

## Bank Question of Computer programming & Numerical Analysis

Q1):-

Write a C++ program to input the elements of the array A[4][3] by using cin then print:

- 1- Array A[4][3] after ascending of each rows.
  - 2- Array A[4][3] after multiplying each element by 2;
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Q2):-

Write a C++ Program by using Newton's Raphson method to find the point of intersection between  $f_1(x) = x \cdot \sin(x)$  and  $f_2(x) = -\cos(x)$ , make the approximated to accuracy 0.0001

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Q3):-

Write a C++ program to solve the below system of equations, using Gauss Jordan elimination method, define the values in the program itself.

$$2x_1 + 3x_2 - 5 = -x_3$$

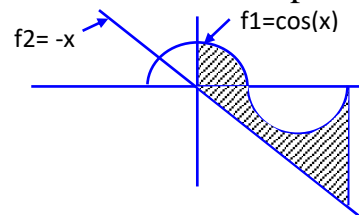
$$4x_2 + 4x_1 - 3 = 3x_3$$

$$3x_2 - x_3 - 1 = 2x_1$$

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Q4):-

Write a C++ program to calculate the shaded area as explained in figure below between 0 &  $(3/2)\pi$ , make the result approximated to accuracy 0.001, and what is the input data for the program. (Hint: for calculation of area use trapezoidal rule)



Q5):-

A- Write a C++ program using Euler method to find the value of y for the differential equation  $y' + y \cdot x = y$ ; if you know  $y(0) = 1$ , use interval = 0.05

B- Write a program using function for finding if the number is odd or even.

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Q.7

Write a C++ program to read names and marks of 8 students in 4 subjects then find the following:

- 1-The average marks for each student.
- 2-Grade for each student according to average marks.

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Q.8

Write a C++ program by using both Bisection and Newton's Raphson methods to find approximately the root of the equation  $(x \cdot \cos x - 2x^2 + 3x - 1)$  and correct to four decimal digits and if you know the root located between (1.2) and (1.3) and make output as follows:

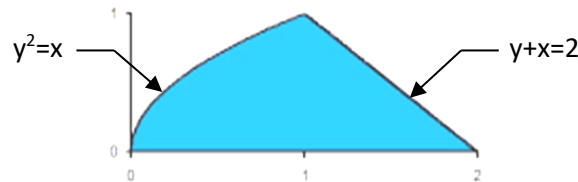
<i>k</i>	<i>x</i> -Bisection	<i>x</i> -Newton's Raphson
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Q.9

Write a C++ program by using trapezoidal rule to calculate the shaded area as explained in figure below and write the input data for the program, if you know width of strip=0.01.



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Q.10

Write a C++ **program** & **manually** to solve the below system of equations, using Gauss Jordan elimination method, define the values in the program itself.

$$2x_1 - 8x_2 + 2x_3 - 6 = 4x_3$$

$$21x_1 + 9x_2 - 15 = 15x_1 + 3x_3$$

$$x_1 + \frac{3}{4}x_2 - \frac{1}{4} = \frac{1}{2}x_3 + \frac{1}{4}x_1 - \frac{1}{2}x_2$$

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Q11

Write a C++ program to find the value of B for any value of x, y and for any number of term. Note (don't use function for finding factorial)

$$B = -\frac{(x^2 + y^3)^5}{5!} + \frac{(x^6 - y^8)^{14}}{7!} - \frac{(x^{12} + y^{13})^{25}}{9!} + \frac{(x^{20} - y^{18})^{38}}{11!} - \frac{(x^{30} + y^{23})^{53}}{13!} + \dots n \text{ term}$$

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Q12

Write a C++ program to input the elements of the array A[5][5] by using cin statement the print :

1-Maximum number in each columns.

2-Summation of the two diagonals separately.

