

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc. ENGINEERING LEVEL-1 TERM-II EXAMINATION'2021

DEPARTMENT : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 FULL TITLE OF PAPER : Computer Programming and Numerical Analysis
 COURSE NO. : CSE 181
 FULL MARKS : 280
 TIME : 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE question from each section. Use separate scripts for each section.

Section -A

- Q.1** (a) What is a compiler? Why is it necessary to run high level languages on a computer? 10
 (b) “The maximum file size in a 32-bit system is around 4 GB”- Explain 10
 (c) Write a brief discussion about Hard Disk, Solid State Disk, RAM and Cache. $16 \frac{2}{3}$
 (d) Demonstrate your way of documentation in programming. 10

- Q.2** (a) Evaluate $I = \int_0^5 \frac{1}{1+x} dx$ using, $23 \frac{2}{3}$
 i. Trapezoidal Rule
 ii. Simpson's 1/3 Rule
 iii. Simpson's 3/8 rule
 and compare the results with proper explanation.
 (b) For the following data, 17

x	1	2	3	4	5	6	7	8
f(x)	3010	3424	3802	4105	4472	4771	5051	5315

Compute f(x) at x= 6.5

- (c) What is meant by interpolation? Write the physical significance of interpolation. 06

- Q.3** (a) For the following data, 25

X	100	150	200	250	300	350	400
Y	10.63	13.03	15.04	16.81	18.42	19.90	21.27

- i. Use forward interpolation to find the value of Y at X=173
 ii. Use backward extrapolation to find the value of Y at X=423
 (b) Use Bisection method to find the root of $f(x) = x^3 + x^2 + x + 7 = 0$, where stopping criteria is 10^{-4} . $16 \frac{2}{3}$
 (c) Compare between forward interpolation and backward extrapolation. 05

- Q.4** (a) Explain the geometrical interpretation of Newton-Raphson method. $16 \frac{2}{3}$

- (b) Write short notes on the following: 12
 i. Bitwise Operator
 ii. Global Variable
 iii. Real Constant
 iv. User-defined Function
 (c) Solve the following expression showing all steps: 10

$$33 - 71 * \left(\frac{24}{4} + 5 \right) - 26 / (42 * \frac{2}{3})$$

- (d) Differentiate between algebraic and transcendental equations with examples. 08

Section-B

- Q.5** (a) What do you mean by pre-test and post-test loops? Describe the general forms of *for* statement, *while* statement and *do-while* statement. 15
- (b) Which of the following are invalid variable name and why? 15
- i. First.name
 - ii. m2 + m3
 - iii. Σadd
 - iv. float
 - v. doubles
 - vi. static
- (c) What do you mean by implicit and explicit type conversion? Write a program to check whether a given year is leap year or not. $16 \frac{2}{3}$
- Q.6** (a) What do you mean by modular programming? Why do we need user defined functions? $13 \frac{2}{3}$
- (b) Develop a program that takes in a 4-bit binary value as input and calculate it's 1's complement. 15
- (c) Write a program to build a basic calculator that can add, subtract, multiply and divide; using user-defined functions. 18
- Q.7** (a) Explain how an array can be initialized? $10 \frac{2}{3}$
- (b) Differentiate between $x++$ and $++x$ in a for loop using a proper programming example along with outputs. 12
- (c) Write a program to find all the unique elements and count the duplicate elements in an array. 18
- (d) Why do we need a terminating null character? 06
- Q.8** (a) Briefly discuss scope of variable and static variable with examples. $14 \frac{2}{3}$
- (b) Demonstrate with an example how address can be passed to a function. [Hints: value swapping.] 15
- (c) Write a program to find the sum of the major and minor diagonal elements of a matrix. 17

THE END

**CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-1TERM-II(19 Batch) EXAMINATION '2020**

DEPARTMENT : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 FULL TITLE OF PAPER : Computer Programming and Numerical Analysis
 COURSE NO. : CSE 181
 FULL MARKS : 280
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 Use separate script for each section.*

Section-A

- | | | |
|--------|--|------------------|
| Q.1(a) | What is machine language? How does machine language differ from high level language? | 15 |
| (b) | Write down the important features of C programming. Explain briefly. | $6\frac{2}{3}$ |
| (c) | State whether the following are variable names, give reasons for invalid ones:
3rd_row, n \$, Row 1, Column-total n1+n2. | 15 |
| (d) | Distinguish between the following:
i) Global and local variable
ii) Automated and static variable | 10 |
| Q.2(a) | Determine the each of the following expression's value if $a = 5, b = 10$ and $c = -8$ | 10 |
| | i) $a > b \&& a < c$
ii) $a < b \&& a > c$
iii) $a == c b > a$
iv) $b > 15 \&& c < 0 a > 0$
v) $(a/2.0 == 0.0 \&& b/2.0 != 0.0) c < 0.0$ | |
| (b) | Area of a triangle is given by the formula $A = \sqrt{s(s-a)(s-b)(s-c)}$ where a, b and c are sides of the triangle and $2s = a + b + c$. Write a C program to compute the area of triangle given the values of a, b and c . | $12\frac{2}{3}$ |
| (c) | State what (if anything is) wrong with each of the following output statements: | 12 |
| | i) <code>printf(%d 7.2%f, year, amount);</code>
ii) <code>printf("%-s, % C"\n, city, code);</code>
iii) <code>scanf("%f, %d'. & amount, & year);</code>
iv) <code>scanf("%c%d%ld", code, & count, Root);</code> | |
| (d) | What is the output of the following program? | 12 |
| | <pre>main() { Int m,n,p; for (m=0;m<3;m++) for (n=0;n<3;n++) for (p=0;p<3;p++) if(m+n+p==2) go to print; print: printf("%d,%d,%d",m,n,p); }</pre> | |
| Q.3(a) | Write a program to determine whether a given number is 'odd' or 'even' and print the message | 16 |
| | NUMBER IS EVEN
or
NUMBER IS ODD | |
| | i) without using else option, and
ii) with else option | |
| (b) | Admission to a professional course is subject to the following conditions: | 18 $\frac{2}{3}$ |
| | i) Marks in Mathematics $>= 60$
ii) Marks in Physics $>= 50$
iii) Marks in Chemistry $>= 40$
iv) Total in all three subjects $>= 200$ | |
| | Or total in Mathematics and Physics $>= 150$. | |
| | Given the marks in the three subjects, write a program to process the applications to list the eligible candidates. | |
| (c) | Differentiate between entry and exit controlled loop with relevant examples. | 06 |
| (d) | Make a comparison between array and structures. | 06 |

