

[N.B. Answer any SIX questions taking THREE from each part]

**Part-A**

- |    |  |      |
|----|--|------|
| 1. | (a) What is computer? Defines analog and digital computer.   | 3    |
|    | (b) Discuss mainframe and supercomputer with applications.   | 3    |
|    | (c) What is computer generation? Mention different generation names with their used technologies.                              | 2.75 |
| 2. | (a) Draw the block diagram of a digital computer and discuss how a program is executed by it.                                  | 4    |
|    | (b) What is CPU? Draw the block diagram of the internal structure of CPU and write its functions.                              | 4.75 |
| 3. | (a) What is computer memory? How is it measured?   | 2    |
|    | (b) What are the differences between magnetic tape and magnetic disk?  | 2.75 |
|    | (c) Define the following terms in context of a disk storage:<br>i) Access time<br>ii) Latency iii) Seek time iv) Transfer rate | 2    |
|    | (d) What is cache memory? What function does it perform?   | 2    |
| 4. | (a) Discuss the functional mechanism of a hard disk drive during data read and write operation.                                | 3.75 |
|    | (b) Discuss how data is read from a compact disk.  | 3    |
|    | (c) What is RAM? Shortly discuss about each type of RAM.   | 2    |

**Part-B**

- |    |  |      |
|----|--|------|
| 5. | (a) Discuss LCD monitor with their types and problems.                                       | 3    |
|    | (b) Discuss different evaluation criteria of a printer.                                      | 2.75 |
|    | (c) Discuss the functional mechanism of a laser printer.                                     | 3    |
| 6. | (a) What is software? Define operating system with its types and functions.                  | 3.75 |
|    | (b) What is utility program? Discuss some utility programs with their tasks.                 | 3    |
|    | (c) Define user-written program and package program.   | 2    |
| 7. | (a) Compare DOS and Windows as two operating systems.  | 2    |
|    | (b) What is database and database management system (DBMS)? What are the advantages of DBMS? | 3    |
|    | (c) Define computer virus. Mention some symptoms and prevention of computer virus.           | 3.75 |
| 8. | (a) What is computer network? Discuss different types of computer networks.                  | 3    |
|    | (b) Define network topology. Discuss bus topology of computer network.                       | 3.75 |
|    | (c) Define browser and search engine with examples.  | 2    |

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**University of Rajshahi**  
**Department of Computer Science and Engineering**

B.Sc. (Engg.) Part-I Odd Semester Examination-2015

Course: CSE1111 (Computer Fundamentals)

Marks: 52.5 Time: 3 Hours

**[Answer any six (06) questions taking three (03) from each part]**

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**Part-A**

1. a) What is a computer? Discuss different types of digital computers with their applications. 4  
b) What is meant by computer generation? Mention the technologies used in different 1.75  
generation of computers.  
c) Draw the block diagram of a digital computer and discuss how a program is executed by it. 3
  
2. a) What is CPU? Draw the internal block diagram of a CPU. 2.25  
b) Draw and discuss the data read-write mechanism of a 64x4 RAM. 3.5  
c) Define computer memory. Suppose your computer has 2 MB cache, 4 GB RAM and 500 3  
GB hard drive. Explain your idea behind having 3 different types of memory instead of  
having just one.
  
3. a) Discuss how data is read from a compact disk. 4  
b) Explain, whether the touch screen of a tablet PC is an input or output device. 2.75  
c) What happens when you press a key on your computer's keyboard? 2
  
4. a) Compare CRT, LCD, and LED monitors. 2.75  
b) Discuss the printing mechanism of a laser printer. 3  
c) Define scanner, bar-code reader, and modem. 3

**Part-B**

5. a) What is software? Define system software and application software with examples. 3  
b) Discuss operating system with its types and functions. 3.75  
c) What are package program and user-written program? 2
  
6. a) What is language translator? Discuss different types of language translators. 4  
b) Define utility program. Mention some name of utility programs with their tasks. 3.75  
c) What do you mean by driver software? 1
  
7. a) What is meant by computer networks? List four benefits that computer networks provide to 3  
their users.  
b) What is network topology? Suppose in a lab of CSE department, all the computers and 3.75  
printers are connected to a network switch. Name and explain the topology that is used  
here.  
c) Why is the Internet sometimes described as a "network of networks"? 2
  
8. a) What do you mean by database and database management system? Are they same or 3  
different? How?  
b) What is computer virus? Mention some symptoms of virus for attacking a computer. 3.75  
c) Define anti-virus and computer hacker. 2