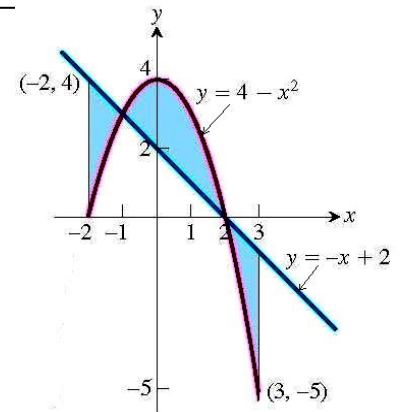
3- Array A[5][5] after multiplying each elements by 3.

Q13

Write a C++ program to find values of  $y$  for  $0 \leq x \leq 1$  by using both Euler & fourth order range kutta methods with  $h=0.25$  if  $y' = 3\sin x - 4\cos x$  and  $y(0) = -1$ .

Q14

Write a C++ program to calculate the shaded area as explained in figure and write the input data for the program, if you know width of strip = 0.001.  
(Note for calculation use midpoint rule)



Q16

Write a C++ Program that asks for the length and width of a rectangle to find its circumference and the circumference of a circle with diameter equal to the length of the rectangle, Declare function to find the difference between two circumferences, print the results as follows:

Rectangle: Width=                      , Length=

Circle:        Diameter=

Circumference of rectangle=                      Circumference of Circle=

Difference=

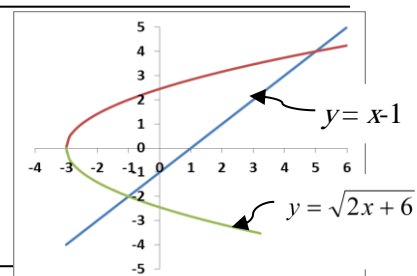
Q17

Write a C++ program to create and print the following array without input statements then find summation of the elements for each column separately.

$$A = \begin{Bmatrix} 0 & 1 & 2 & 2 & 4 & 5 & 6 \\ 0 & 1 & 6 & 9 & 12 & 5 & 6 \\ 0 & 12 & 15 & 18 & 21 & 24 & 6 \\ 20 & 23 & 26 & 29 & 32 & 35 & 38 \end{Bmatrix}$$

Q18

Write a C++ program to calculate the area between two functions as explained in figure and write the input data for the program, if you know width of strip = 0.01.  
(Note for calculation use trapezoidal rule)



Q19

Write a C++ program to find approximately where the  $f(x)=\cos(x)$  and  $f(x)=x.e^x$  intersect and take 0.001 accuracy, if you know the root located between (0) and (1), without using kmax and what is the input data for the program. (use bisection method)

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Q20

Write a C++ **program** and solve **manually** by using Runge Kutta method to find the value of y when x reach to  $(\pi/4)$ , if  $y'.\tan x - y = 1$  and  $y(\pi/6)=0.5$ , use interval 0.13 make the output to be shown on the screen and written in a TXT file and what is the input values of the program

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Q21

Use the bisection method manually to find the root of equation  $f(x) = 1 - 3x + 5x^2 - 6x^4$  if you know the root lies between (-1) and (2) make the approximated to accuracy 0.1

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Q22

Write a C++ program using Rung-Kutta method to find the value of y for the differential equation  $2xydx + (1+x^2)dy = 0$  for x between 1 and 5, if you know  $y(1)=2$ , use interval =0.05

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Q23

Write a C++ program to find the value of series B which defined as follows, for any value of x and for any number of term.

$$B = x - \frac{x^3}{4} + \frac{x^5}{7} - \frac{x^7}{10} + \frac{x^9}{13} - \frac{x^{11}}{16} \dots \dots \dots n$$

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Q24

Write a C++ program to print the following matrix without input statements

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

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Q26

Write a C++ program to input a number of days then convert the days into years then the remaining days in year's calculation convert to months and the remaining days in month calculation convert into weeks.