- Q.4(a)** Write down a C program that will display matrices A and B that are given below and also display matrix C where $C = A \times B$. 19 $\frac{2}{3}$

$$A = \begin{bmatrix} 1 & 2 \\ 2 & 4 \\ 1 & 0 \end{bmatrix} B = \begin{bmatrix} 1 & 2 & 4 \\ 1 & 3 & 5 \end{bmatrix}$$

- (b)** Define pointer and pointer variable. After executing the following program segment what would be the value of a, b, x and y? 12

```
int x,y,a,b;
int *p,*q,*r,*s;
x=10;
y=30;
p=&x;
q=&y;
a=*q+*p;
b=*q-*p;
r=&b;
s=&a;
x=*s;
y=*r;
```

- (c)** Write a C program to find out the solution of following series. 15
- $$1^2 + 3^2 + 5^2 + 7^2 + \dots \dots \dots \text{up to } n^2 \text{ term.}$$

Section-B

- Q.5(a)** A polynomial gives the following values: 25

x	1	3	5	7	9	11
y_x	3	14	19	21	23	28

And hence compute, y_x at $x = 8$.

- (b)** Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ using 21 $\frac{2}{3}$
- i) Simpson's 1/3 rule
 - ii) Simpson's 3/8 rule
 - iii) Weddle's rule

- Q.6(a)** State whether the following are valid variable names; Give reasons for invalid ones; 12
- HEAD-ETE, 19 Batch, Minimum, \$ sign, Int, % ETE, CUET, AUTO.
- (b)** Write a program to print a table of Sin and Cos functions for interval from 0 to 90° in the increments of 100.10° . 18
- (c)** Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to three decimal places. 16 $\frac{2}{3}$

- Q.7(a)** Suppose, A, B and C three different integer value. Now write down a C program using ifelse statement to print these numbers in descending order. 20
- (b)** Explain about dangling else problem. Why do we need a terminating null character in array? Discuss with examples. 26 $\frac{2}{3}$

- Q.8(a)** Solve the following system of equations by Jacobi-iteration method. 30

$$3x + 4y + 15z = 54.8$$

$$5x + y + 3z = 29.66$$

and

$$x + 5y - z = 2.22$$

- (b)** Using Newton-Raphson method, find the root of the equation $\sin x = 1 + x^3$. 16 $\frac{2}{3}$

THE END

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-I TERM-II EXAMINATION '2019

DEPARTMENT : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 FULL TITLE OF PAPER : Computer Programming and Numerical Analysis
 COURSE NO. : CSE-181
 FULL MARKS : 280
 TIME : 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.

Section-A

- | | | |
|--------|--|------------------|
| Q.1(a) | Why C is called general purpose language? Explain the importance of C. | 10 $\frac{2}{3}$ |
| (b) | Classify programming language. Explain most common programming language translator. | 12 |
| (c) | Which of the following are invalid variable name and why?
First.name,n1+n2, &name, float, doubles, SUM | 12 |
| (d) | Write a C program to find out whether given alphabet is vowel or not. | 12 |
| Q.2(a) | Determine the value of each of the following logical expressions if a=8, b=7 and c=-10 | 12 |
| | i) (a b) && (a && b)
ii) (b==10)&&(c== -10)
iii) (a%2==0) (b%3 == 7)
iv) (a!= 8) & & (b!=7)
v) (a>b) (b> c) | |
| (b) | What is the output of the following segment when executed? | 12 |
| | (i) int m=-14,n=3;
printf("%d\n",m%n*10);
n=-n;
Printf("%d\n",m%n*10);
(ii) for(m=0;m<3;++m)
printf("%d\n", (m%2)?m:m+2); | |
| (c) | The cost of one type of mobile service is Rs.250 plus Rs 1.25 for each call made over and above 100 calls. Write a program to read customer codes and calls made and print the bill for each customer. | 12 |
| (d) | What are the outputs of the following program: | 10 $\frac{2}{3}$ |
| | (i) int m[2];
*(m+1)=100;
*m=(m+1);
printf("%d",m[0]);
(ii) int m[]={1,2,3,4,5};
intx,y=0
for(x=0;x<5;x++)
y=y+m[x];
printf("%d",y); | |
| Q.3(a) | What is the basic difference between entry controlled and exit controlled loop?
Write a program to find the largest number among three numbers. | 16 $\frac{2}{3}$ |

- (b) An electric power distribution company charges its domestic consumers as follows:

Consumption Units	Rate of charge
0-200	Rs.0.50 Per unit
201-400	Rs.100 plus Rs 0.65 Per unit excess of 200
401-600	Rs.230 plus Rs 0.80 Per unit excess of 400
601 and above	Rs.390 plus Rs 1 Per unit excess of 600

Write a program that reads the customer number and power consumed and prints the amount to be paid by customer.

- (c) What will be output of the following program when executed?

```
int x=10,y=20;
if( (x<y)|| (x+5)>10)
printf("%d",x);
else
printf("%d",y);
```

- Q.4(a) Write a program to add the following series using for, do while and while statement.

$1+3+5+7+\dots+n$

10

- (b) Write a program that will print A and B matrices and prints $C=A+B$.