**University of Rajshahi**  
**Department of Computer Science and Engineering**  
B.Sc. (Engg.) Part-I Semester-I Examination-2014  
Course: CSE-1111 (Computer Fundamentals)  
Full Marks-52.5 Time: 3 hours

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[N.B. Answer SIX questions taking any THREE from each part]

**PART-A**

- |   |      |
|---|------|
| 1. (a) Define computer. Discuss analog, digital, and hybrid computers with applications     | 4.75 |
| (b) Draw the block diagram of the internal structure of a CPU and write its functions.      | 4    |
| 2. (a) Define computer memory. Why is RAM called primary memory and volatile memory?        | 3    |
| (b) Draw the architecture of a 64x4 RAM and discuss data read-write operation in it.        | 4    |
| (c) What are BIOS and flash memory?   | 1.75 |
| 3. (a) What is cache memory? Mention its importance and functions.                          | 4    |
| (b) Discuss the functional mechanism of a hard disk drive during data read-write operation. | 4.75 |
| 4. (a) Briefly discuss LCD monitor with their types and problems.                           | 4    |
| (b) Write the differences between impact and non-impact printers.                           | 1.75 |
| (c) Define and discuss computer buses.  | 3    |

**PART-B**

- |   |      |
|---|------|
| 5. (a) What is software? Define operating system with its functions and types       | 4    |
| (b) Write the differences between DOS and Windows operating system.                 | 2.75 |
| (c) Define language translator and driver software.                                 | 2    |
| 6. (a) What do you mean by data and information? Write the difference between them. | 3    |
| (b) Define database and DBMS with example.  | 2.75 |
| (c) What is utility software? Mention its functions.                                | 3    |
| 7. (a) Define computer network. Discuss the function of a bus network.              | 4    |
| (b) Discuss the operation of optical fiber as a communication media.                | 3    |
| (c) Define Internet, intranet, and extranet.  | 1.75 |
| 8. (a) What is a computer virus? What tasks can they perform?                       | 2.75 |
| (b) How can you prevent viruses in a computer? Name some common antivirus software. | 3    |
| (c) Discuss the following terms: (i) HTTP (ii) SMTP (iii) FTP                       | 3    |

University of Rajshahi  
**Department of Computer Science and Engineering**  
B.Sc. (Engg.) Examination-2013, Year-I, Semester-I  
Course: CSE-1111 (Computer Fundamentals)  
Full Marks-52.5 Time: 4 hours

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[N.B. Answer any six questions taking THREE from each of the groups]

**PART-A**

- |  |      |
|--|------|
| 1. (a) What is a computer? Discuss different types of digital computers with their applications.   | 5    |
| (b) Draw the block diagram of a digital computer and discuss how a program is executed by it.      | 3.75 |
| 2. (a) Describe two main parts of the CPU and explain how they work together.                      | 4    |
| (b) Explain the difference between RAM and ROM.  | 2    |
| (c) Describe three hardware factors that affect processing speed.                                  | 2.75 |
| 3. (a) Discuss the functional mechanism of a hard disk drive during data read and write operation. | 4    |
| (b) What is a cache memory? Discuss why and how a cache memory is used in a computer.              | 4.75 |
| 4. (a) List the five steps a computer follows when accepting input from a keyboard.                | 2    |
| (b) Describe four characteristics one should consider when comparing monitors.                     | 4    |
| (c) Explain the factors one should consider when evaluating printers.                              | 2.75 |

**PART-B**

- |  |      |
|--|------|
| 5. (a) What is software? Define system software and application software with example. | 3    |
| (b) What is an operating system? Mention its different types and functions.            | 3.75 |
| (c) Write the differences between DOS and Windows operating system.                    | 2    |
| 6. (a) Define the term database and DBMS.  | 2    |
| (b) Differentiate between flat file databases and relational databases.                | 3    |
| (c) Explain different field types of a database table with example.                    | 3.75 |
| 7. (a) What is computer network? Discuss different types of computer networks.         | 4    |
| (b) Define topology. Shortly discuss the function of a star topology.                  | 3.75 |
| (c) What do you mean by protocol?  | 1    |
| 8. (a) What is Internet? Mention different applications of Internet.                   | 2.75 |
| (b) Define browser and search engine with example.                                     | 2    |
| (c) What is computer virus? Mention some harms and symptoms of virus program.          | 3    |
| (d) What does an anti-virus do?  | 1    |

[N.B. Answer SIX questions taking at least THREE from each Section.]

