(iii) Develop a C program to form a frequency table for marks (integers only) $(x_i, i = 1, 2, \ldots n \leq 100)$ and $0 \leq x_i \leq 50$ with an interval of 10.

5. Attempt any **two** parts : $(7\frac{1}{2} \times 2 = 15)$

(i) Develop functions to carry out the matrix multiplication and addition of two matrices A and B of same order $m \times m$ $(m \leq 5)$. Hence, write a C program to compute $Y = (A + B) * (A - B)$.

(ii) Write a C program to draw a random sample of size n from normal distribution with parameters $(\mu \equiv mu)$ and variance $(\sigma^2 \equiv var)$. Arrange the generated sample in ascending order and calculate mean and variance.

(iii) Write a C-program to test the independence of attributes, for a given contingency table of the order $m \times n$ $(m, n \leq 5)$ using χ^2 - test. Use files to read and write the data and results.

[This question paper contains 8 printed pages.]

Your Roll No...............

Sr. No. of Question Paper :   1053   C

Unique Paper Code   : 32371502

Name of the Paper   : Statistical Computing using C/ C++ Programming

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

Semester   : V

Duration : 3 Hours   Maximum Marks : 75

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 : $(10 \times 3 + 10)$

(i) Define the range of the random numbers generated by the following expressions :

(a) rand() % 5 + 15

(b) rand() % 3 + 1

(c) rand() % 40 – 10

(d) rand() % 25

P.T.O.

(ii) Illustrate #define statement. Can they be used to define an arithmetic expression too? Explain with the help of examples.

(iii) What is recursion? What are its advantages?

(iv) What is the difference between the following modes of file opening?
(a) "w"   (b) "r"   (c) "a"

(v) Fill in the blanks :

(a) C programming was developed by _____ .

(b) A char data type always occupies _____ bytes.

(c) A program starts execution from _____ function.

(d) Pointer variable is a variable that contains the _____ of another variable

(e) An integer can be _____ to a pointer.

(f) Elements of an array are stored in _____ memory location.

(vi) What are Unary and Binary operators? Give two examples of each operator which act as unary or binary operator only.

```
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");
}
}
```

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

(i) Write a recursion function in C to find the value of n! and use it to compute $\binom{n}{r}$. (n > r)

(ii) Write a C program to fit a Poisson distribution for the given discrete data in the form: $\{(x_1, f_1)$ $i = 1, 2, 3, ...n \leq 25\}$. Also test it for *goodness of fit*.

(ii)   #include<stdio.h>

int fn(int v)

{

if(v==1 \\ v==0)

return 1;

switch(v%3)

{

case 0: return fn(v/2) + 5;

case 1: return fn(v-1) + 6;

case 2: return fn(v-3) + 7;

}

}

main( )

{

printf("%d\n", fn(29));

}

(iii)   #include<stdio.h>

void main()

{

int r, i, j, k;

clrscr( );

r = 5;

for(j=1; j<=r-i++)

{

for(j =1; j<=r-i; j++)

printf(" ");

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

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

(ix)   What is the difference between #include <stdio.h> and #include"stdio.h"?

(x)   What is dynamic memory allocation? Explain two functions of dynamic memory allocation.

(xi)   Explain what is likely to happen when the following situations are encountered in a program:

(a)   Actual arguments are less than the formal arguments in a function.

(b)   Data type of one of the actual arguments does not match with the type of the corresponding formal arguments

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

(i)   What is a structure and how does it differs from an array? How is a structure declared and how its members are accessed?

(ii)   What is a function? Name the type of functions with an example. Give the syntax for defining a function.

P.T.O.

(iii) ```
       #include<stdio.h>
       void funct(int *p);
       main()
       { static int x[5] = {1,2,3,4,5};
         funct(x);
       }
       void funct(int *p)
       {
         int i, prod=0;
         for(i=0; i<5; i++)
           prod *= *(p+i);
         printf("product=%d", prod);
         return;
       }
       ```

(a)  What type of argument is passed to funct?

(b)  What value is returned by funct?

(c)  What information is passed to funct?

(d)  What is the purpose of the for loop in funct?

(e)  What is the output of the program?

3.  Explain the output of any **two** parts from the following :

(5×2=10)

(i)  #include<stdio.h>

```
int h()
{
    int u=1;
    return (u);
}
int g()
{
    static int i=-1, a;
    int coeff;
    i++;
    if (i==0)
    {
      a = h();
      return(a);
    }
    coeff = (i%2) ? 2:3;
    a = coeff * a +2;
    return(a);
}
main( )
{  int i, d;
   for(i=1; i<=5; i++)
   {
      d=g();
      printf( "\n%od",d);
   }
}
```