16

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 2 & 1 \\ 1 & 1 & 1 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 2 & 6 \\ 1 & 1 & 11 \end{bmatrix}$$

- (c) Write a program to find the factorial of a number using recursion function.

14

Section-B

- Q.5(a) After executing what would be the output of the following program?
Void main()

12

```
{
int x,y;
int *p,q;
x=10;y=5;
y=*p;
x=*q;
*p=10;
q=10;
print("x=%d and y=%d",x,y);
}
```

- (b) Write down the basic difference between the structured programming and object oriented programming. Define the terms: object, classes, data abstraction and encapsulation, inheritance, polymorphism

12 $\frac{2}{3}$

- (c) Write a C++ program to find the average of two numbers.

13

- (d) Which of the following statements are correct?

9

- (a) char str [4] = "GOOD";
- (b) char str[] = "C";
- (d) char str4[] = {'S', 'U', 'N'};

18

- Q.6 (a) Fit a parabola in least square sense to the following data:

X	10	12	15	23	20
Y	14	17	23	25	21

- (b) Show that at any stage the subsequent error is proportional to the square of the previous error.

18

- (c) Explain different type's error in numerical computing.

 $10\frac{2}{3}$

- Q.7 (a) Find a real root of the following equations correct to three decimal places using Bisection method $X^3 - X^2 + X - 7 = 0$

 $26\frac{2}{3}$

20

- (b) The following are the measurements of t made on a curve recorded on an oscilloscope representing a change in the conditions of electric current i.

t	1.2	2	2.5	3
i	1.36	0.58	0.34	0.20

Find the value of I at $t=1.6$

- Q.8(a) Evaluate $\int_0^{10} \frac{5dx}{2+x^2}$ by using

 $26\frac{2}{3}$

- i) Trapezoidal rule
- ii) Simpson's 3/8 rule and
- iii) Weddle's rule. Compare the results with the actual value

- (b) The following data gives corresponding values of pressure and specific volume of super heated steam.

20

V	2	4	6	8	10
P	105	42.07	25.3	16.7	13

Find the rate of change of volume with respect to pressure when $P=105$.

THE END

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-I TERM-II (17 BATCH)EXAMINATION '2018

DEPARTMENT	: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
FULL TITLE OF PAPER	: Computer Programming and Numerical Analysis
COURSE NO.	: CSE181
FULL MARKS	: 280
TIME	: 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.

Section-A

- | | | |
|--------|--|------------------|
| Q.1(a) | Define Assambly language. Explain the characteristics of C. | 11 $\frac{2}{3}$ |
| (b) | What is translator? Distinguish between compiler and interpreter. | 10 |
| (c) | Briefly explain the basic structure of C program. | 10 |
| (d) | Determine the value of each of the following logical expressions if $a=5$, $b=10$ & $c=-10$. | 15 |
| | (i) $(a \% 2 == 0) \parallel (b \% 3 == 5)$ | |
| | (ii) $(a > b) \parallel (b > c)$ | |
| | (iii) $(a == c) \parallel (b > a)$ | |
| | (iv) $(b > 15 \& \& c < 0) \parallel a > 0$ | |
| | (v) $(a > b \& \& a < c)$ | |
| Q.2(a) | Identify the errors in the following program. After corrections what output would you expect when you execute it? | 11 $\frac{2}{3}$ |
| | #define PI 3.14159 | |
| | main () | |
| | { | |
| | int R,C; | |
| | float perimeter; | |
| | float area; | |
| | C=PI | |
| | R=5; | |
| | Perimeter=2.0*C*R; | |
| | Area=C*R*R; | |
| | printf("%f", "%d", &perimeter, &area) | |
| | } | |
| (b) | Write a C program to compute the real roots of quardratic equation $ax^2+bx+c=0$ | 15 |
| | The program should request for the values of the constants a,b and c and print the values of roots using the following rules: | |
| | i) No solution; if both a and b are zero | |
| | ii) imaginary root if $b^2-4ac < 0$ | |
| | iii) Otherwise two real roots | |
| (c) | What is the basic difference between key word and identifier? Differentiate between postfix and prefix operator with an example. | 10 |
| (d) | Which of the following arithmetic expression are valid? If valid, give the value of the expression otherwise give reason | 10 |
| | i) $25/3 \% 2$ | |
| | ii) $-14 \% 3$ | |
| | iii) $21 \% (\text{int}) 4.5$ | |
| | iv) $7.5 \% 3$ | |
| Q.3(a) | State the output produced dy the following printf ststements | 11 |
| | i) $\text{Printf}(" \% 2d \% c \% 4.2f", 1234, 'x', 1.23);$ | |
| | ii) $\text{Printf}(" \% d \% d \% d", 10, 20)$ | |
| | iii) $\text{Printf}("7.2f", y) \text{ where } y=98.77$ | |

- iv) `Printf("%-10.2e", y)` where $y=58.75$
 v) `Printf("%5 s\n", 'NAME');`
- (b) Suppose A, B and C three different integer numbers. Now write down a C program using nesting ifelse statements to print those numbers in ascending order. 10
- (c) For a certain electrical circuit with an inductance L and resistance R, the damped natural frequency is given by 15

$$\text{Frequency} = \sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

It is desired to study the variation of this frequency with C (capacitance). Write a program to calculate the frequency for different values of C starting from 0.01 to 0.1 in steps of 0.01.