Section A

- 1.a) What are the basic components of a computer system? Briefly discuss each component. 3.75  
b) Briefly discuss about different generations of computer. 3  
c) Write down your idea about the specification of a high configuration personal computer. 2
- 2.a) Define computer memory. Why RAM is called a primary memory as well as volatile memory? 3  
b) What is a cache memory? Discuss why is it essential in a computer system? 3.75  
c) Define resolution and refresh rate of a monitor with example. 2
- 3.a) Discuss the data read-write mechanism of a hard disk drive. 4.75  
b) Discuss the printing mechanism of a laser printer. 4
- 4.a) What are the specifications that should be considered while buying monitors? Explain. 3  
b) How does a color CRT monitor produce images on screen? 2.75  
c) Write the advantages disadvantages of CRT monitor and LCD monitor. 3

Section B

- 5.a) What is software? Define system software and application software with example. 3  
b) Define operating system with its types and functions. 3.75  
c) Write the differences between DOS and Windows operating system. 2
- 6.a) What is language translator? Differentiate between compiler and interpreter. 3  
b) What is utility program? Write the names and functions of some utility programs. 3  
c) Define user-written program and package program with example. 2.75
- 7.a) What are the differences between data and information? 1  
b) Define the terms: (i) DBMS (ii) Database (iii) Entity (iv) Record (v) Field (vi) File. 4  
c) Define DDL and DML. 2  
d) How computer process data? 1.75
- 8.a) What is network topology? Discuss different types of networks topologies. 5  
b) What do you mean by internet access providing and internet presence providing by an ISP? 2.75  
c) What is a MODEM? 1

Dept. Computer Science and Engineering

University of Rajshahi

Semester Final Examination, B.Sc. Engg. 2016, 1<sup>st</sup> year, Odd semester.

Course ID: CSE -1121

## **Course Title: Computer Programming with C**

Total Time 3 Hours

Total Marks 52.5

**Answer any six questions taking three from each section**

Section A		
1(a)	(i) If int i = 7, float f = 5.5, char c = 'a', What will the output of (a) 'i + c' and (b) 'i + f' (ii) If int result, i = 7, f = 8.5, What will the output of ' result = (i + f) % 4' (iii) If float num = 10.5, What will the output of 'num % 2' and '((int)num) % 2'	3
(b)	What will be simplified form of (a) !(a < b), (b) !(c <= d), (c) !(x => y) ?	1.5
(c)	What will be the output of the following code? (Objective of the question: To check the formatting knowledge)	4.25

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

```
main()
{
    printf("%7d\n",123);
    printf("%-4d\n",123);
    printf("%07d\n",15);
    printf("%4.3f\n",3.14159);
    printf("%x\n",127);
    printf("%o\n",127);
    getch();
}
```

2(a) What will be the output of the following code?

2.75

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

```
int i,j;  
main()
```

```

{
    i=1;
    while(i<=5)
    {
        for (j=1; j<=6; j++)
            {if (i==j)
                printf("X");
            else
                printf("Y");
            }
        i=i+1;
        printf("\n");
    }
}

```

(b) List the syntax error (if any) of each line of the following code?  
(Objective of the question: To check the knowledge of basic C syntax.)

6

```
#include <conio.h>
int 1x,2x, y1,y2;
float z;
char a[10], b[10];
Main()
{
    scanf("%d%d%f",y1,z);
    scanf("%c%c%c%c", &a[1],a[2],&a[3]);
    b[2]=a[2];
```

```

y2=b[2]+a[1]+y1;
printf("%f %f %f %d", &y1, z, y2, z, a[3]);
}

```

2  
6.75

- 3(a) What is the difference between 'while' and 'do-while' loops?  
 (b) What will be the output of the following program?  
 (Objective of the problem: To check the capacity of four-layer nested loop control)

```

#include<stdio.h>
#include<conio.h>

int x[5][5]={ {1, 4, 3, 6, 8},
              {2, 9, 0, 5, 7},
              {5, 9, 6, 7, 6},
              {9, 0, 2, 6, 8},
              {3, 6, 0, 1, 7}};

int i,j,k,l, tmp,big,p;

```

```

main() {
    for (i=0;i<=4;i++)
    {
        for(j=0; j<=4; j++)
        {
            for(k=j; k<=4; k++)
            {
                for(l=k ; l<=4; l++)
                {
                    x[k][l]=x[k][l]+1;
                }
            }
        }
    }

    for (i=0;i<=4;i++)
    {
        for(j=0; j<=4; j++)
        {
            printf ("%d ",x[i][j]);
        }
        printf ("\n ");
    }

    getch();
}

```

- 4(a) What is the purpose of the switch statement? How does this statement differ from the other statements?  
 (b) What is the difference between the break and continue statement?  
 (c) Write a fragment of program that makes use of the goto statement.

