

**M.Sc. (INFORMATICS) / 1<sup>st</sup> Semester 2018**  
**PAPER IT-11-Programming Methodology**

**Max Marks: 75**

**TIME: 03 hours**

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

**Q 1 is compulsory. Attempt any 4 questions from Q. 2 to Q6.**

**Q1.** What do following signifies: (3)

- const float \* const \* const pcpci;
- An array T[25][20] is stored in the memory along the row with each of its elements occupying 2 bytes. Find out the location of T[10][15], if T[0][0] is stored at 42000. Also find the total number of elements in the array. (3)
- void (\*f)(int, int \*\* (\* (int \*\*, char \*\*))?) (3)
- typedef char \* (\*operation)(int \*\*, float \*); (3)
- int (\*(\*x[5])(char \*, int \*))[5]; (3)

**Q2.**

- Explain all phases through which "C" program passes before being transformed into an executable form? (3)

- Provide the output of following program? (3)

```
#include<stdio.h>
int main(){
    int a=0,b=1,c=3;
    *((a)? &b : &a) = a ? b : c;
    printf("%d %d %d\n",a,b,c);
}
```

*Handwritten notes:*  
 a = 0? b = 1, c = 3  
 a = 3, b = 1, c = 3

- Provide the output of following program: (5)

```
#include<stdio.h>
int main(){
    int arr[]={0,1,2,3,4};
    int *p[]={arr,arr+1,arr+2,arr+3,arr+4};
    int **ptr=p;
    ptr++;
    printf("%d %d %d\n",ptr-p,*ptr-arr,**ptr);
    *ptr++;
    printf("%d %d %d\n",ptr-p,*ptr-arr,**ptr);
    *++ptr;
    printf("%d %d %d\n",ptr-p,*ptr-arr,**ptr);
    ++*ptr;
    printf("%d %d %d\n",ptr-p,*ptr-arr,**ptr);
}
```

- d. What functions performed by C preprocessor? Provide output of following program? (4)

```
#include<stdio.h>
#define MIN(x,y) (x < y) ? x : y
int main(){
    int x=3,y=4,z;
    z=MIN( x+y/2 , y-1 );
    printf("%d\n",z);
}
```

Q3.

- a. What is Dynamic memory management in C? What are its advantages over static memory allocation? Explain the functions used for dynamic memory management? (5)
- b. What are dangling pointers? How many bytes are allocated by following program? (5)

```
#include<stdio.h>
#include<stdlib.h>
int main(){
    int (*p)[4];
    p= malloc ( 3 * sizeof( *p ));
    return 0;
}
```

- c. Write a program that dynamically allocates two dimensional array of 5 rows and 4 columns using array of pointers? (5)

Q4.

- a. What are Enumerations? Provide output of following program? (5)

```
#include<stdio.h>
void func1(void);
void func2(void);
int main(void){
    func1();
    func2();
    return 0;
}
void func1(void){
    extern int x;
    x++;
    printf("%d\t",x);
}
int x=89;
void func2(void){
```

```

        x++;
        printf("%d\n",x);
    }

```

- b. Explain different kind of storage classes supported with example? (5)
- c. What is use of volatile qualifier? Provide the output of following program. (5)

```

#include<stdio.h>
int main(void)
{
    char *ptr;
    ptr = "Every saint has a past, Every sinner has a future.\n";
    printf("Giving " "is " "living." "\n");
    printf(ptr);
    return 0;
}

```

Q5.

- a. What are self-referential structures? Differentiate between structures and union? Give example. (5)
- b. Differentiate between function parameters and arguments? Provide output of following program (5)

```

#include<stdio.h>
#pragma pack(1)
struct{
    char a[20];
    int b;
    union{
        double c;
        struct{
            char d[15];
            float e;
        }x;
    }y;
}z;
int main(void){
    printf("%u %u %u\n",sizeof(z.y.x),sizeof(z.y),sizeof(z));
    return 0;
}

```

- c. Which are recursive functions? Provide output of following recursive function?

(5)

```
#include<stdio.h>
int func(int a, int b);
int main(void){
    printf("%d \n",func(3,8));
    return 0;
}
int func(int a, int b){
    if(a>b)
        return 1000;
    return a + func(a+1,b);
}
```

5.

- a. List all 6 bitwise operators along with their symbols? Provide output of following program.

(5)

```
#include<stdio.h>
int main(void){
    int k;
    k=((3<<4)^(96>>1));
    printf("%d\n",k);
    return 0;
}
```

- b. List 3 valid arithmetic operations that cannot be performed on pointers? Complete the following table:

(5)

File Pointer	Stream	Buffering
stdin	Standard input	?
stdout	?	?
stderr	?	Unbuffered

- c. Define scope of an identifier? Explain with example about different kinds of scopes?

(5)