- (d) Describe run time initialization and compile time initialization with examples. 2

- Q.4(a) What is user defined functions? How does it differ from library function? 2
 (b) What do you mean by recursion function? Write a program by using recursion function which will be able to find factorial of a given number. 15
- (c) What is the output of the following code?

```
int x, y, a, b;
int *m, *n, *o, *p;
x=15;
y=35;
m=&x;
n=&y;
a=*n-*m;
b=*n-*m;
o=&b;
p=&a;
x=*p;
y=*o;
```

- (d) What is the output of the following program? 2

```
Main()
{
    int m[]={3, 5, 7, 9, 11}
    int x, y=0;
    for (x=0; x<15; x++)
        y=y+m[x];
    printf ("%d", y);
}
```

Section-B

- Q.5(a) Distinguish between inheritance and polymorphism of C++ using examples. Describe how they are feasible to C++ programming. 15 2
- (b) When will you make a function inline? why? How is an exception handled in C++? 18
- (c) Describe the process of the call by reference? Explain why it is advantageous and when it is used? 15
- Q.6 (a) What do mean by numerical computing? Describe the process of numerical computing. 11 2
- (b) Fit an equation of the form $y=ae^{bx}$ to the following data by the method of least squares. 15 3

X	1	2	3	4
y	1.65	2.7	4.5	7.35

- (c) Using N-R method, find a root correct to three decimal places of the following 20
 $x^3 - 3x - 5 = 0$
- Q.7 (a) Describe different types of error in numerical computing? 11 $\frac{2}{3}$
- (b) Solve the equations given in example by Gauss-Seidel iteration method. 20
 $2x+y+z=4$
 $x+2y+z=4$
 $x+y+2z=4$
- (c) The following data give I, the indicated p and v, the speed in knots developed by a ship 15

V	8	10	12	14	16
I	1000	1900	3250	5400	8950

Find I when V=9, using Newton forward interpolation formula.

- Q.8(a) The following data give the percentage of criminals for different age groups: 16 $\frac{2}{3}$

Age (less than x)	25	30	40	50
% of criminals	52	67.3	84.1	94.4

find % of criminal at the age less than 35

- (b) Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using 15
 i) Trapezoidal rule
 ii) Simp'son 1/3 rule
 iii) Simp'son 3/8 rule
 iv) Weddles rule

- (c) The following data gives corresponding values of pressure and specific volume of superheated stream. 15

V	2	4	6	8	10
P	105	42.07	25.3	16.7	13

- i) Find the rate of change of pressure with respect to volume when V=2
 ii) Find the rate of change of volume with respect to pressure when P=105

THE END

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-I SELFSTUDY (17 BATCH)EXAMINATION '2018

DEPARTMENT : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 FULL TITLE OF PAPER : Computer Programming and Numerical Analysis
 COURSE NO. : CSE181
 FULL MARKS : 280
 TIME : 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.

Section-A

- | | | |
|--------|---|------------------|
| Q.1(a) | What is machine language? How does machine language differ from high level languages? | 10 |
| (b) | Write down the importance of C? | 10 |
| (c) | What are trigraph characters? How are they useful? | 10 |
| (d) | Differentiate between interpreter and compiler? How do variables and symbolic names differ? Illustrate with examples. | 16 $\frac{2}{3}$ |
| Q.2(a) | Write a program to determine and print the sum of the following harmonic series for a given value of n: $1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n}$
The value of n should be given interactively through the terminal. | 12 $\frac{2}{3}$ |
| (b) | Identify unnecessary parentheses in the following arithmetic expressions:
(a) $((x-(y/5)+2)\%8)+25$
(b) $((x-y)*p)+q$
(c) $(m*n)+(-x/y)$
(d) $x/(3*y)$ | 12 |
| (c) | Find the output of the following program?
main ()
{
int x=100;
printf ("%d/n", 10 + x++);
printf ("%d/n", 10 + ++x);
} | 10 |
| (d) | Distinguish between the following pairs:
(a) getchar and scanf functions.
(b) %s and %c specifications for reading.
(c) %g and %f specifications for printing. | 12 |
| Q.3(a) | State what (if anything) is wrong with each of the following output statements:
i) $\text{Printf}("%d7.2%f", \text{year}, \text{amount});$
ii) $\text{Printf}("%-s%c\n", \text{city}, \text{code})$
iii) $\text{Printf}("f%d%s, \text{price}, \text{code}, \text{year});$
iv) $\text{Printf}("%c%d%f\n", \text{amount}, \text{code}, \text{year});$ | 12 |
| (b) | What is the output of the following program?
main ()
{
int m,n,p;
for (m=0; m<3; m++)
for (n=0; n<3, n++)
for (p=0; p<3; p++)
if (m+n+p==2)
go to print;
print:
$\text{printf}("%d, %d, %d", m, n, p);$
} | 9 $\frac{2}{3}$ |

- (c) Write a program to identify the lowest number among three integer number. 10
- (d) Write a program to compute the sum of digits of a given integer number using for, while, do while. 15
- Q.4(a) Which of the following initialization statements are correct? Explain the reason 10
- char str[u]= "GOOD";
 - char str[]="c";
 - char str 3[5]= "Moon";
 - char str 4[]={‘S’, ‘U’, ‘N’};
 - char str 5[10]= "Sun";
- (b) Write a program to find out the factorial of an integer number using recursive function. 15
- (c) Distinguish between (*m)[s] and *m[5] 2
3
- (d) What is the output of the following segment? 12
- ```
int m[2];
*(m+1)=100;
m=(m+1);
printf("%d", m[0]);
```

### Section-B

- Q.5(a) Differentiate between object oriented programming and structured programming. What are the special advantages of C++ over C? 12  
3
- (b) What do you mean by dynamic binding? How is it useful in OOP? 12
- (c) Describe the process of the call by reference? What is the purpose of using it in a program. 12
- (d) Define friend and virtual function. Explain the significance of friend and virtual function. 10
- Q.6 (a) Differentiate between analog and digital computing? Explain the characteristics of numerical computing. 16  
3
- (b) By the method of least squares find the curve  $y = ax + bx^2$  that best fit the following data. 15
- | x | 1   | 2   | 3   | 4    | 5    |
|---|-----|-----|-----|------|------|
| y | 1.8 | 5.1 | 8.9 | 14.1 | 19.8 |
- (c) Explain the geometrical interpretation of Newton-Raphson method. 15
- Q.7 (a) Find the root of the following equations correct to three decimal places using bisection method:  $x^4 - x - 10 = 0$  15
- (b) Solve by Gauss-Seidel iteration method the following system of equations. 16  
2  
3
- $$\begin{aligned} 28x+4y-z &= 32 \\ x+3y+10z &= 24 \\ \text{and } 2x+17y+4z &= 35 \end{aligned}$$
- (c) The amount of a substance remain in a reacting system after a interval of time t in a certain chemical experiment is tabulated below: 15

|        |      |      |      |      |
|--------|------|------|------|------|
| t(min) | 2    | 5    | 8    | 11   |
| A(gm)  | 94.8 | 87.9 | 81.3 | 75.1 |

Obtain the value of A where t=9 using Newton forward interpolation formula.