2.5  
2.5  
3.75

### Section-B

- 5(a) What are the advantages of using functions?  
 (b) What are the differences between passing an array to a function and passing a single-valued data item to a function?  
 (c) What will be the output of the following code? If you think any value displayed may be garbage, mention it as garbage too. Explain how the variables take the values.  
 (Objective of the question: To check the concepts of local and global variables)

2  
2  
4.75

```

#include<stdio.h>
#include<conio.h>

```

```

void add_int(int n);

int x,p,q;

int main(){
    int p;
    q=200;
    x=10;
    printf("\nBefore calling x=%d p=%d q=%d",x, p, q);
    add_int(x);
    printf("\n After calling x=%d p=%d q=%d",x, p, q);

}

void add_int(int x){
    x=50;
    p=200;
    q=300;
}

```

- 6(a) What conditions must be satisfied by all of the elements of any given array? 1.75  
 (b) What will be the output of the following code  
 (Objective of the question: Check the concepts of pointers)

```

void func1(int *p, int *q, int *r, int *s);

main() {
    int a,b,c,d,*x,*y;

    a=15; b=100; x=&d; y=&c; c=25; d=300;
    printf("Before calling %d %d %d %d\n",a,b,*x,*y);
    func1(&c,&d,&a,&b);
    printf("After calling %d %d %d %d\n",a,b,*x,*y);
    getch();
}

void func1(int *x1, int *x2, int *x3, int *x4)
{
    *x1=100; *x2=200; *x3=300; *x4=400;
}

```

- (c) Can entire arrays be processed with single instructions, without repetition? 2

- 7(a) Write a program to read a  $n$  bit long binary string and then search how many times pattern '000' occurs. Do not consider same '0' in two adjacent '000' pattern. For example '100001' or 1000001 has only one '000' pattern, but '100000001' has two '000'. 3.5

**Sample input:** 101000111001000010110000010000001110

**Output:** 5

- (b) What will be the output of the following code?(Objective of the question: To check the knowledge of recursive function) 5.25

```

#include<stdio.h>
#include<conio.h>

int y(int n);

int main(){
    int x;
    x=y(50);
    printf("Final Output=%d",x);
    getch();
}

int y(int n){

```

```

    int y(int n){
```

```

if(n==0)
{
    printf("In Terminating Condition= %d \n",n);
    return n;
}
else
{
    printf("In Recursive Calling =%d\n", n);
    return n+y(n-5);
}
printf("CSE %d Times\n",n);
}

```

- 8(a) Draw the 'flow chart' to find out the 'biggest number' from given 10 integers. 2.75  
 (b) Write C program for the following problem, it does not need to think about run-time optimization. 6  
 (Objective of the question: To check the problem understanding capacity)

One day, one of the students of CSE dept. named Sumon is having a party, and he has invited his friends,  $p$  of them have arrived already, but some other are runninglate. To occupy his guests, Sumon tried playing some team games with them, but he found that it wasimpossible to divide the  $p$  guests into any number of equal-sized groups of more than one person. As a result, he had to wait until  $q$  guest(s) arrived,  $q$  may be single guest or group of guests arrived at the same time. Finally, summon could make teams of equal sized from the arrived  $(p+q)$  guests and started his games.

#### **Sample Input**

The input will consist of 5 test cases. Each test case will be given as a non-negative integer  $(p+q)$  and  $(p+q) \leq 50$ ;

#### **Sample Output**

For each test case, output will be an integer  $q$  that is closest to  $(p+q)$ ..

