Time:1 hours   **Mid Semester Exam-II: MTH409**   **Full Marks 50**

1. Consider the following C program:

   #include <stdio.h>

   int main() {

   int x[5] ={ 0, 1, 2, 3, 4 };

   int a, b;

   int *p = x+1;

   *(p+3)=9;

   a = *(x + 3);

   b = *(--p);

   printf("a=%d b=%d *p=%d x[4]=%d \n",a,b,*p,*(x+4));

   }

   What is the output of the program?   [6]

2. Find the ouput of the following program   [7]

   #include <stdio.h>

   int main() {

   char *ptr;

   char arrayCh[40] = "Computer Programming in C";

   puts(arrayCh);

   ptr = arrayCh;

   puts(ptr);

   *(arrayCh+24)='G';

   printf("%s\n",ptr);

   while(*ptr != 'i')

   ptr++;

   *ptr='R';

   printf("%s\n",arrayCh);

   puts(ptr);

   }

3. Consider the following function definition:

   int *func1* (int n)

   {

   return (n == 0)? 0 : n^2 + *func1* (n - 1);

   }

   What is the value return by *func1* (4)? What happens if you make the call *func1* (-1)?

   Describe the purpose of the function.   [6]

4. Given the following declarations

   int x = 1, y = 2, *px = &x, *py = &y, **ppx = &px;

   and assume that the variables are stored in the memory locations indicated below

   x:100, y:102, px:104, py:106, ppx:108

   (Note: x:100 means address of the variable x is 100)

   Show the contents of their locations (pictorially or otherwise) after each of the following assignments: [8]

   px = py;

   ppx = &py;

   y = *px;

   x = **ppx + 1;

5. Find the output of the following program: [8]

```
#include <stdio.h>
void revn(int *);
int main() {
int a=435,b=101;
revn(&a);
printf("%d\n",a);
revn(&b);
printf("%d\n",b);
revn(&a);
printf("%d\n",a);
revn(&b);
printf("%d\n",b);
return 0;
}

void revn(int *n)
{
int s=0;
while(n % 10 != 0){
s += n % 10;
n /= 10;
}
*n = s;
}
```

6. The bionomial coefficient is define recursively as follows

$$\binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1}$$

Using this definition and appropriate terminating condition(s), write a C function that takes non negative integers n and k as arguments and return the value of the binomial coefficient $\binom{n}{k}$. Also write down the prototype of the function. [7]

7. Write a C program which calculates the total number of consonants in the string "Computer Programming in C". It then prints out the string and the total number of consonants in the string. [8]