Q.8(a) Evaluate  $\int_0^5 \frac{dx}{4x+5}$  by using

- i) Trapezoidal rule,
- ii) Simpson's 1/3 rule,
- iii) Simpson's 3/8 rule, and
- iv) Weddle's rule.

Compare the results with the actual value.

(b) From the values in the table given below, find the value of  $\sec 31^\circ$  using numerical differentiation: 15

|                |        |        |        |        |
|----------------|--------|--------|--------|--------|
| $\theta^\circ$ | 31     | 32     | 33     | 34     |
| $\tan\theta$   | 0.6008 | 0.6249 | 0.6494 | 0.6745 |

(c) Explain different types of error in numerical computing?

$13\frac{2}{3}$

THE END

**CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY**  
**B.Sc. ENGINEERING LEVEL-1 TERM-I EXAMINATION '2017**

DEPARTMENT : ELECTRONICS AND TELECOMMUNICATION ENGINEERING  
 FULL TITLE OF PAPER : Computer Basics and Programming  
 COURSE NO. : CSE181  
 FULL MARKS : 210  
 TIME : 3 HOURS

*The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.*

**Section A**

- 1(a) What is machine language? How does machine language differ from high level languages? 8
- 1(b) What is mouse? Distinguish between mechanical mouse and optical mouse? 13  
 Write down the main benefits of mouse.
- 1(c) Briefly describe about the construction and important features of disk disks. 14
- 2(a) Briefly explain- how does a CD-ROM drive read the data from the surface of a compact disk? Why CD ROM drives are slow compared to hard disk drives? 13
- 2(b) Describe the working procedure of floppy disks. 10
- 2(c) Write short note on the following terms: 12  
 I. Master circuit board of computer  
 II. Real time operating system  
 III. Magnetic Ink character reader(MICR)
- 3(a) Solve the following system of equations by Jacobi iteration method: 17  

$$\begin{aligned} 3x+4y+15z &= 54.8 \\ x+12y+3z &= 39.66 \\ 10x+y-2z &= 7.74 \end{aligned}$$
- 3(b) Using Newton-Raphson method, find a root correct to three decimal places of the following equation: 18

$$\sin x = 1 - x$$

- 4(a) The amount of 'A' of a substance remaining in a reacting system after an interval of time 't' in a certain chemical experiment is tabulated below. 20

|        |      |      |      |      |
|--------|------|------|------|------|
| t(min) | 2    | 5    | 8    | 11   |
| A(gm)  | 94.8 | 87.9 | 81.3 | 75.1 |

Obtain the value of A where t=9 using Newton's forward interpolation and backward interpolation formula.

- 4(b) Evaluate  $\int_0^{10} \frac{dx}{1+x^2}$  by using 15  
 I. Trapezoidal rule  
 II. Simpson's 1/3 rule  
 III. Weddle's rule.

Compare the results with actual value.

## Section B

- 5(a) Write a C program to read a four digit integer and print the same of its digits. 10  
5(b) Write a C program to find the roots of the following equation: 18

$$e^a x^2 + (\log_{10} b)x + c^d = 0$$

Where a, b, c and d are integer values and the program should request for those integer values. If calculation gives the imaginary value than output will be 'roots are imaginary'.

- 5(c) State whether the following are valid identifiers, give reasons for invalid ones: 07  
Char, 16\_Batch, avg\_num, int-type, marks%, \$amount, doubles.
- 6(a) Write a C program to find out whether given alphabet is vowel or not 9  
6(b) Write a C program using **for** looping to find out the solution of following series: 13

$$1 + 2^2 + 3 + 4^2 + 5 + 6^2 + \dots \dots \text{ upto } n \text{ terms.}$$

- 6(c) Suppose A, B and C three different numbers. Now write down a C program using nesting if.....else statements to print those numbers in ascending order. 14
- 7(a) Write a C program to find out whether a number entered by user at output terminal is Armstrong number or not. 15  
(Hints: 153 is an Armstrong number because  $153 = 1^3 + 5^3 + 3^3$ )
- 7(b) Write a C program to display Fibonacci series up to n terms where the value of n should be requested from output terminal. (Hints: Fibonacci series: 0 1 1 2 3 5 8 13 21 ..... ) 15
- 7(c) Mention some benefits using pointers. 05
- 8(a) Write a C program that will print A and B matrices given below and calculate and prints matrix C where  $C=A \times B$  17

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 2 & 1 \\ 1 & 1 & 1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 2 \\ 2 & 2 \\ 1 & 1 \end{bmatrix}$$

- 8(b) Write a C program using subprogram function to find out whether given integer number from output terminal is prime or not. 13
- 8(c) After executing the following program segment what would be the value of x and y? 05  
int x, \*p, y;  
x=10;  
p=&x;  
y=\*p-1;  
p=&y  
x=\*p;

\*\*\*THE END\*\*\*

**CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY**  
**B.Sc ENGINEERING LEVEL-I TERM-I EXAMINATION '2016**

|                     |                                                 |
|---------------------|-------------------------------------------------|
| DEPARTMENT          | : ELECTRONICS AND TELECOMMUNICATION ENGINEERING |
| FULL TITLE OF PAPER | : Computer Basics and Programming               |
| COURSE NO.          | : CSE181                                        |
| FULL MARKS          | : 210                                           |
| TIME                | : 3 HOURS                                       |