Sample Input	Corresponding Output
8	1
22	3

**University of Rajshahi**  
**Department of Computer Science and Engineering**

B.Sc. (Engg.) Part-1 Odd Semester Examination 2015

Course: CSE 1121 (Computer Programming with C)

Full Marks: 52.5

Time: 3 Hours

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**Answer Six (06) Questions taking any Three (03) from each section in separate answer script**

**Section A**

- |  |      |
|--|------|
| 1.(a) What is run-time error? Give an example.                 | 2    |
| (b) What are local and global variables?                       | 2    |
| (c) What are the syntax errors (if any) of the following code? | 4.75 |

```
#include <conio.h>
int 1x,2x, y1,y2;
float z;
char a[10], b[10];
Main()
{
    scanf("%d%d%f",y1,z);
    scanf("%c%c%c"), &a[1],a[2],&a[3]);
    b[2]=a[2 ];
    y2=b[2]+a[1]+y1;
    printf("%f%f%f%d%d",&y1,z,y2,z,a[3]);
}
```

- |   |      |
|---|------|
| 2.(a) What are the uses of 'break' statements? Give an example.   | 3    |
| (b) What will be the output of the following statements?  | 3    |
| printf("%5d\n",123);     printf("%-5d\n",123);     printf("%05d\n",15);     printf("%3.2f\n",3.14159);     printf("%x\n",255);     printf("%o\n",255);  |      |
| (c) Write a function named ' <i>int floatInteger(float n</i> )' to decide whether a number, n, is a floating point or pure integer. Your function will return '1', if n is a floating point number otherwise '0'. | 2.75 |
| 3.(a) Suppose, you are given an array of 'n' integers. You are asked to develop a program to sort that array in ascending order using at most one extra variable. Draw a flowchart to solve the problem.          | 4    |
| (b) What will be output of the following code?  | 4.75 |

```
int x[10] = {1, 4, 3, 6, 8, 2, 9, 0, 5, 7};
int i,j,k,tmp,big,p;
main() {
    for (i=1;i<=5;i++)
    {
        big=x[i];
        for(j=i; j<=5; j++)
            {if(x[j]> big) p=j+1;}
            tmp=x[p]; x[p]=x[i]; x[i]=tmp;
    }
    for (k=1;k<8;k++) printf ("%d -th %d\n",k,x[k]);
}
```

- (b) What will be output of the following code?

```
int i,j;

main() {
    for (i=1;i<=7;i++)
    {
        for (j=2; j<=7; j++)
        { if (i==j-1) printf("A"); else printf("0");
        printf("\n");
    }
}
```

- (c) Why do we need to use 'fclose(fp)'?

1

### Section-B

- 5.(a) What is the deference between function declaration and function definition? 2

- (b) Correct the following C programs so that you can compile them successfully. 1.25+ 2

a.c

```
/* Date: 5.3.2015
main(){
    int i,
    for(i=0, i<5, i++){
        scanf("%d",x)
        printf("%d\n",x)
    }
}
```

b.c

```
#include<stdio.h>
main(){
    int x,sum;
    float y;
    scanf("%d",x);
    sum=summation(x,y);
}
```

- (c) What will be output of the following code? 3.5

```
main() {
    int a,b,c,d,*x,*y;

    a=5; b=10; x=&c; y=&d; c=20; d=30;
    printf("Before calling %d %d %d %d %d\n",a,b,*x,*y);
    func1(&c,&d,&a,&b);
    printf("After calling %d %d %d %d %d\n",a,b,*x,*y);
}

void func1(int *p, int *q, int *r, int *s){
    *p=100; *q=200; *r=300; *s=400;
}
```

- 6.(a) What is a pointer? Is there any relation between a pointer and the name of a one-dimensional array? 2

- (b) What will be output of the following code? 3.5

```
void func1(int a, int p, int q[]);
int x, y;
main(){
    int a,b,c[3];
    a=10;b=20;c[1]=1,c[2]=2;
    x=100;y=200;
    printf("Before %d %d %d %d %d %d \n",a,b,c[1],c[2],x,y);
    func1(a,b,c);
    printf("After %d %d %d %d %d %d \n",a,b,c[1],c[2],x,y);
    getch();
}
```

2

```

void func1(int a, int p, int q[]){
    int x;
    a=100;
    p=200;
    q[1]=q[1]+2;
    q[2]=q[2]+2;
    x=102;
    y=202;
}