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Q.27

Write a C++ Program by using Runge-Kutta method to find the value of (y) at x reach to  $\pi$  for the differential equation  $y' \tan(x) - y = 1$ , if you know that  $y(\pi/6) = -0.5$ , use interval  $= 0.1$  make the output to be shown on the screen and written in a TXT file and what is the input values of the program?

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Q.28

Write a C++ program to find the value of Q for any value of x and for any number of term.

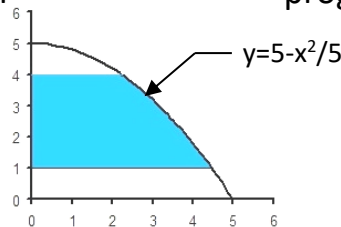
$$Q = -(x)^{1/2} - \frac{(x+3)^{1/2}}{4!} + \frac{(x-6)^{1/2}}{7!} - \frac{(x+9)^{1/2}}{10!} - \frac{(x-12)^{1/2}}{13!} + \frac{(x+15)^{1/2}}{16!} \dots \dots n \text{ term}$$

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Q.29

Write a C++ program by using midpoint rule to calculate the shaded area as explained in figure below, and write the input data for the program, if you know the width of strip equal to 0.01.



Q31

Write a C++ program to read names and marks of 6 students in 5 subjects then find the following:

- 1-Average marks for each students.
  - 2-Result of each student passes or fails.
  - 2-Grade for each student according to average marks if the student is passing in subjects.
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Q32

Write a C++ program to find the value of y from the following equations.

$$y = \left\{ \begin{array}{ll} \sin(x) - 2\tan(x) + x & , x > 12 \\ x^5 - 3x^3 + x^2 & , -2 \leq x \leq 12 \\ e^x + \frac{\tan(2x)}{3x} & , x < -2 \end{array} \right\}$$


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Q33

Write a C++ **program** & **manually** to solve the below system of equations, using Gauss Jordan elimination method, define the values in the program itself.

$$7x_1 + \frac{1}{2}x_2 + \frac{3}{2}x_3 - 6 = x_3 + 2x_1$$

$$\frac{2}{5}x_1 + 12x_2 + \frac{1}{5}x_3 = 13 + 10x_2$$

$$3x_1 + 7x_2 + 20x_3 = 21 + 5x_3 + 4x_2$$


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Q35

Write a C++ program by using the bisection method to find the root of equation  $f(x) = 3\sin(2x - 1) - 5\cos(1 - 2\sin x)$  if you know the root lies between (-1) and (2) make the approximated to accuracy 0.1 and write the input data for the program

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Q36) A- Write the output when the following program is executed, then convert **for** loop into **do while** loop:

```
for (int x = 1; x <= 20; x++ )
{ cout << x;
  if ( x % 5 == 0 ) cout << endl;
  else cout << "\t"; }
```

B- Are the following logical expression true or false? when i=1 and a=10.5, then explain it,

a).  $(i \leq 0) \ || \ (a > 12.0)$

b).  $(!(i == 0))$

c).  $((i == 0) \ \&\& \ (a > 10.0)) \ || \ (a < 9.0)$

D-What are the values of D after each of the following statements are executed assume at first f=12, b=2.

```
D=++f-b*f + f%b++;
```

```
D=f%b+ ++f/b;
```

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Q37) Write a C++ program that asks for the length and width of a rectangle to find its perimeter and area (using metric units). Print the results as follows:

Width of rectangle =

Length of rectangle=

Perimeter of Rectangle=

Area of rectangle=

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Q38)- Write a C++ program to find the value of Z for any value of y and for any number of term. Note (use function for finding factorial)

$$Z = -\sqrt{\frac{(y * 5)^{-3}}{3!}} + \sqrt{\frac{(y * 8)^{-6}}{7!}} - \sqrt{\frac{(y * 12)^{-9}}{11!}} + \sqrt{\frac{(y * 17)^{-12}}{15!}} - \sqrt{\frac{(y * 23)^{-15}}{19!}} \dots n \text{ term}$$

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Q39)- Write a C++ program to input (using cin statement) and print an array A[5][5], then:

1-Print the two diagonals of Array A.