*The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.*

**Section-A**

- |        |                                                                                                                                                                                                                                                    |    |
|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Q.1(a) | Define operating system and mention its function. Explain about single user/multitasking operating system.                                                                                                                                         | 10 |
| (b)    | Distinguish among minicomputer, microcomputer, mainframe computer and super computers.                                                                                                                                                             | 10 |
| (c)    | Describe about four basic number system.<br><br>i) Convert the hexadecimal number 129A.B86 to a binary number<br>ii) Convert the decimal number 109.78125 to a binary number<br>iii) Convert the binary number 10110110111.1001 to a octal number. | 15 |
| Q.2(a) | Briefly describe the important features of Hard disks.                                                                                                                                                                                             | 13 |
| (b)    | What are the processing devices? Describe two main components of processing devices.                                                                                                                                                               | 12 |
| (c)    | What is mouse? Make a comparison between mechanical mouse and optical mouse.                                                                                                                                                                       | 10 |
| Q.3(a) | Solve $x^3+2x^2+10x-20=0$ by Newton- Raphson method.                                                                                                                                                                                               | 17 |
| (b)    | Solve by Gauss-Seidal method, the following system of equations:                                                                                                                                                                                   | 18 |

$$\begin{aligned} 28x+4y-z &= 32 \\ x+3y+10z &= 24 \\ 2x+17y+4z &= 35 \end{aligned}$$

- |        |                                          |    |
|--------|------------------------------------------|----|
| Q.4(a) | A polynomial gives the following values: | 18 |
|--------|------------------------------------------|----|

|       |   |    |    |    |    |    |
|-------|---|----|----|----|----|----|
| $x$   | 1 | 3  | 5  | 7  | 9  | 11 |
| $y_x$ | 3 | 14 | 19 | 21 | 23 | 28 |

And hence compute,  $y_x$  at  $x=2$ .

- |     |                                                                                                                  |    |
|-----|------------------------------------------------------------------------------------------------------------------|----|
| (b) | The velocity ' $v$ ' of a particle at distance ' $s$ ' from a point on its path is given by the following table: | 17 |
|-----|------------------------------------------------------------------------------------------------------------------|----|

|           |    |    |    |    |    |    |    |
|-----------|----|----|----|----|----|----|----|
| $s(ft)$   | 0  | 10 | 20 | 30 | 40 | 50 | 60 |
| $v[ft/s]$ | 47 | 58 | 64 | 65 | 61 | 52 | 38 |

Estimate the time taken to travel 60ft using Simpson's 1/3 rule. Compare the result with Simpson's 3/8 rule.

**Section-B**

- |        |                                                                                                                                                                                                                                                                                                                                                   |    |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Q.5(a) | Briefly explain the basic structure of C program.                                                                                                                                                                                                                                                                                                 | 10 |
| (b)    | Write a C program to compute the real roots of quadratic equation $ax^2+bx+c=0$                                                                                                                                                                                                                                                                   | 17 |
|        | The program should request for the rules of the constants $a$ , $b$ , $c$ and point the rules of roots using the following rules:<br><br>i) No solution, if both $a$ and $b$ are zero.<br>ii) There is only one root, if $a=0$ ( $x=-c/b$ )<br>iii) There are no real roots, if $b^2-4ac$ is negative.<br>iv) Otherwise, there are two real roots |    |

- (c) State whether the following are valid variable names, give reasons for invalid ones. 08  
 float, batch-15, Head ETE, if, printf, CUET, 123, avg\_15.
- Q.6 (a) Determine the value of each of the following logical expressions if  $x=10$ ,  $y=5$  and  $z=40$  10  
 i)  $(x > y) \&\& (y > z)$   
 ii)  $(y > 15) \parallel (x \% 2 == 0) \&\& (z \% 8 == 5)$   
 iii)  $(x > z) \&\& (y != 5) \&\& ((x > y) \parallel z == 40)$   
 iv)  $(x == 10) \parallel ((x + y) >= 10)$   
 v)  $(x != 5) \&\& (y != 10) \&\& (x == z)$
- (b) Suppose A, B and C three different integer numbers. Now write down a C program using nesting if .....else statements to print those numbers in descending order. 13
- (c) Consider the following program segments 12
- |                      |                      |
|----------------------|----------------------|
| (i)                  | (ii)                 |
| $x = 1;$             | $x = 10;$            |
| $y = 10;$            | $y = 1;$             |
| $a = x - - ;$        | $a = x ++ ;$         |
| $b = - - y ;$        | $b = ++ y ;$         |
| $z = a + + - + + b;$ | $z = a - - + - - b;$ |
| $z - - ;$            | $z + + ;$            |
- After executing, what would be the value of x, y, a, b and z in each case.
- Q.7 (a) Write a C program using a subprogram function to give the lists of prime number in the range from 10 to 500. 17
- (b) Write a C program to calculate the standard deviation of an array of values. The array of values. The array elements should read from the terminal. Use function to calculate standard deviation and mean. 18
- Q.8(a) Make comparison between Array and Structures. 06
- (b) Define pointer and pointer variable. After executing the following program segment what would be the value of a, b, x and y. 12
- ```
int x, y, a, b ;
int *p, *q, *r, *s ;
x=10;
y=30;
p=&x ;
q=&y;
a=*q + *p;
b=*q - *p;
r = & b;
s = & a;
x= * s;
y= * r;
```
- (c) Write a C program that will take A and B matrices as input and calculates and prints a matrix that represent the multiplication of two matrices. 17

Where,

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$$

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-II SELF STUDY EXAMINATION '2015

I, T-2

DEPARTMENT : ELECTRONICS AND TELECOMMUNICATION ENGINEERING
 FULL TITLE OF PAPER : Numerical Method in Engineering
 COURSE NO. : ETE-309
 FULL MARKS : 210 *312 CSE-181*
 TIME : 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.