```

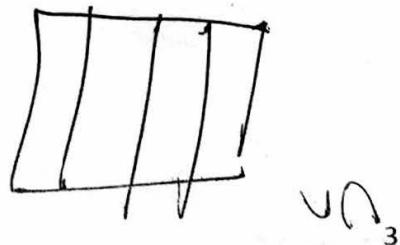
- (c) Write a program to take two matrices  $A[n][n]$  and  $B[n][n]$  from the keyboard. Set the value of each cell of a row of the matrix  $C[n][n]$  with biggest value of respective two rows of matrix  $A$  and  $B$ . The maximum size of 'n' is 10. 3.25
- 7.(a) What is the difference between "structure" and "union"? Give an example to explain it. 3
- (b) Let the contents of file named "data.dat" : 4
- |   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| 2 | 3 | 4 | 5 | 6 |
| 3 | 4 | 5 | 6 | 7 |
| 4 | 5 | 6 | 7 | 8 |
| 5 | 6 | 7 | 8 | 9 |
- Write a program to read those values from that file and print the sum of each row in another file named "output.dat". The contents of "output.dat" look like:
- |    |
|----|
| 15 |
| 20 |
| 25 |
| 30 |
| 35 |
- (c) How many times will "Bangladesh" be printed on screen? 1.75
- (i) `for(i=0; i<=6; i++) printf("Bangladesh\n");`
  - (ii) `for(i=0; i<6; i++) printf("Bangladesh\n");`
  - (iii) `for(i=2; i<=9; i++) printf("Bangladesh\n");`
  - (iv) `for(i=0; i<=9; i--) printf("Bangladesh\n");`
- 8.(a) Does it make any difference if you compile any C program by typing 'gcc hello.c' or 'gcc hello.c -o hello.o'? 1
- (b)
- (i) Write a structure named 'familyInfo' having the members: 'motherName' and 'fatherName' as string, 'childNo' as integer, 'income' and 'expenses' as floating point numbers. 2
  - (ii) How many bytes are required for the above mentioned structure definition? 1
  - (iii) How many bytes are required if the above definition is 'union' instead of 'structure'? 1
  - (iv) Write a C program using that structure to take 10 families' information from keyboard and save into structure. 3.75

*Diagram illustrating a structure definition:*

Diagram showing a structure definition with fields: motherName, fatherName, childNo, income, and expenses.

Annotations:

- Top left: "Struct familyInfo"
- Below "Struct": "{'motherName', 'fatherName', 'childNo', 'income', 'expenses'}"
- Bottom left: "Suppose float"
- Bottom center: "int"
- Bottom right: "float"
- Bottom far right: "float"



## University of Rajshahi

### Department of Computer Science and Engineering

B. Sc. (Engg) Part-I Odd Semester Examination 2014

Course: CSE-1121 (Computer Programming with C)

Full Marks: 52.5 Duration: 3(Three) Hours

**Answer 06(Six) questions taking any 03(Three) questions from each section in separate answer script**

#### Section - A

1. a) Mention the advantages of high level programming language. Differentiate between compiler and interpreter. 3

- b) Differentiate between pseudo-code and algorithm with example. 2

- c) You are given an array containing some real numbers. You are asked to develop a program to find the average of positive and negative numbers separately. Draw the flowchart to solve the problem. 2

- d) Find and explain the output of the following program: 1.75

```
void main() {  
    int a=5, b=15, r, s;  
    r=a<8;  
    s=(a<10)&&(b==12);  
    printf("r=%d, s=%d", r, s); }
```

2. a) What is meant by constant and variable? Write down the name of different constant types. 3

- b) Define escape sequence. List any 5(five) escape sequences used in C programming. 2

- c) Distinguish between unary and binary operator with example. 2

- d) Find the output of the following code. 1.75

```
void main() {  
    int i = 10, j = 20 ;  
    float a, b, c;  
    a = i / j;  
    b = 1.0 * i / j ;  
    c = i / j * 1.0;  
    printf("%f %f %f ", a, b, c); }
```

3. a) How the value of an expression can be converted to a different data type? Consider the expression  $x=(y+z)\%4$ ; if the value of  $y$  and  $z$  are 5 and 5.5 respectively, what will be the value of  $x$ ? Explain the reason of output. 2

- b) Explain bitwise AND and OR operation with example. If  $x=5$ ;  $y=11$ ; what is the value of  $(x\&y|2)$  and  $(x|y==3)$ ? 3

- c) Explain the purpose of keyword “void” and “return” statement. 2

- d) Explain the output of the following block of C code: 1.75

```
void main() {  
    int i=4, j ;  
    j = ++i * i++;  
    i *= j;  
    printf("%d %d", i,j); }
```

4. a) Explain the difference of while and do – while loop with example. 2

- b) What is the purpose of break statement? Suppose you are given an integer (positive and negative) type array containing  $n$  elements. Write a C code to find the position of first occurrence of negative number in the array. It is required to stop the searching when the first negative integer is found. 3

- c) How the following statements are interpreted? 2

```
if e1 if e2 s1  
else s2
```

Which logical expression is associated with else clause?

