Roll No. : 4014

M.Sc. (Informatics), Semester-I Examination, 2014
Paper: IT-11
Programming Methodology

Time: 3 hrs. Maximum Marks: 75

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

Attempt any 4 questions from Q2 to Q6. Q1 is compulsory.

Q1. Expand the following pointer declarations: 12

(3+3+3+3+3)

1) void * (*c) (char, int (*)());
2) typedef void (*p)(int **, float *, char *);
3) char *(*(*p())[])(int * , void **);
4) int * (*ptr) (void(*) (int * , void **), int (*) (void ** , int *));
5) int ** (*ptr) (int **, int ** (*) (int **, int *));

Q2.

(5+2+3+2+3)

1) Explain Variadic functions with example? Write the whole procedure to create a Variadic functions? 5
2) Write the output of following program?

```
#include<stdio.h>
#include<stdarg.h>
void func(int a, ... ,int b);
int main(void)
{
        int a=2,b=3,c=4,d=5;
        func(4,2,3,8,5);
        return 0;
}
void func(int a, ... ,int b)
{
        va_list *ap;
        va_start(ap,a);
        for(i=0; i<b; i++)
                printf("%d",va_arg(ap,int));
        va_end(ap);
}
```

3) What are enumerations? Explain with example? 3
4) Write the output of following program? 2

```
#include<stdio.h>
enum day{sun=-1,mon,tue,wed,thu=7,fri};
int main(void)
{
        enum day d1;
        printf("%d\t",mon);
        d1 = mon+2;
        printf("%d\n",d1);
        d1=wed;
        printf("%d\n",d1);
```

```
        d1=fri;
        printf("%d\n",d1);
        return 0;
}
```

5) Write a program to check whether number is even or odd using bitwise operators? Also write the output of following program?

```
#include<stdio.h>
int main(void)
{
        int x=7,y=19;
        printf("%d  %d  ",x&y,x&&y);
        printf("%d  %d  ",x|y,x||y);
        printf("%d\n",x^y);
        return 0;
}
```

Q3. (4+3+4+2+2)

1) How Dynamic Memory allocation is done in C? Write all the functions used for dynamic memory allocation in C? In which memory segment dynamic memory is allocated? Complete the following table: 3

realloc first parameter	realloc second parameter	Behaviour
null	NA	?
Not null	0	?

2) When memory leaks occurs in C program? Give 2 examples programs showing memory leaks? 2
3) Write a program to dynamically allocate 2-D array using pointer to an array?
4) Find out the logical error in program and also provide correct solution:

```
#include<stdio.h>
#include<stdlib.h>

int *func1(void);
int main(void)
{
        int *ptr1,*ptr2;
        ptr1=func1();
        printf("%d \n",*ptr1);

        return 0;
}
int *func1(void)
{
        int a=8,*p=&a;
        return p;
}
```

5) Write the output of following program? 9

```
#include<stdio.h>
int main(void)
{
        int a[2][3];
        a[1][2]=9;
        printf("%d\n",a[1,2]);
        return 0;
}
```

Q4)

(3+2+3+2+3+2)

1) Write a program to identify whether the machine used is little endian or big endian?
2) What are self referential structures? Give one example? Where these types of structures are used?
3) Write the difference between structures and unions?
4) Provide the output of following program?

```
#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;
}
```

5) How the members of inner structure date are accessed by structure variable and pointer to structure?

```
struct student{
        char name[20];
         int rollno;

         struct date{
                    int day;
                    int month;
                    int  year;
         }birthdate;

         float marks;
};
```

6) Which of following mechanism is most efficient? Give reason.
   a. Passing pointer to structure as arguments to function.
   b. Passing structure variable as arguments to function.

Q5)

(3+3+2+2+3+2)

1) What are storage classes? Explain various types of storage classes supported?
2) Write a program which shows usage of sprintf() and sscanf() string library functions?
3) Write the output of following program?

```
#include<stdio.h>
void func(char str[]);
int main(void)
{
        char str[]="Vijaynagar";
        func(str);
        return 0;
}
```

```
void func(char str[])
{
        str=str+5;
        printf("%s\n",str);
}
```

4) Write the output of following program?

```
#include<stdio.h>
#include<string.h>
int main(void)
{
        char str1[]="Parul";
        char str2[10];
        strcpy(str2,str1);
        if(str1==str2)
                printf("Same\n");
        else
                printf("Different\n");
        return 0;
}
```

5) What are command line arguments in C language? Write one example program?

6) Write the output of following program?

```
#include<stdio.h>
int main(void)
{
        char *ptr;
        ptr="My name is %s and age is %d\n";
        printf(ptr,"Ranju",30);
        return 0;
}
```

Q6)

(3+5+2+5)

1) Provide the output of following program?

```
#include<stdio.h>
#define dp double *
int main(void)
{
        dp p1, p2, p3;
        typedef double *dptr;
        dptr ptr1, ptr2, ptr3;
        printf("%u  %u  %u\n", sizeof(p1), sizeof(p2), sizeof(p3) );
        printf("%u  %u  %u\n", sizeof(ptr1), sizeof(ptr2), sizeof(ptr3) );
        return 0;
}
```

2) What is use of typedef keyword in C?

a. typedef float * fptr;

fptr p, **r;

Describe the data type of p and r.

b. typedef int intarr[10];

intarr a, c[15];

Describe the data type of a and c.

3) Differentiate between following two pointer declarations?

a. const int * const p;

b. const int * const *q;

4) What are different jump statements in C language? Give example of each. Does switch case supports continue statement?