Section-A

- Q.1(a) With proper diagram, explain computing process. 12
 (b) Briefly explain the characteristics of numerical computing. 15
 (c) Write the advantages of digital computing over analog. 08
- Q.2(a) Mathematically explain error propagation in subtraction and multiplication. 12
 (b) Explain Blanders along with some common type. 10
 (c) Explain different types of Iterative methods with proper sketching. 13
- Q.3(a) Use the secant method to estimate the root of the equation:
 $x^2 - 4x - 10 = 0$ with the initial estimates of $x_1 = 4$ and $x_2 = 2$. 17
 (b) State the limitations of Newton-Raphson method. 06
 (c) Derive the Newton-Raphson method from Taylor series expansion. 12
- Q.4(a) Explain curve fitting. Differentiate between Interpolation and Regression. 11
 (b) Data set in the following table representing the discrete relation of oscillation frequency of a PLL with its input voltage 20

V	1	1.5	2.6	3.2	4.1	5.0
f	79	112	139	251	342	569

Develop a Transcendental equation to fit the data set. Also calculate the percentage error at point 2.6.

- (c) What is relative error?-Explain. 04

Section-B

- Q.5(a) Compute Romberg estimate R_{22} for $\int_0^2 (e^{x^2} + 1) dx$ 17
 (b) Compute the integral $\int_{-1}^1 e^x dx$ using composite trapezoidal rule for $x=2$. 05
 (c) Use Simpson's 3/8 rule to evaluate 13
 (i) $\int_{1.5}^2 (x^5 - 1) dx$ (ii) $\int_0^{3/4} \sqrt{(\sin^2 x + 1)} dx$
- Q.6 (a) Mention five real life application of differential equation 11
 (b) Use Taylor series method to solve the equation
 $y' = x^3 + 2y^2$ for $x = 0.35$ and $x = 0.52$, given $y(0) = 1$ 12

- (c) Given $y' = 3x^2 + 1$ with $y(1) = 3$, estimate $y(2)$ using $h=0.2$ by Euler's method 12
- Q.7(a) If $y'(x) = \frac{2y}{3x}$ and $y(1) = 2$, estimate $y(2)$ using Heun's method with $h=0.333$. 14
- (b) Use fourth order RK method to estimate $y(0.6)$ when $y'(x) = x^2 + y^2$ with $y(0)=0$ and $h=0.2$. 21
- Q.8(a) Derive the generalized solution of Laplace equation. 13
- (b) Consider a steel plate of size $15\text{cm} \times 15\text{cm}$. If two of the sides are held at 1000°C and other two sides are held at 0°C , What are the steady state temperature at interior points assuming grid size of $5\text{cm} \times 5\text{cm}$. Use Liebmann's Iterative method. 22

THE END

1

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-I TERM-I EXAMINATION '2014

DEPARTMENT	: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
FULL TITLE OF PAPER	: Computer Basics and Programming
COURSE NO.	: CSE181
FULL MARKS	: 210
TIME	: 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.

Section-A

- | | | |
|--------|--|----|
| Q.1(a) | What are machine languages and high level languages? Differentiate between them with examples. | 08 |
| (b) | Write short notes on: | 12 |
| | i) Main frame computer
ii) Super computer
iii) Workstations | |
| (c) | What are the four basic number systems? | 15 |
| | i) Convert the hexadecimal number 129A.B86 to a decimal number
ii) Convert the decimal number 653.625
iii) Convert the binary number 11100.1011011011 to a hexadecimal number. | |
| Q.2(a) | How a CD-ROM drive reads data from the surface of a compact disk? Why hard disk drives are faster than CD-ROMs? | 13 |
| (b) | Define "program". Explain system software and application software in detail. | 12 |
| (c) | Write short notes on | 10 |
| | i) Master circuit board of a computer
ii) Flash memory | |
| Q.3(a) | Find a real root of the following equations correct to three decimal places using Bisection method | 18 |
| | $x^3 - x^2 + x - 7 = 0$ | |
| (b) | Solve $\sin x = 1 + x^3$ using Newton-Raphson method | 17 |
| Q.4(a) | The amount 'A' of a substance remaining in a reacting system after an interval of time 't' in a certain chemical experiment is tabulated below: | 17 |

t (min)	2	5	8	11	
A (gm)	94.8	87.9	81.3	75.1	

Obtain the value of A where $t=9$ using Newton's backward interpolation formula.

- | | | |
|-----|---|----|
| (b) | Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using | 18 |
| | i) Trapezoidal rule
ii) Simpson's 3/8 rule and
iii) Weddle's rule. Compare the results with the actual value. | |

Section-B

- | | | |
|--------|--|----|
| Q.5(a) | Write a program to read a four digit integer and print the sum of its digits. | 10 |
| (b) | State whether the following are valid variable names, give reasons for invalid ones: | 07 |
| | Char, 14 batch, avg_num, int_type, 12345, ETE, \$sign. | |
| (c) | Write a C program to find the roots of the following equation: | 18 |

$$e^a x^2 + (\log_{10} b)x + c^d = 0$$

where a, b, c and d are integer values and the program should request for those integer values. If the calculation gives the imaginary value then output will be 'Roots are imaginary'.