- d) Explain the output of the following C code:

```
main() {
    int *a, b = 30;
    a = &b;
    b = *a + 40;
    a = b % 5;
    printf("%d %d", *a, b); }
```

### Section – B

5. a) Define function and function prototype with examples. Why function prototype is used in C? 2  
 b) Explain formal and actual parameter with examples. 2  
 c) Write a recursive function in C programming that will return the sum of the series 2  
 $1+2+3+\dots+n$ . Here  $n$  is a positive integer.  
 d) Distinguish between “function call by value” and “function call by reference”. Explain with 2.75 example.
6. a) Compare global variable and local variable with example. 1.75  
 b) What is the relation between pointer and single-dimension array? Give example. 2  
 c) Define dynamic memory allocation. Why it is required? 2  
 d) Explain the following C declarations. i) `int *p[10];` ii) `int (*p)[10];` iii) `int *p(char *a[]);` 3
7. a) What is user-defined variable? Why it is required for C programming? 1.50  
 b) Distinguish between structure and union. 1.75  
 c) Define self-referential structure with example. 1  
 d) Write a C program that will define a structure `time` which contains three integer variables `hours`, `minutes` and `seconds` where  $0 \leq \text{hours} \leq 23$  and  $0 \leq \text{minutes}, \text{seconds} \leq 59$ . Then the program will read the beginning and ending time of an event from input console and pass them to a function that compute and print the duration of the event. For example, if an event begins at 21:55:34 and ends at 03:25:21 then the duration of the event is 05 hours 29 minutes and 47 seconds. Consider that the maximum duration of an event is less than 24 hours. 4.50
8. a) Describe different types of file opening mode to open a data file. 3  
 b) Define command line arguments. Give an example for passing command line arguments in a C program. 2.5  
 c) Consider the following C program. 3.25
- ```
#include <stdio.h>
int main()
{
    int i = 10, n=0;
    while(i>1)
    {
        if(i&1==1)
        {
            i+=i<<2;
            i=i|1;
        }
        else i>>=1;
        n++;
    }
    printf("%d %d", n, i);
    return 0;
}
```
- Compute the output of the above program.

**Answer six questions taking any three questions from each section**

## SECTION: A

- |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1 | a) What is meant by a computer program? What, in general, happens when a computer program is executed?<br>b) Name some commonly used high-level languages. What are the advantages of using high-level languages?<br>c) What is meant by compilation? What is meant by interpretation? How do these two processes differ?<br>d) Mention and describe the four basic data types in C.<br>e) What is an escape sequence? What is its purpose?                                                                                                                                                            | 2<br>1.75<br>2<br>2<br>1 |
| 2 | a) What is the difference between file and stream? What are the purpose of the following functions:<br>i) fopen()    ii) feof()    iii) fflush()<br>b) What is the difference between ‘s’ and “s”?<br>c) What do you know about “nested if” and “if-else-if ladder”? Briefly describe with example.                                                                                                                                                                                                                                                                                                    | 4<br>1.5<br>3.25         |
| 3 | a) What do you know about lvalue and rvalue? Explain with example.<br>b) How do do-while and while statements differ? When is a for, do-while or while control statement preferable to use?<br>c) Write a loop that will calculate the sum of every third integer, beginning with i=2(i.e. 2+5+8+....) for all values of i that are less than 100. Write the loop in two different ways.<br>i) Using a do...while statement              ii) Using a for statement.                                                                                                                                    | 2<br>2.5<br>4.25         |
| 4 | a) What is a function? State three advantages to the use of functions.<br>b) Suppose an array is passed to a function as an argument. If the value of an array element is altered within the function, will this change be recognized within the calling portion of the program?<br>c) What are function prototypes? What is their purpose? Where within a program are function prototypes normally placed?<br>d) Summarize the rules governing the use of the return statement. Can multiple expressions be included in a return statement? Can multiple return statements be included in a function? | 2.75<br>2<br>2<br>2      |