2-Construct array B[5] from array A[5][5] where the elements are the sum of each column of array A[5][5], then print array B[5] into a file.

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Q40) A- What will be the output when the following code segment below executed?

```
int i = 8, y = 12, k = 5, n = 3;
cout << i + y * k - k % n << endl;
cout << i / n << endl;
```

B –Write single C++ statements that do the following:

1)-Input string variable x with getline function.

2)-Define civil as a constant and its value is 8;

3)- Header for using function sin.

C- What will be the output when the following code is executed.

```
int k, f=15, b=76, j=34, h=3;
k=--b/f + ++j*h++;
cout<<k<<endl<<h;
```

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Q41.)Write the output when the following code fragment is executed.

```
total =1; for (int cv=1; cv<=8; cv++) {total =total *cv;
cout<<total<<endl;}
total =total *5; cout<< total << endl;
```

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Q44.) What is displayed by the code segment below when executed ?

```
int a[10]={ 18,12,10,5,6,12,1,6,0,9};
float sum =pow( a[2],2)/a[3]; cout << sum<< endl;
```

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Q45.) What will be the output when the following code is executed?

```
int M, n=44,k=22,a=16, b=27;
M=++b+a* n/k+b++;
```

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Q46.) What is the output when the following code fragment is executed?

```
int i = 5, j = 6, k = 7, n = 3;
cout << i + j * k - k % n << endl;
cout << i / n << endl;
```

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Q47.) How many times does below loop executed? and what will print?

```
for(n=6;n<27;n+=4)
cout<< n+2<< "\\t";
```

Q48.) Convert the following mathematical formula to a C++ expression.

$$h = \frac{\sqrt{\sin x}}{x^5} + \frac{/x/}{\cos x}$$

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Q49.) Write the output when the following code fragment is executed. if the input is 4567.

```
int j, k , n, x; j=x=0; k=1 ; cin >> n;
while (n> 0){ x+=n%10*k; k*=10;
n/=10; cout<< x<< endl;}
```

---

Q50.)The following statements are wrong, re-write them in correct way;

```
a-if x>y ; count<< x+x
b-cingetline<<(civil,50);
c-# define PI=3.145;
d-int main; int x=1;y;
y=x+5; return 0;
```

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Q51.) Which of the following code fragments outputs the number 3 to the screen?

- A. cout << 1+2\*3/4 <<endl;                      B. cout <<1\*2+3/4+2<<endl;  
C. cout <<2\*(2+3)/4 <<endl;                    D.cout <<1/2\*2+3 <<endl;  
E. More than one of the above
- 

Q52.) What is the output when the following code fragment is executed?

```
int n; double x=3.8; n=(int)x; cout <<n<< endl;
```

- A. 3            B. 4            C. 8            D. this will not compile            E. none of the above
- 

Q53.) Consider the following code fragment:

```
int x=7; if (x==7/2*3) cout <<'p'; cout<<'q'; cout<<'r';
```

What does the above code print? Read carefully!

- A. pqr    B. qr    C. r    D. 'r'    E. none of the above
-



Q54.) What is the output when the following code fragment is executed?

```
int i=5, j=6, k=7, n=3;    cout <<i+j*k-k % n << endl;
cout << i / n << endl;
```

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Q55.) What is the output when the following code fragment is executed?

```
for(int i=0;i<16;i+=2) {if (i%2==0) cout <<i+6<<endl;
else if (i%3==0) continue;    else if (i%5==0) break; }
cout<<"End of program.\n";
```

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Q56.) Write format of function if and else in Microsoft Excel program?