Q.6 (a) Determine the value of each of the following logical expressions if a=5, b=10 and c= - 6 10

- i) $(a \mid b) \&\& (a \&\& b)$
- ii) $(b == 10) \&\& (c == -5)$
- iii) $(a \% 2 == 0) \mid\mid (b \% 3 == 5)$
- iv) $(a != 10) \&\& (b != 5)$
- v) $(a > b) \mid\mid (b > c)$

(b) Write a C program using subprogram function to check whether a given number from output terminal is prime or not. 15

(c) Write the general forms of for statement, while statement and do statement. 10

Q.7 (a) Write a C program to find out whether a number entered by user at output terminal is Armstrong number or not. 18

(Hints: 153 is an Armstrong number because $153 = 1^3 + 5^3 + 3^3$)

(b) Write a C program to check whether a number entered by user from output terminal is palindrome number or not. 17

(Hints: |232| is palindrome number because, if we reverse the number, we will get same number |232|)

Q.8(a) Write down a C program that will display matches A and B that are given below and also display matrix C where $C = A \times B$ 17

$$A = \begin{bmatrix} 1 & 2 & 7 \\ 5 & 4 & 8 \end{bmatrix} \text{ and } B = \begin{bmatrix} 3 & 2 \\ 6 & 4 \\ 9 & 10 \end{bmatrix}$$

(b) Write a C program to calculate average number obtained in Physics, Chemistry, Math and Economics and prints addresses of each variable used along with their values. 10

(c) After executing what would be the output of the following program? 08

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

```
void main ()
{
    int x, y;
    int *p, q;
    x = 10;
    y = 5;
    p = &x;
    q = &y;
    y = *p;
    *q = 5;
    x = *q;
    *p = 10;
    print f ("x=%d and y=%d", x, y);
}
```

THE END

CHITTAGONG UNIVERSITY OF ENGINEERING AND TECHNOLOGY
B.Sc ENGINEERING LEVEL-I TERM-I EXAMINATION '2013

DEPARTMENT	: ELECTRONICS AND TELECOMMUNICATION ENGINEERING
FULL TITLE OF PAPER	: Computer Basics and Programming
COURSE NO.	: CSE181
FULL MARKS	: 210
TIME	: 3 HOURS

The figures in the right margin indicate full marks. Answer any THREE questions from each section. Use separate script for each section.

Section-A

- | | | |
|--------|--|----|
| Q.1(a) | Define operating system and mention its function. Explain single user/ multitasking operating system. | 10 |
| (b) | Describe about the four basic number systems. | 15 |
| | i) Convert the binary number 101101101110.1000110 to a Hexadecimal number.
ii) Convert the decimal number 109.78125 to a binary number.
iii) Convert the hexadecimal number 7385.88 to a decimal number. | |
| (c) | Write short notes on
i) RAM
ii) ROM | 10 |
| Q.2(a) | Write short notes on the following terms: | 12 |
| | i) Master circuit board of computer
ii) Real-time operating system
iii) Magnetic Ink Character Reader | |
| (b) | Briefly describe about the important features of Hard-disks. | 13 |
| (c) | Differentiate between CD-ROM and DVD-ROM. | 10 |
| Q.3(a) | Find a real root of the equation $x^3 - 2x - 5 = 0$ by the method of false position correct to three decimal places. | 20 |
| (b) | Using Newton-Raphson method, find a root correct to three decimal places of the following equation | 15 |

$$\sin x = 1-x$$

- | | | |
|--------|--|----|
| Q.4(a) | The following data give I, the indicated HP and V, the speed in knots developed by slip. | 20 |
|--------|--|----|

V	8	10	12	14	16
I	1000	1900	3250	5400	8950

Find I when V= 9, using Newton's forward interpolation formula.

- | | | |
|-----|---|----|
| (b) | The velocity v of a particle distance s from a point on its path is given by following table: | 15 |
|-----|---|----|

$s \text{ (ft)}$	0	10	20	30	40	50	60
$v \text{ [ft/s]}$	47	58	64	65	61	52	38

Estimate the time taken to travel 60ft using Simpson's 1/3 rule. Compare the result with Simpson's 3/8 rule.

Section-B

- | | | |
|--------|---|----|
| Q.5(a) | State whether the following are valid variable names; give reasons for invalid ones:
Head_ETE, 13 batch, Minimum, \$ sign, Int, % ETE, CUET. | 07 |
|--------|---|----|

- (b) Write a program to print a table of sin and cos functions for the interval from 0 to 180 degrees in increments of 15 as shown below: 13

x (degrees)	sin(x)	cos(x)
0	--	--
15	--	--
--	--	--
--	--	--
180	--	--

- (c) Write a C program to compute the real roots of quadratic equation 15

$$ax^2 + bx + c = 0$$

The program should request for the values of the constants a,b and c and print the values of roots using the following rules:

- i) No solution, if both a and b are zero.
- ii) There is only one root, if $a = 0$ ($x = -c/b$)
- iii) There are no real roots, if $b^2 - 4ac$ is negative.
- iv) Otherwise, there are two real roots.

- Q.6 (a) Draw the flowchart of the selection process of the switch statement. Mention five 10 rules for switch statement.

- (b) Consider the following program segments : 10

(i)	(ii)
$m = 5;$ $n = 15;$ $a = m ++;$ $b = --n;$ $x = a + - - b;$	$m = 5;$ $n = 10;$ $a = - - m;$ $b = n ++;$ $x = ++a + - - b;$

After executing, what would be the value of m, n, a, b and x in each case.

- (c) Suppose A,B,C three different integer numbers. Now write down a C program using nesting ifelse statements to print these numbers in ascending order. 15

- Q.7 (a) Write a C program to display Fibonacci series upto n terms where the value of n should be requested from output terminal. 15

(Hints : Fibonacci series → 0 1 1 2 3 5 8 13 21.....)

- (b) Write a C program to find out the factorial of given integer number by using recursive method. 10

- (c) Mention some benefits of using pointers. 10

- Q.8(a) What is user-defined functions? How does it differ from library functions? 10

- (b) Define pointer variables? After executing the following program segment what would be the value of x and y? 07

```
int x, *p, y;
x=10;
p = & x;
y=*p;
*p=20;
```

- (c) What are the advantage of "division approach" used in programming? 08

- (d) Write a program to evaluate the ration $(a+b)/(c+d)$ and print the result. a,b,c,d are read from terminal. Use function to calculate the ratio. 10