## SECTION: B

- |   |                                                                                                                                                                                                                                                     |      |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 5 | a) In what way does an array differ from an ordinary variable?                                                                                                                                                                                      | 2    |
|   | b) Can initial values be specified within an external array definition? Can they be specified within a static array definition?                                                                                                                     | 2    |
|   | c) When passing an argument to a function, what is the difference between passing by value and passing by reference? Explain.                                                                                                                       | 3    |
|   | d) When a multidimensional array is passed to a function, how are the formal argument declarations written? Compare with one-dimensional arrays.                                                                                                    | 1.75 |
| 6 | a) How pointers and arrays are closely related? What are the advantages of using pointer?                                                                                                                                                           | 2.25 |
|   | b) What is the difference between <code>int *p[5]</code> and <code>int (*p)[5]</code> .                                                                                                                                                             | 2    |
|   | c) Write a program that will read a $5 \times 5$ matrix of integer numbers and then calculate the row sum and column sum and put the result in a $2 \times 5$ matrix where first row represent the row sum and second row represent the column sum. | 4.5  |

- 7 a) How does a structure differ from an array? How the members of a structure are accessed? 2.5  
b) Write a program using structure that will allow you to enter and display the following information of your family: 4.25  
    i) Name ii) Age iii) Occupation iv) Salary  
c) What is wrong with the following code? Correct the error, and also give the output. 2
- ```
#include<stdio.h>
int main()
{
    struct s {
        char *s;
    } a = { "Rithcie"}, *p = &a;
    printf("%s", *p.s);
}
```
- 8 a) What are the differences between malloc() and calloc()? 1.5  
b) What is the difference between #include<filename> and #include "filename"? 1.5  
c) What is meant by "bit masking"? How do you check the 3rd bit of an integer variable is '1'? 2  
d) What is a macro, and how do you use it? What is the output of the following code? Explain. 3.75
- ```
#define mul(x,y) (x)*y
int main()
{
    printf("%d", mul(3+2,4+5));
}
```

University of Rajshahi  
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 B. Sc. (Engg), Part-I, Odd Semester Examination, 2012  
 Course: CSE1121 (Computer Programming with C)  
Answer any three questions from each section

Time: 04 (Four) Hours

Full Marks: 52.5

**Section A**

1. a) What is computer programming? 1  
 b) Draw the flowchart that reads five numbers as input from the user and prints whether the numbers are odd or even (Do not use the modulus operator for this problem). 6.75  
 c) What are the general characteristics in C? 1
2. a) What is the difference between '*i++*' and '*++i*'? Explain with proper example. 1  
 b) Write a C program that will take integer as input with the following condition.  
     i. First two input there are no checks.  
     ii. From third input, it will check following conditions  
         • Program will terminate, if the input is greater than any of the preceding two taken input  
         • Program will terminate if the input is less than the difference between last two proceeding input. 7.75
3. a) There are two matrix A and B of size 5x5. Write a C program that will add A and B and store the result in A. 3  
 b) There is a two dimensional matrix M of size 50x50, each cell of the matrix contains either '0' or '1'. There is another array N of size 50. Write a C program that will sum the total number of '1' in  $i^{\text{th}}$  column of M and store in the  $i^{\text{th}}$  cell of N where  $i=1, 2, \dots, 50$ . 5.75
4. a) Define the structure of a 'for' loop. 2  
 b) Write a C program to generate the number of the following sequence:  
     -50, 48, -46, 44, -42, ..., 0  
 Write the above program using 'while' and 'for' loop. 6.75

**Section B**

5. a) What do you mean by 'function declaration' and 'function definition'? 2  
 b) What is 'recursive function'? Give an example. 2  
 c) Write a function in C that will take two integers as argument and return the largest value. 4.75
6. a) Name and describe four basic data types in C. 2  
 b) What is a character constant? How do character constants differ from numeric-type constants? Do character constants represent numerical values? 3  
 c) What is a variable? How can variables be characterized? 2  
 d) What is an operator? Describe several different types of operators that are included within the C language. 1.75
7. a) Explain 'array name is a pointer'. 2  
 b) There is an array of integers 'a' that holds 100 integers. Write a C program that will copy the content of array 'a' to another array 'b', with the condition that all the integers stored in 'a' greater than 100 will be stored in the upper part of array 'b'. 6.75
8. a) Define a structure of name 'student' that has the members: student name, roll as integer and grade as floating. 2  
 b) How many bytes are required for the above structure definition? 1  
 c) How many bytes are required if the above definition was 'union' instead of 'structure'? 1  
 d) What are the advantages of structure over array? 2  
 e) Explain 'self-referential structure' with example. 2.75