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Q59.) What is the output when the following code fragment is executed?

```
int b[8]={17,5,12,4,6,8,22,29};
int h=pow(b[1],b[3])/++b[7]; cout<< h;
```

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Q60.) Convert the following mathematical formula to a c++ expression :

$$w = \frac{\tan x^2}{b^2} + \sin^2 2x$$

---

Q61) What will be the output when the following code is executed?

```
int z,p,x=22,y=54,w=27, r=5;z=++y/r-- + ++w/x++; p=y-- + ++r +
w%r;
cout <<z<<"\n"<<p;
```

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Q62- Describe the output from this program then convert to while loop

```
int main(){for (int j=2; j<12 ;){if (j%3==0) cout<< 2*j-1<<"\n";
else if (j%5==0) continue; else cout<<pow(j,2)-4<<"\n"; j++;}
```

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Q63- Write the output when the following code fragment is executed.

```
cout<<"\" ; // "this is a comment";
```

a) \    b) \";    c) \";    // this is a comment    d) none of the above.

---

Q64- Which of the following code fragment output the number 3 on the screen and why?

a) cout<< 1+2\*3/4<<endl;                      b) cout<< 1\*2+3/4+2<<endl;  
c) cout<< 2\*(2+3)/4<<endl;                    d) cout<< 1/2\*2+3<<endl;  
e) More than one of the above.

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Q65-Are the following logical expression true or false? when r=1 and a=10.5, then explain it.

a) (r<=0) || (a>12.0)  
b) (!(r==0))  
c) ((r==0) &&( a>10.0)) || (a<9.0))

---

Q66-Write the output when the following code fragment is executed.

```
int b=15, k=14; if (b !=12 || k!=12) { if( b<18 && k> 10) k=b++;} else  
b=k++; cout<< b<< "\n"<< k;
```

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Q69-Convert the following mathematical formula to a Microsoft excel formula (note you can take the value of x at cell G2.

$$= \frac{\tan x^2}{x^2} + \sin^2 2x$$

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Q70-The following statements are wrong, re-write them in correct way;

```
a-If n>m : count>> x+x:  
b-cingetline<<(eng.60):
```

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Q71) What will be the output when the following code is executed?

```
int a[5]; a[4]=3; for(int i=3;i>=0;i--)  
{a[i]=2*a[i+1]-i; cout <<a[i]<<"\t";}
```

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Q72) What will be the output when the following code is executed?

```
int x=18; do {if(x%2==0) x=x%5; else x=x/2; cout<<x<<"+";}  
while(x>0);
```

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Q73) Rewrite the if-else below as a switch statement. Here x is a variable of type int.

```
if(x==2) cout<<"x is 2"; else if(x==3||x==4)cout<<"x is 3 or 4";  
else cout<<"Civil";
```

Q74) What will be the output when the following code is executed if the input is 4102?

```
int i, power, n, x; i=x=0; power=1; cin>>n;  
while(n>0){x+=n%10*power; power*=10; n/=10;  
cout <<x<<endl;}
```

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Q75)Describe the output from this program then convert to while loop.

```
int main(){for (int i=0; i<=15 ;){if (i%4==0) cout<< 4*i-1<<"\n";  
else if (i%5==0) continue; else cout<<pow(i,2)+2*i<<"\n"; i++;}
```

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Q76)The following are wrong, re-write in correct way.

```
a- If (g>h>k) cout <g< \----- < "k<< end;  
b- If (sqrt=0 cout < d"=0/n"  
c # (includ)iostream
```

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Q78)Convert the following mathematical formula to a Microsoft excel formula (note you can take the value of x at cell b4.

$$\text{if } x > 5 \text{ } y = \frac{\tan x^2}{x^2} + \sin^2 2x \text{ else } y = 10$$

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Q79) Write single C++ Statement that do the following:

- a- Header for extracting numbers from string contents.
  - b) Header for read data from file.
  - c) Input String variable y with getline function.
  - d) Use eng as a constant and its value is 15.
  - e) Header for using function logarithm.
- 

Q80) What are the values of H after each of the following statements are executed

assume at first j=5, i=15

H= ++j - i\*j + i%j++;

H= i%j + ++i/j;