the difference between #include "filename" and #include<filename>?

(ii) Which of the following are invalid constants and variable names? Also, comment on the reason for invalid

(a) 0.0001

(b) 5 × 1.5

(c) $255

(d) –1.79e + 4

(e) int_type

(f) (area)

(g) Group One

(h) sum1

(iii)
```
int p=40, q=25, r, s;
r = (p++) + (q++);
s = (++p) + (++q);
printf("%d %d",r,s);
```

what will be the output of the above code?

(iv) How do you initialize a 2 × 4 two-dimensional array in a fully bracketed method and an unbracketed method?


```
int fun1(int a)
{
        int b;
        b = 2*fun2(a);
        return(b);
}
int fun2(int a)
{
        static int b=1;
        b += a;
        return (b);
}
```

4. Attempt **any two** parts : (5×2=10)

(i) Develop a C program to obtain C = A × B, where A is m × n and B is n × p matrices.

(ii) Develop a C program to generate a random sample of size n from gamma distribution having shape and scale parameters n, λ respectively. Assume that n > 0 is an integer.

(iii) Write a C program that generates 50 random real numbers uniformly in the range 0.0 to 1.0 and stores these numbers in an array and then sorts them in ascending order.

(ii)

```
#include<stdio.h>
void main( )
{
    int  r, i ,j, k;
    clrscr( );
    r = 5;
    for(i=1; i<=r; i++)
    {
            for(j=1; j<=r-i; j++)
                    printf(" ");
            for(k=1; k<=i; k++)
                    printf(" *");
            printf("\n");
    }
       for(i=r-1; i>=1; i--)
    {
            for(j=r-i; j>=1; j--)
                    printf(" ");
            for(k=1; k<=i; k++)
                    printf(" *");
            printf("\n");
    }
}
```

(iii)

```
#include<stdio.h>
int fun1(int a);
int fun2(int a);
main( )
{       int a=0, b=1, count;
        for(count=1; count <=10; count++) {
                b += fun1(a)  + fun2(a);
                printf("%d ",b);
                a++;
        }
}
```


(v) (a) Write an infinite loop using for loop.

(b) What functions may be used for input and output of a single character?

(vi) (a) What is the type of return value of sizeof()?

(b) Give an illustrative example of a calculation wherein the change in precedence of operators can make a difference in the result.

(vii) What is the difference between while loop and do while loop?

(viii) What is the difference between the following modes of file opening?

(a) "w"

(b) "r"

(c) "a"

(ix) What are the basic data types in C language?

(x) What are Unary and Binary operators? Compare the precedence levels of the following operators :

* + % = && ( )

(xi) What is a pointer variable? How it is declared? How a value is accessed by pointer?

2. Attempt **any two** parts : (6×2=12)

(i) Define a function is in C programming. List the different types of functions with examples and provide the syntax for defining a function.

(ii) Given the following definitions :

```
int num[26] = {23, 3, 5, 7, 4,-1, 6};

int * n = num, i=2, j=4;
```

show the value of the following expressions :

(a) n

(b) *n

(c) *n+1

(d) *(n+1)

(e) *n + j

(f) *&i

(g) *(n + i) +j

(h) *(n+i+j)

(iii) What is meant by the storage class of a variable? Explain the four storage class specifications available in C.

3. Explain the output of **any two** parts from the following : (6×2=12)

(i)
```
#include<stdio.h>
main()
{
        char Str[]="123456789";
        int i, j, k, l;
        for (i=0;  i<5;i++)
        {
                for (k=4; k>i; k--)
                {
                        printf(" ");
                }
                for (j=0, l=i; j<=i; j++, l++)
                {
                        printf("%c",Str[l]);
                }
                l=l-2;
                for (k=0;k<i;k++,l--)
                        printf("%c",Str[l]);
                printf("\n");

        }
}
```